



# European Security & Defence

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**COUNTRY FOCUS: MALAYSIA**

## Unmanned Maritime Systems



### Game Changer for EU Defence?

25 member states established the "Permanent Structured Cooperation" (PESCO).



### Spain: Increasing Funds for Defence

Seven new programmes are to be scheduled for the next 15 years.





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# The Balkans Are Losing Their Illusions



At the beginning of the year, Bulgaria took over the presidency of the European Council. The six months in which a Member State exercises this honorary position, before passing on the baton to the next capital city, are too short for course-setting. Certainly, at least for a moment, the President of the Council can put issues that are important to him on the agenda. One issue that Bulgaria would like to highlight is the question of the prospects of accession to the EU for the countries of the Western Balkans that are not yet members of the European Union. In mid-May, representatives of the governments of the countries concerned will be discussing what the answer might look like with their colleagues from the EU, at a summit in Sofia.

Regardless of this initiative of Bulgaria presiding the Council, the European Commission has already made its own observations, and published these on 6 February under the fulsome title “A credible enlargement perspective for an enhanced EU engagement with the Western Balkans”. The document can be seen as a kind of compensatory gesture. Commission President Jean-Claude Juncker had caused resentment with comments that there would be no new members during his term of office. Some people read from this a fundamental rejection of an extension of the EU to include countries of the Western Balkans. This was just a misunderstanding, though one of many that Juncker has conjured up by casual remarks and brash initiatives. In fact, he probably only wanted to express what anyone who knows the lengthy accession procedure and can do a few calculations could have found out for himself. Juncker’s term of office ends in 2019, and nothing will be completed by that time which has not even begun in earnest. What is more, even during the term of office of the next Commission it is unlikely that at least Serbia and Montenegro, with which Brussels is already negotiating accession, will be ready to join, though. Nothing will be done before 2025.

The paper published by the Commission is supposed to concern a “new Balkan

strategy”. If this were true, the authors would have performed a particularly great service by giving the term a new content. So far, it has been assumed that a strategy indicates how a goal should be achieved. However, this document offers only vague hints. Instead, it lists once again what requirements applicants must fulfil in order for them to be awarded the honour of EU membership and in what political and economic fields they can hope for assistance. To attest patronisingly to the six addressees of the Western Balkans where they have already made progress, and to reproach them like a schoolmaster regarding where they still have to make an effort, may perhaps be meant as constructive assistance. However, based on the assumption of international law that states communicate at eye level, it is an affront, especially as there are also EU members that do not fulfil some of the cited eligibility criteria. After all, the “Strategy Paper” is so sincere that it does not conceal from the Balkan states that even if they have done their “homework,” they will not automatically receive their entry ticket to the EU. The EU must, in fact, come to terms with itself before it can pay attention to outsiders: “The EU itself needs to ensure that it will be institutionally ready to welcome new Member States once they have met the conditions set. The Union must be stronger and more solid, before it can be bigger.” What is given out as a strategy thus turns out to be a declaration of surrender.

Should this actually be all that the EU has to offer, the view will prevail in the Western Balkans that the “European perspective” was merely an illusion from which they should bow out. Surveys indicate that a corresponding shift in sentiment among the public is already underway. Alternatives are available. Russia and Turkey are evoking their historical ties with the region. China is enticing with the offer of considerable and swift investment in infrastructure. In Brussels, the competition is disdainfully taken note of. The EU would not have to fear the competitors if it had stood by its promises.

**Peter Bossdorf**

## Country Focus: Malaysia

Photo: Dzirhan Mahadzir



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Photo: MoD Poland

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## Littoral Defence Capabilities



Photo: US Navy

The US Navy's LCS programme is moving ahead.

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## New Beam from the Rising Sun



Photo: Georg Mader

Japan's new C-2 transport aircraft attracted attention at last December's Dubai Airshow.

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## ■ Jet-Powered Drone

(ck) BAE Systems and the University of Manchester have successfully tested MAGMA, a small-scale unmanned aerial vehicle (UAV). The jet-powered MAGMA uses a blown-air system to manoeuvre the aircraft, which is intended to make the aircraft stealthier.

Photo: BAE Systems



The aircraft concept removes mechanical moving parts used to move flaps to control the aircraft during flight. The engineers believe this could reduce weight and maintenance costs, allowing for lighter, stealthier, faster and more efficient military and civil aircraft in the future. The two technologies to be trialled first with MAGMA are wing circulation control which takes air from the aircraft engine and blows it supersonically through the trailing edge of the wing to provide control for the aircraft, and fluidic thrust vectoring, which uses blown air to deflect the exhaust, allowing the direction of the aircraft to be changed. Clyde Warsop, engineer at BAE Systems, says: "The technologies we are developing with the University of Manchester will make it possible to design cheaper, higher performance, next generation aircraft."

## ■ Rotary-Wing Drone for Naval Surface Combatants

(ck) The French DGA (Direction Générale de l'Armement) wants Naval Group and Airbus Helicopters to develop a helicopter drone for warships. In a first step, Naval Group and Airbus Helicopters are to identify, deploy and test the technologies necessary for the integration of a tactical drone-system capability with a heavily armed naval vessel. The demonstrator project will encompass trials of the drone launch system, mission system and airborne vehicle

Photo: Airbus Helicopters



conducted from a French Navy vessel. It is part of the preparation of the SDAM (Navy Airborne Drone System), the entry into

service of which is foreseen in the middle of the next decade on the new Intermediate-Sized Frigates (FTIs) and other French Navy ships. The study will help to select the principal technologies for the SDAM and to identify technical risks necessary for initiating and completing the programme. The level of technological maturity sought is that of a demonstrator of the complete system in a representative environment. Naval Group started work on naval aerial drones in 2005. Based on the CABRI G2 light civilian helicopter, the VSR700 drone system developed by Airbus Helicopters has a weight of 700 kg. The VSR700 can exceed ten flight hours with a payload of up to 150 kg. The system will benefit from all the know-how in terms of automated flight control (the guarantee of a unique automatic deck-landing capacity in rough seas), autonomous navigation systems, secure data links, the integration of sensors such as radar and optronic systems, the management of complex mission systems and the certification of military aircraft. The aerial vehicle has low maintenance requirements and strong synergies with the ships' existing logistical footprint, thus limiting support and operation costs, while its compact size makes it compatible with the simultaneous use of an on-board helicopter on different surface ships.

## ■ Demand for Paradigm's SWARM VSAT

(ck) The rugged and lightweight multiband SWARM VSAT terminal from Paradigm has met with considerable demand. UK-based company Paradigm provides satel-



Photo: Paradigm

lite communication and control solutions, and the easy-to-use, high-speed SWARM packs into one case or backpack which is compliant as airline hand luggage and it can be set up in under 90 seconds. Commercially agile, it is configurable for Ka, Mil-Ka, Ku and X-Band frequencies and is operational on a multitude of satellite constellations. In conversation, Ulf Sandberg, MD of Paradigm, noted that customers have been impressed with the portability and the ease-of-use of SWARM.

## ■ Aimpoint Red Dot Sights for Finnish Army

(ck) The NATO Support and Procurement Agency (NSPA) has awarded Aimpoint a contract to supply the Finnish Defence

Photo: Aimpoint



Forces with Aimpoint's MICRO T-2 red dot sights including transportation bags for €5.5M. The red dot sights will be delivered by the end of 2018. "The MICRO T-2 is an extremely reliable sight and we know that the operators currently using that sight are very pleased," says Lennart Ljungfelt, President of Aimpoint AB. The MICRO T-2 sights have been in operation with several armies for many years. Currently, more than 1,500,000 Aimpoint sights are already in use with military forces around the world. The weight is just over 100 grammes, and it comes with an operational life on a single battery of up to 50,000 hours or 5 years in permanent use.

## ■ Aimpoint Sights for the Swedish Army

(ck) Following an international tender, the Swedish Defence Materiel Administration (FMV) has awarded a contract Aimpoint deliver CompM5 and MPS3 red dot sights for the Swedish Army. The contract has a value in excess of SEK20M (€2M). Aimpoint's CompM5 sight is the company's latest red dot sight, and is in operation with the US State Department. It is a user-friendly and rugged sight that relies on a single AAA battery to provide a 'constant on' of up to 5 years. The Swedish Army chose the Aimpoint sights because of their ability to obtain an accurate target acquisition in any type of light condition, ability to function in all types of weather conditions and long operational life on a single battery.

Photo: Aimpoint





## ■ The World's Fastest OPV

(ck) BMT has completed sea trials for the first of two 48m patrol boats destined for the Qatar Coastguard. Partnering with ARES Shipyard, the duo have built 17 patrol boats from advanced composites in 36 months – 18 months ahead of schedule. The last in the series, the ARES 150 HERCULES, has just completed sea trials with the vessel achieving a maximum speed of 37 knots. The total order from the Qatar Ministry of Interior, Coastguard has comprised of three different vessel sizes: five of 24 metres, 10 of 34 metres and two of 48 metres. BMT has been responsible for hull development, class level design and engineering work on all three vessel sizes. John Bonafoux, Managing Di-



Photo: BMT

rector of BMT comments: "ARES 150 HERCULES represents a high-quality patrol boat with fantastic seakeeping ability, minimum noise levels and high manoeuvrability." Kerim Kalafatoğlu, Chairman and Executive Director at ARES Shipyard says: "These boats break two important records – firstly, they have become the largest composite hull military ship to have ever been built in Turkey and secondly, with its speed of 37 nautical miles an hour, it is the world's fastest off-shore patrol vessel."

## ■ Damen to Deliver Patrol Vessels for the South African Navy

(ck) Armscor, the procurement agency for the South African Department of Defence,

contracted Damen Shipyards Cape Town (DSCT) to deliver three 62 x 11 metres Inshore Patrol Vessels (IPV). The vessels form part of the South African Navy's Project Biron; South Africa wants to increase maritime security to respond to maritime threats such as illegal trafficking and fishing. The IPVs will be the first vessels of a Damen SEA AXE design to operate in South Africa. The SEA AXE is a hull design which offers exceptional seakeeping characteristics; the straight-edged, axe-shaped bow cuts through the water, minimising slamming for improved safety and comfort on board and reduced fuel consumption. DSCT plans to provide support for the Government's Enterprise Supplier Development programme by sourcing components and services for the project from South Africa-based suppliers. "DSCT is about the development of an entire shipbuilding and related industries," said Chairman Sam Montsi.

## ■ German Army to Buy FN Herstal's Fire Control Unit

(ck) In the scope of the "Infanterist der Zukunft - Erweitertes System" (IdZ-ES) programme the German Army has selected FN



Photo: FN Herstal

Herstal's FCU Mk3 Fire Control Unit. The FCU Mk3 Fire Control Unit makes target engagement fast and accurate and increases the hit probability of the 40 mm grenade system, taking a number of factors into account: the distance to the target, slope

angle, temperature, grenade type, cant and drift effect and automatically indicates the correct point of aim to the user. This is helpful when faced with stress situations in defence or security operations. Additionally, the FCU Mk3 comes with several laser safety features for an enhanced training capability.


## ■ UAE to Buy SEEKERs from Denel

(ck) The United Arab Emirates has ordered R182M (€12.4M) worth of SEEKER unmanned aerial vehicles (UAVs) from Denel



Photo: Denel

Dynamics. The UAE is an existing customer for the SEEKER, having deployed the aircraft to Afghanistan and to Yemen; one was shot down in 2015. The SEEKER II evolved from the SEEKER I with a better range, improved ground control, and additional payload, such as electronic surveillance systems. The SEEKER II has been sold to Algeria and the UAE. The further improved SEEKER 200 features a multi-sensor payload combining EO/IR, laser designator and laser rangefinder as well as enhancements to the ground station, mission control unit and tactical ground station. The SEEKER 200 operates at ranges of up to 250 km from base and has an endurance of up to ten hours with a 40 kg payload. Denel's larger SEEKER 400 can be used for a wide range of missions, including maritime surveillance and disaster reconnaissance. It has up to 16 hours




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endurance at altitudes up to 18,000 feet. At typical operating altitudes of between 4,500 and 9,000 feet, it is not visible from the ground and is effectively inaudible. The UAV's line-of-sight range is 250 km from its ground station. It can carry two sensor payloads (weighing a combined 100 kg) at the same time, such as an optronic sensor turret and a synthetic aperture radar, and can be armed with IMPI-S missiles manufactured by Denel Dynamics. The SEEKER 400 has been ordered by South Africa.

## ■ HENSOLDT Missile Approach Warners for Belgian F-16

(ck) HENSOLDT will equip Belgian Air Force F-16 fighters with its AN/AAR-60 (V) 2 MILDSF missile warning system integrated into Terma's PIDS+ weapon pylon (Pylon Integrated Dispensing System). With this contract the majority of the European F-16 operator countries (Denmark, Norway, The Netherlands and now Belgium) are relying on the MILDSF to protect their F-16s. The AN/AAR-60 (V) 2 MILDSF (= Missile Launch Detection System, Fighter) is a passive imaging sensor detecting the UV radiation signature of approaching missiles. The system allows flexible installation in either pylons, pods or in the fuselage. MILDSF enhances the protection against anti-aircraft missiles such as shoulder-fired infrared-guided missiles, which are hard to detect with current warning systems. The AN/AAR-60 (V)



Image: HENSOLDT

2 MILDSF is using key components of the MILDS AN/AAR-60 missile warner, which is in global use on helicopters and transport aircraft, including TIGER, NH90, CH-53, CH-47 and C-130.

## ■ PrecISR Airborne Surveillance Radar

(ck) HENSOLDT is developing an airborne multi-mission surveillance radar which will provide armed forces and border protection authorities with a tool for surveillance of large sea and coastal areas against piracy, trafficking or illicit intrusion. The software-defined radar named PrecISR is a scaleable sensor which can be installed aboard helicopters, UAVs and fixed-wing aircraft. Be-



Image: HENSOLDT

cause of its software-defined radar modes and electronic beam steering, PrecISR can detect, track and classify thousands of objects at the same time. Its compact design makes the airborne integration of PrecISR relatively easy. PrecISR is in the full-scale development phase; a demonstrator is expected in about one year's time.

## ■ Improvements for Iveco's LAV

(ck) Iveco Defence Vehicles handed over the last of four tranches of 62 Light Armoured



Photo: Iveco

Vehicles (LAV) to the Norwegian Armed Forces, which has operated the vehicle in missions abroad. The fourth generation LAV features several improvements, such as a new driveline, which offers a higher performance, more payload and a new air filtration system. The layout of the crew cell has been redesigned to improve crew ergonomics and incorporates new seats, a new dashboard and an upgraded hardtop – all measures to increase the internal volume. More than 4,000 Iveco LAVs have been sold to 13 European countries.

## ■ DRAGON SHIELD for Finland

(ck) After completing flight tests, Lockheed Martin's DRAGON SHIELD airborne surveillance system developed for the Finnish Defence Forces has achieved final operational capability. Lockheed Martin tailors palletised systems that can be rolled on and off the aircraft to match customer's sensor requirements and airframe needs. For Finland, Lockheed Martin's team modified an Airbus CASA C-295 cargo aircraft to accommodate a containerised surveillance system that rolls on and off the aircraft. The system has an open, modular architecture that enables upgrades to be added.

Lockheed Martin also provided the Finnish Defence Forces with ground stations and communications terminals to support the airborne system. "We worked with Finnish industry to maximise industry participation to ensure that the system can be maintained in-country," said Dr. Rob Smith, Vice President of C4ISR Systems for Lockheed Martin.

## ■ MTU Turbines for the CH-53K Helicopter

The US Marine Corps contracted GE Aviation to build 22 T408-GE-400s engines and provide support for the engine. The T408 engine will power the US Marine

Photo: MTU Aero Engines



Corps' CH-53K heavy-lift helicopter. The contract is valued at US\$144M. MTU Aero Engines is responsible for the production of the power turbine for the T408 engine and has a work share of 18 percent in the engine programme. MTU Aero Engines is manufacturing the three-stage power turbine producing 7,378-rated shaft horsepower plus the exhaust casing and output shaft. Its three T408 engines give the CH-53K helicopter the power to carry a 27,000-pound load over a radius of 110 nautical miles, tripling the external load-carrying capacity of the service's current CH-53E SUPER STALLION helicopter. The US Marine Corps expects its first squadron of CH-53K helicopters to reach initial operational capability by 2019.

## ■ Frigate NORMANDIE Floated

(ck) Naval Group just floated the FREMM multi-mission frigate NORMANDIE. The NORMANDIE is the eighth frigate built

Photo: Naval Group





in Lorient and the sixth in the series ordered by OCCAR (Organisation for Joint Armament Cooperation) on behalf of the French Defence Procurement Agency (DGA) to be delivered to the French Navy before the end of 2019. In autumn NORMANDIE will leave the dry dock to undergo sea trials before delivery to the French Navy in summer 2019. Heavily armed, the FREMM frigates deploy the HERAKLES multifunction radar, the naval cruise missile (MdCN), the ASTER and EX-OCET MM 40 missiles and the MU 90 torpedoes. The overall length is 142 metres and width 20 metres. The frigates have a displacement of 6,000 tonnes with a max. speed of 27 knots. At a speed of 15 knots, the frigates have a range of 6,000 nautical miles.

### ■ Nexter and Texelis to Build 4x4 VBMR

(ck) The French Procurement Agency DGA contracted Nexter and Texelis to supply the Lightweight Multi-Role Armoured Vehicles (VBMR Véhicules Blindés Multi-Rôles) to the French Army. The 4x4 vehicles are intended for the Army's intelligence and reconnaissance units as part of the SCORPION programme. With their multi-role capability, they are equipped with the SCORPION information and communication systems (SICS)



Photo: Nexter

and come in several variants: troop transport, command post, artillery fire control, engineering, ambulance, and ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance). Nexter will be responsible for design, integration, production and support. Texelis, a French specialist in heavy vehicle power trains, will supply the mobility equipment. Stéphane Mayer, Nexter's CEO commented, "With this contract Nexter is reinforcing its presence within the SCORPION programme and strengthening its position as the reference player in the field of land armament."

### ■ Airborne Situational Awareness Using Manned Airships

(sb) Future effective airborne situational awareness (SA) requires an increasing diversity of sensors be flown on a range of platforms – with each evolving to meet new challenges, changing operational environments, and increasingly sophisticated adversaries.

To that end, security and defence or-

Photos: Airships Arabia



ganisations worldwide are now enhancing traditional SA sensors with additional complementary sensors such as wide-area motion imagery (WAMI) systems. The powerful WAMI systems can continuously image and monitor a city-sized area as well record and archive the imagery for use by forensic analysts – all in real time. Using the WAMI data, analysts can easily uncover previously hidden relationships between people, vehicles, places, and events of interest.

Logos Technologies has been developing and deploying WAMI sensors for over 20 years –advancing the sensor designs and real-time image processing to improve the systems' capabilities. At the same time, the company has been reducing the size, weight, and power (SWaP) of its WAMI systems, adapting them to a growing range of platforms, including planes, helicopters, unmanned systems, and lighter-than-air (LTA) vehicles.

When flying on an LTA aerostat at just 3,000 feet AGL, the Logos Kestrel Block II WAMI sensor system can image an area well over 100 square kilometres, day and night, in medium resolution. The WAMI system can also cue, when necessary, high-resolution FMV cam-

eras to conduct detailed inspections. As a result of this complementary SA capability, Logos WAMI sensors have become an integral component of the US Department of Defense's and other countries' airborne SA suites.

However, the evolution of SA technology is not just limited to sensors. Platform selection is key, too, which is why Logos Technologies, Skyship Services, Inc., and Airships Arabia DWC-LLC are collaborating on a project to mount a WAMI sensor on a manned Skyship airship. This WAMI-equipped airship would then be available for testing and demonstration in the United Arab Emirates later this year.

The aim of this project is to take advantage of the slow speed of the airship, providing the flexibility to gradually move the 100 square kilometre area of imagery coverage as the mission evolves over time.

Skyship airships have a long history in the surveillance community. They have been used, for example, to help secure the Los Angeles, Atlanta, and Athens Olympics. They were employed in a British military surveillance programme from the 1990s, as well as several other longer-term surveillance tasks in the Caribbean, the United States, and Asia.



With a payload capacity of some 1,500 kg (3,300 lbs), a surveillance mission endurance in excess of 12 hours, and the ability to carry operators, analysts, and observers onboard in unpressurised, quiet comfort, while sending data back to a ground operations centre, these unique platforms will enhance the potential for WAMI sensors to cover even wider areas.

All three companies hope that this project will lead to new offerings to their existing clients, as well as opening up new opportunities to provide cost-effective persistent SA capabilities to new clients.

## ■ New Multi-Role Aircraft

(ck) The South African defence and aerospace company Paramount will ramp up production at its new factory north of Preto-

Photo: Paramount



ria where the Advanced High Performance and Reconnaissance Light Aircraft (AHRLAC) and its military variant, the MWARI, are assembled. The AHRLAC can be equipped with mission systems to convert the aircraft into the military version MWARI. It is designed for hybrid ISR and CAS missions that air forces are increasingly called upon to perform. One of the AHRLAC/MWARI's key features is an Interchangeable Multi-Mission Pod System (IMPS) under the aircraft's cockpit. The interchangeable pod allows a single airframe to be used in multiple roles with nearly zero down time between role changes. The pod can carry various systems ranging from ELINT, COMINT, SAR, FLIR through to cargo.

## ■ MRZR X Connected Lightweight Vehicle

(ck) Polaris developed a multi-mode, connected off-road vehicle called MRZR X which is a robotics-capable multi-mission platform. As military forces worldwide look to lighten the warfighter's load, there is growing demand for networked vehicles in the multi-domain battlefield in the coming years. The MRZR X has the typical Po-

Photo: Polaris



laris mission profile, plus it has additional robotic and networked capabilities; it provides warfighters with a modular support platform and various modes of operation: traditional operator driving and multiple

levels of autonomy, including the capability for remote control, teleoperation, leader-follower and full autonomy. This allows to use the MRZR X in varying roles, such as robotic equipment mule, autonomous resupply, warfighter-driven squad carrier, logistics support vehicle, rescue missions and high-speed casualty evacuation. In the future, the connectivity of the MRZR X will provide the ability to act as a networked node in the multi-domain battle space.

## ■ Latvia to Buy SPIKE Missiles

(ck) The Latvian MoD contracted EuroSpike GmbH to deliver a number of SPIKE missiles. The contract has a volume of €108M. The SPIKE family consists of 4th and 5th generation electro-optical missiles, providing high precision and high lethality against various targets, including

Photo: Rafael



advanced MBTs. The SPIKE system was developed by the Israeli company Rafael, which is also involved in the deal as a subcontractor through EuroSpike, a joint venture with Diehl Defence and Rheinmetall Defence. SPIKE is in operational use in over 29 countries. Over 29,000 missiles have been supplied. Approximately 5,000 SPIKE missiles have been fired in combat and in training. SPIKE has been integrated with more than 40 platforms, aerial, vehicular and naval.

## ■ US Navy and US Marines to Buy Rheinmetall Ammunition

(ck) Rheinmetall Defence received two orders from the US Armed Forces: The US Marine Corps ordered day and night-capable 40mm x 46 practice cartridges for around US\$3M (€2.5M). These cartridges are produced by American Rheinmetall Munitions, Inc. (ARM) in Camden, Arkansas, a subsidiary of Rheinmetall Defence, Germany. Deliveries started in December 2017. Additionally, the US Navy will procure advanced flash-bang grenades from Rheinmetall, now type-classified by the US Government as the MK 24 MOD 0, for a total of US\$3.8M (€3.2M). Delivery will take place in 2018 through

Photo: Rheinmetall



ARM, although these non-lethal diversionary devices will be produced at the Rheinmetall plant in Trittenau, Germany.

## ■ Submersibles for Combat Divers

(ck) ROTINOR DPD is a compact hand-steered submersible to enable combat-divers to travel long distances with less time exposed to open water. The ROTINOR DPD can be steered down to a depth of 60 metres, making it suitable for all kinds of underwater missions. Steering and diving manoeuvres are carried out by shifting the weight of the body. Virtually silent, the electric jetstream system works on the principle of water displacement. Water is sucked in by a rotating impeller and forced out in the jet channel under high pressure. The thrust propels the ROTINOR DPD forward. Speed is

Photo: Rotinor



controlled by 10 levels, enabling the operator to alternate individually between slow or high speed. The hydrodynamic design of the ROTINOR DPD provides agility in the water. The harness system enables the operator to control the enormous thrust of over 70 kg. The ROTINOR DPD can be launched from a number of platforms, such as OTB, RHIB, submarine and parachute drop. ROTINOR is an official NATO supplier; over 25 nations currently use the ROTINOR DPD.



## ■ New MEDEVAC Stretchers for Dornier 228

(ck) RUAG Aviation has secured modern MEDEVAC stretcher kits from GVH Aerospace. The AEROSTRETCHER Mk IV received approval by the European Aviation Safety Agency (EASA). The installation of the new stretchers to replace the former, now defunct, stretchers in the Dornier 228 is offered by RUAG under exclusive contract. RUAG is the original equipment manufacturer (OEM) of the Dornier 228 and promises to ensure optimum performance capabilities for this and other supplementary aircraft equipment. The new stretchers feature a modular design for flexibility in all situations: MEDEVAC teams are able to transport their patients securely throughout their mission, including transfers to and from the aircraft, thus avoiding disruptions in care conditions; easy stretcher fastening and unfastening within the cabin promotes speed of care and reduces workload; and a multi-fit floor interface system adapts to varying cabin configurations for better responsiveness to passenger and mission needs.

## ■ Secure Doors from Technocover

(ck) Ultimately, the effectiveness of any security asset will depend on the last line of defence between the determined assailant and a critical installation. This is why companies like Technocover design high-security entry systems with tested resistance to deter and mitigate the risk of unauthorised entry and attack. Technocover is a producer of above-ground, below-ground and building-hardening security solutions

for physical protection and site security. Typically, Technocover equipment is used to protect critical assets like water, gas and electricity distribution, telecommunications, energy, laboratories, banking, and



Photo: Technocover

government sites. At the trade fair SCTX 2018, Technocover will be showcasing its range of LPCB-certified doors with security ratings SR2, SR3, SR4 and SR5 and with certified entry and exit controls.

## ■ Spain and Germany to Buy Thales Rockets

(ck) The Spanish Army Aviation and the German Armed Forces who have been involved in different UN-peacekeeping missions and



Photo: Thales

are currently deployed in Mali with TIGER helicopters, are increasing their capabilities with Thales' rockets. The Spanish Logistic

Support Command of the Army and the German Procurement Agency have just awarded Thales a contract for a batch of 1,000 and 10,000 70 mm rockets respectively for their TIGER HAD-E and their UH TIGER. Deliveries are expected shortly. Produced by Thales in Belgium (Herstal), the 70 mm rockets offer a high level of efficiency on both helicopters and combat fixed wing aircraft. In the scope of the German contract, Thales is to meet the increased demand for training of the German Armed Forces. The rocket will feature a modified FZ90 MOD.4 rocket motor with reduced debris. The Spanish Army Aviation requires high mobility and firepower for assault operations. All forces operating TIGER helicopters – Spain, France, Germany and Australia – have introduced 70 mm rockets from Thales.

## ■ Ukrainian Cruise Missile

(ck) Ukraine tested a domestically-produced cruise missile capable of hitting land and sea targets from land, National Security and Defence Council Secretary Oleksandr Turchynov said. Turchynov did not reveal the range of the missile, the first wholly made in Ukraine to be tested, but said it was in line with international agreements. Ukraine is battling Russian-backed separatists in eastern Ukraine in a conflict that erupted after Russia's annexation of Crimea in 2014. Kiev has committed to spending 5% of GDP on defence. "Successful flight tests of the new missile system, namely of a land-launched cruise missile, were carried out. Flight performance and performance of all systems of this new Ukrainian weapon system were checked during the tests," Turchynov said.

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# PESCO: Current State and Future Perspectives

**Giulia Tilenni**

**Ten years after the Lisbon Treaty entered into force, 25 EU member states established the PErmanent Structured COoperation (PESCO), arguably the biggest legal framework innovation within the CSDP.**

The PESCO regulatory framework aims to advance defence cooperation among subgroups of member states; articles 42.6 and 46 of the Treaty on European Union (TEU) allow individual member states to bind themselves to a higher level of defence cooperation than the EU as a whole. As a precondition, member states

programmes) as well as the ability to deploy combat units and support logistics in accordance with pre-defined criteria. For about a decade now, PESCO has been regarded as the “Sleeping Beauty” of the Common Defence and Security Policy (CSDP). The adoption of the Lisbon Treaty represented a profound change in the ar-

PESCO was officially established in December 2017 after the Council unanimously agreed. To date, 25 EU countries have decided to participate in PESCO: Austria, Belgium, Bulgaria, Czech Republic, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain and Sweden. As Denmark has opted out from participation in CSDP projects, Malta and Great Britain are the only two countries that do not take part in PESCO.

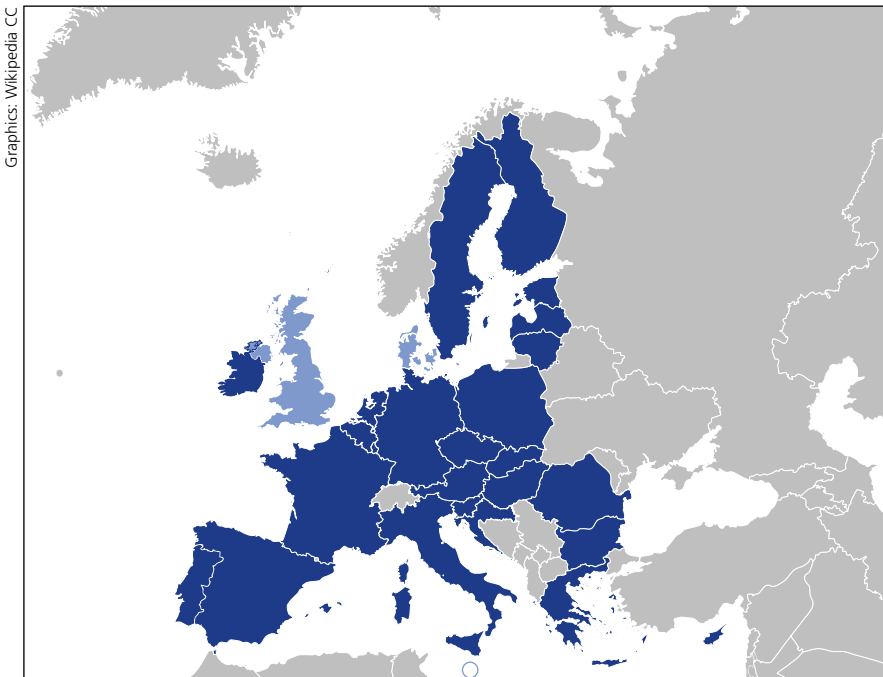
## Steps towards PESCO: Why and How?

Although the impact of PESCO on EU defence in general is likely to be limited (see below), its establishment represents an important step towards further EU defence integration. So far, the conclusions of the EU Council have repeatedly referred to the idea of giving “new impetus” to EU defence cooperation.

The declarations have not been followed up by concrete measures for about a decade or so. However, the year 2016 marked a turning point in the EU member states’ position on defence cooperation. There are at least two driving factors for PESCO: the EU Global Strategy (EUGS) and its follow-up and Brexit.

## The EUGS

Although an EU strategy was already in place (2003, revised in 2008), EU defence integration remained limited due to a lack of political will. However, the increased uncertainty and unpredictability at global level and the negative impact on EU security (especially terrorism) have heightened awareness of the importance of a more coherent EU on security and defence issues. High Representative Mogherini has therefore tried to capitalise on the growing attention by launching a new security strategy based on some simple, yet crucial assumptions: The EU countries can no longer protect their citizens and their interests individually. However, a stronger EU at international level has the potential to resolve this issue. If the EU is to be a credible international ac-



**PESCO member states (dark blue; light blue: other EU members)**

willing to participate in PESCO must already be involved in some defence cooperation within the EU framework. In accordance with Protocol 10 annexed to the EU Treaty, this includes common defence capabilities (national economic and military contributions to multinational operations, participation in EU defence research and equipment

architecture of the CSDP, as it contained a number of CSDP-related articles. PESCO is one of the most interesting CSDP instruments introduced by the 2007 reform, as it allows groups of member states to advance their defence cooperation in the Council without a veto.

However, PESCO remained on paper for ten years. It was not until the Bratislava Summit in September 2016 that the possibility of using PESCO to intensify defence cooperation was recalled.

Thanks to an unprecedented effort made by the EU High Representative, Mogherini,

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tor, it must pursue an independent foreign policy agenda, including the ability to use military instruments when necessary. In summary, it can be said that deepened defence cooperation is seen as a *sine qua non* in order to protect the interests of the

of one of the two militarily most powerful countries in Europe and one of the two nuclear powers. Therefore, if the EU considers the military element to be a key factor in its foreign policy, it would have to press ahead with cooperation in order to “balance”

AS) and the EU Military Staff will provide their support as point of contact for PESCO. They will also assess the projects’ compliance with their operational needs. The European Defence Agency (EDA) will provide support to the High Representa-



**On 13 November 2017, 23 EU member states signed the joint notification of intention for the establishment of PESCO.**

member states on the one hand and to revive the EU’s international role on the other. Since then, member states have agreed on a number of actions to be taken for EUGS’ implementation. In fact, PESCO is part of a more ambitious and comprehensive defence package which consists of:

- a Coordinated Annual Review of Defence, to assess member states’ defence capabilities and monitor the evolution of their national defence plans;
- a European Defence Action Plan, to sustain common investments through different economic measures: strengthen the Single Market for Defence; enhance SMEs’ investments; finance innovative technologies (research window) and the joint purchase of materiel (capability window).
- reframed CSDP structures and procedures, to make civilian and military missions faster and more efficient.

Brexit Britain was one of the first sponsors of the EU security and defence policy (Saint Malo agreement, 1998). London has, however, repeatedly blocked the further integration of defence within the EU because London believes that NATO is the only institution responsible for the defence of the EU. Britain has preferred bilateral agreements on defence over EU cooperation. At the political level, Brexit is likely to be an opportunity as Britain can no longer veto further defence integration. Finally, PESCO was founded. This notwithstanding, Brexit creates a factual capability gap in Europe’s balance of forces. Britain out of the EU means the loss

Brexit – a challenging ambition in times of budgets constraints, especially considering that member states have heterogeneous military capabilities. PESCO could help EU countries to improve defence efficiency, for example by reducing the number of different assets of the same type.

### Structure and Governance

So far, member states taking part in PESCO agreed on its general principles – more details on procedural rules for individual projects and cooperation with third parties will follow in the coming months. PESCO will have a two-layered structure consisting of the Council and project levels. The Council is responsible for general policy-making and decision-making. Resolutions will be adopted unanimously, with the exception of those concerning suspension of membership or new memberships (qualified majority). Each project is managed exclusively by the participating countries (the project level) in accordance with the general project management rules of the Council, which is responsible for the unity, consistency and effectiveness of PESCO. As PESCO is part of the CSDP, the institutions/agencies involved in EU defence policy will also play a role in PESCO. The High Representative will be involved in PESCO proceedings and will annually report to the Council about PESCO implementation and the participants’ commitment to projects. The European External Action Service (EE-

tive for reporting activities, and will be in charge of avoiding unnecessary duplication with other initiatives, thus facilitating capability development projects. As already mentioned, PESCO is part of a broader cooperation in the defence domain, enshrined within the so-called Defence package. Thus, PESCO will be closely connected to the other package provisions. In particular, PESCO will include capability projects identified according to CARD priorities, and eligible projects could become European Defence Fund recipients. Funds could cover up to 20% of the costs for capability projects, and up to 30% for prototypes. Participating states will be main contributors to PESCO projects, but these could also receive contributions from the EU general budget in accordance with the Treaties and the EU instruments.

### Priorities and Projects

In general terms, PESCO participants commit themselves to:

- increase the level of defence expenditures for investments in capability projects (up to 20% of total defence spending, collective benchmark) and defence research and technology (up to 2% of total defence spending, collective benchmark).
- Harmonise their defence apparatus (especially requirement harmonisation), and evaluate the joint use of existing capability as an instrument for resources optimisation.



- Enhance forces availability, interoperability, flexibility and deployability, for example by introducing dedicated tools (especially force database to keep track of available forces, fast track political commitment at the national level).
- Use collaborative EU projects as instrument to fill capability shortfalls, strengthen the European Defence Technological and Industrial Base (EDTIB) and increase the EU's strategic autonomy.
- Take part in at least one PESCO project identified as strategically relevant and concerning capabilities' development or supplying.

To make PESCO more efficient, participation is developed through a number of projects including at least two participants. Countries can choose between the participant and the observer status. To date, PESCO participants agreed on 17 projects, focusing on enablers (6), training (2), Cyber (2), maritime environment (3), land environment (4).

## Enablers

This category includes the projects aimed at developing joint capabilities in different sectors: medical support (European Medical Command, EMC), radio communications (European Secure Software defined Radio, ESSOR), logistics (network of logistic hubs in Europe and support to operations), military mobility, energy (Energy Operational Function), command and control (Strategic Command and Control for CSDP Missions and Operations).

The German-led Military Mobility Project is the most successful in terms of participants (22, with France as observer). It aims at standardising and simplifying military cross-board transport procedures to enhance EU military forces' speed of movement across Europe. The project will focus on reducing both legal (especially bureaucracy, passport checks) and infrastructure (especially bridges and roads) obstacles to personnel and assets movements.

The ESSOR (France, 6 participants, 2 observers) project is likely the most ambitious in terms of military impact. ESSOR provides a secure military communication system through the development and adoption of common radio technologies, thus raising EU strategic independence in this domain.

## Training

The two PESCO training projects seek the creation of two centres, the European Union Training Mission Competence Centre (EU TMCC) and the European Training Certification Centre for European Armies. The

EU TMCC (a German-led project involving 12 participants and 2 observers) is expected to provide personnel/trainers with specific skills, thus ameliorating availability and interoperability across participating countries. Training will be made more rapid and efficient thanks to higher situational awareness about available personnel and training needs.

## Cyber

Projects concerning the cyber domain aim at reinforcing member states' capabilities in terms of cyber risk mitigation (Cyber Threats and Incident Response Information Sharing Platform) and cyber resilience/collective response in case of incident (Assistance in Cyber Security and Cyber Response Teams, CRRT).

## Maritime Environment

The three projects dedicated to the maritime environment focus on enhancing maritime security in national and international waters. The Harbour Maritime Surveillance and Protection (HARMSPRO) proposes the integration of maritime sensors, software and platforms in one system to ameliorate security and safety of maritime traffic and support. The upgrade of maritime surveillance is more focused on land, maritime and aerial systems' integration and a better information exchange. The Maritime (semi-)Autonomous Systems for Mine Countermeasures (MAS MCM) aim at developing a mix of (semi-)autonomous underwater, surface and aerial technologies for maritime mine countermeasures.

## Land Environment

Two projects promote the development of a military force package; the others promote common capabilities. One package focuses on emergencies management within the EU or abroad (Deployable Military Disaster Relief Package, DMDRP), the other on crisis management (Crisis Response Operation Core, EUFOR CROC). The two capability projects aim at developing a mobile precision artillery platform (Indirect fire support – Euroartillery) and of an Armoured Infantry Fighting Vehicle/Amphibious Assault Vehicle/ Light Armoured Vehicle.

## A Preliminary Assessment of PESCO's Impact on CSDP

PESCO is still under development but it is already possible to draw some conclusions about its domestic (CSPD) and international (EU-NATO) impact at the political and military level.

# The Mission-Ready Ram Air Parachute Chosen by the United States Marine Corps



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### Impact on CSDP

| CSDP           | Political | Military |
|----------------|-----------|----------|
| General level  | Green     | Red      |
| Projects level | Green     | Orange   |

Green: positive impact. Orange: limited impact.  
Red: no impact

PESCO will likely have a positive impact on CSDP at the political level. EU members have finally decided to reach a higher level of defence cooperation through binding measures. This means that they now consider cooperation as a viable solution to face defence and security threats. If member states will maintain their commitment, PESCO will probably give the EU defence the impetus it has always demanded, but never achieved. PESCO projects could represent a potential “revolution” in European thinking of defence, as they are concrete steps towards integration, something that has been missing so far. Furthermore, other projects will likely be added in the months ahead. In general, the use of PESCO tools might trigger further integration in the defence sector.

Conversely, PESCO will likely have a limited impact on military integration overall. As repeatedly remarked by the High Representative Mogherini, PESCO does not intend to establish an EU army. Rather, it is an instrument to enhance security within and outside the EU. To make an example, PESCO participants commit themselves to make available formations, but this commitment “does neither cover a readiness force, a standing force nor a stand by force.”

Furthermore, PESCO might be far too inclusive to have a real impact on overall military capacity. Inclusiveness has been a disputed point between Germany and France. Berlin wanted a broader PESCO in order to develop more EU defence capabilities to be used for external missions (mainly civilian). Paris would have preferred a smaller number of participants and a deeper impact on EU defence. The French idea was to use PESCO projects to build some EU military capabilities and gain strategic independence, especially from the US.

In addition, as member states participate on a voluntary basis, a change of government in one or more EU countries (a likely scenario if we consider the number of political elections in 2018) could have a negative impact on PESCO implementation.

Although PESCO projects are still on paper, it is already possible to draw some conclusions by looking at their structure and goals. The majority of them will undoubtedly ameliorate EU capabilities in the defence domain but their impact on



Photo: VK Group

**NATO's new headquarter in Brussels. There are fears that PESCO might rival NATO.**

EU military capabilities will be limited. One notable exception could come from the ESSOR project which, in fact, is a France-led one, and mirrors the French idea of PESCO.

### Impact on the EU-NATO Relationship

| EU-NATO        | Political | Military |
|----------------|-----------|----------|
| General level  | Red       | Orange   |
| Projects level | Orange    | Green    |

Green: positive impact. Orange: limited impact.  
Red: no impact

As PESCO is not a first step towards an EU army, its impact on the EU-NATO relationship will likely be limited in political terms. The High Representative Mogherini has reaffirmed PESCO will not rival NATO for what concerns EU defence. Rather, being a credible military actor will help the EU to pursue its own international agenda. This could transform the EU into a NATO competitor in the long term, but only if the EU establishes a stronger foreign policy agenda and develops its military capabilities accordingly (especially more ambitious and military-focused PESCO projects). For the time being, this scenario is unlikely.

However, PESCO could potentially have an impact on EU-NATO relations, particularly as regards the EU's contribution to NATO. According to the PESCO factsheet, “military capacities developed within PESCO remain in the hands of member states, which can also make them available in other contexts such as NATO or the UN.” As the political priorities of NATO and the EU could diverge, capability programmes can vary accordingly. This means that countries that are members of the EU and NATO may in the medium and long term have to choose the political agenda they want to follow and plan

their economic and military contributions accordingly.

From the NATO point of view, PESCO is an opportunity to reinforce the Alliance, rather than a danger to its stability. In fact, a stronger EU defence means that EU countries could provide NATO with new capabilities by sharing burdens within the alliance. PESCO will therefore ameliorate complementarity, rather than promoting competition. Military mobility is the most compelling project in this sense, as NATO will be the primary recipient of its implementation. The Alliance faces several difficulties in assets/personnel movements within the EU, especially for the lack of adequate infrastructures. Increased mobility will enable EU countries to better serve NATO missions and improve mobility of US personnel and assets within the EU. Other projects, such as the establishment of an EU medical command and a network of logistics hubs, might also serve NATO missions.

### Conclusion

PESCO could be a potential game changer for EU defence. However, its current goals and projects do not ameliorate EU defence capabilities. Consequently, PESCO has a high political impact, but a limited military one.

From a NATO perspective, PESCO serves the Alliance's agenda, as its limited military impact keeps EU countries dependent on NATO capabilities.

The fact that PESCO is very inclusive and that PESCO projects are aimed at strengthening the EU's strategic independence shows that EU members are divided in terms of foreign and defence priorities. EU member states could reverse this trend by making new PESCO projects more ambitious and military-oriented. ■



# Viewpoint from Ankara



**Cengizhan Çatal**

## Operation Olive Branch: Dangerous and Courageous Steps in Turkey's Syrian Chess Game

Turkey's Operation Euphrates Shield in 2016 not only ended the presence of ISIS on the Syrian-Turkish border but also created a buffer zone between two autonomous Kurdish regions Kobani and Afrin which in turn prevented the Kurds of Syria to create a corridor along the Turkish border. Turkey sees the Democratic Union Party (PYD) as a terrorist organisation affiliated with the PKK.

When the US sided with Kurdish militias to fight the terrorist organisation ISIS, PYD / PKK occupied a large area in Northern Syria. Backed by extensive US land and air support PYD seized almost a quarter of the entire country. The main goal of the Kurds' expansion was to reach the Mediterranean Sea in an attempt to establish statehood and to seek direct support from the world. Since July 2012, when the Assad regime abandoned the city of Afrin to ISIS without a fight, the city turned into a major hideout for PYD/PKK. At some point, PYD's military structures around Afrin began to threaten Turkey's border provinces. Up until now, Afrin has been one of the PKK's strategic centres for both ideological education and military training. PKK militants received weapons and explosives training in the camps around Afrin and then staged attacks against Turkey.

Ignoring Turkey's unease, the US sees the Kurds as an effective ally in its fight against ISIS. But there are fears in Ankara that sophisticated weaponry handed to the PKK will someday be used against Turkey.

Relations between the two NATO allies deteriorated after the US decided to arm the YPG. The US announcement to set up a new security force of 30,000 men made Ankara angry, and a US\$500M weapons aid announcement to the YPG caused a major fall-out between the two countries.

Faced with these developments, Turkey launched the Operation Olive Branch; its main objective is to destroy PKK's strategic moves. With Operation Olive Branch Turkey wants to demonstrate its military prowess at a time when the US decided to establish a new border protection force which would include YPG militias. The operation's first goal is to minimise YPG's presence to the West of the Euphrates River. Officially, it is being said that the operation, which is named after the olive trees in the Afrin region, intends to bring peace and stability to the region.

Turkey will go very far to reach its objectives. At this point we can safely say that, in addition to the challenges at the military, technical and operational levels, Ankara's strategic objectives will also

face serious geopolitical challenges in the short and medium term. During Operation Euphrates Shield, Turkey was taught a military lesson on the tactical and strategic level. But now Turkey faces an entirely different challenge; this is the least we can say when it comes to Afrin region. Ankara emphasises that Turkey's enemies are about to establish a "corridor of terror" around Turkey, and that the Turkish Army would only target terrorists and spend "utmost care" to avoid civilian casualties. But it is easy to predict that PKK will shore up its defence in a region where its social base is strong. PKK will be unable to defend its territorial gains in rural areas which is why it will take its main defence to the settlements and thus take the conflict to the urban areas in Afrin. This, in turn, could prolong the duration of the operations and cause the diplomatic table to turn against Turkey. In any case, Turkey's Operation Olive Branch has opened a new page in the Syrian civil war and will redefine friend and foe. There are certainly many risks for Turkey but there are also political risks for the US as well. The US needs to ponder how far it wants to go without jeopardising its relations with Turkey which is quite a tightrope act. Ankara wants the Western countries to leave their armchairs and show themselves as friends or enemies like black and white. Ankara expects its allies, in particular the EU member states, to fully support Operation Olive Branch.

On the other hand, Russia as another major power broker in the region welcomes the Afrin operation as an opportunistic chance to deepen the Turkish-American rift. Russia is no threat to Turkey as both countries are determined to protect their mutual relations. Without Russian support the Turkish land operations in Northern Syria will fail to suppress the terrorists. At any rate, Russia's air force controls almost all of Syria's airspace; it is impossible to conduct operations in Syria without direct or indirect involvement of Russia. Turkish officials are well aware of this, and it is therefore unlikely that Turkish military operations will threaten the Russian army. Turkey and Russia will certainly find a consensus even when faced with a complicated diplomatic crisis.

Operation Olive Branch is not the first and will not be the last conflict in the troubled Middle East for many years to come. Ankara also sees that major players like Russia, China, and the US are no longer masking their interest in the region. Ankara believes that larger military threats might emerge in the near future. This is the perspective from which one needs to look at Ankara's latest strategies and steps – from defence industry to economy.

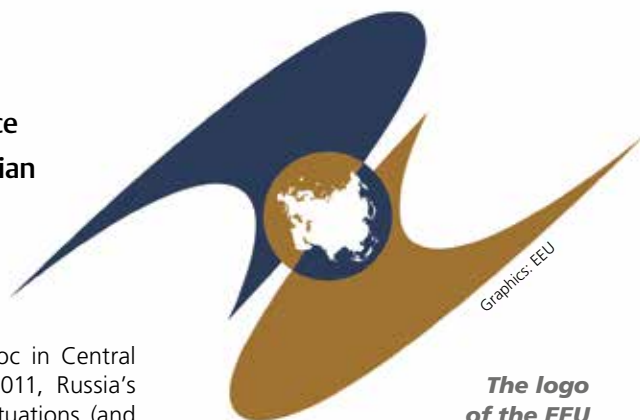
# What Is the Future for the Eurasian Economic Union?

**Stephen Blank**

The Eurasian Economic Union (EEU) has been the centrepiece of Vladimir Putin's foreign policy since he regained the Russian presidency in 2012.

The EEU's primary purpose is to promote the economic-political integration of the former Soviet republics around Russia. In addition, the EEU, as it emerged from the preceding customs union of Russia, Belarus, and Kazakhstan,

may have also been envisaged as a model for recasting a Russian-led bloc in Central and Eastern Europe. In 2011, Russia's Minister for Emergency Situations (and now Defence Minister) Sergey Shoigu



*The EEU in geographic terms*



*The SCO has far more influence than the EEU*

## Author

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stated that the customs union would also include Montenegro and Serbia. That clearly has not occurred. And Moscow's efforts to compel Ukraine into abandoning an Association Agreement with the EU in 2013 and join the EEU backfired, triggering the Maidan Revolution of 2013-14 and, subsequently, the Russian invasion of Ukraine. So, Ukraine is clearly lost to the EEU. But, as many observers have noted, without Ukraine it remains an incomplete project at best. An integration entity comprising Russia, Belarus,

Armenia, Kazakhstan, Kyrgyzstan and potentially Tajikistan faces serious obstacles in maximising economic-political gains for all of its members.

## Russia's Secondary Role

As originally conceived, the EEU was also intended to enable Russia to compete with China and its already-visible tendencies in 2011-12 towards fashioning an economic bloc around it as well as the EU. But, today, it is clear that Moscow is failing to



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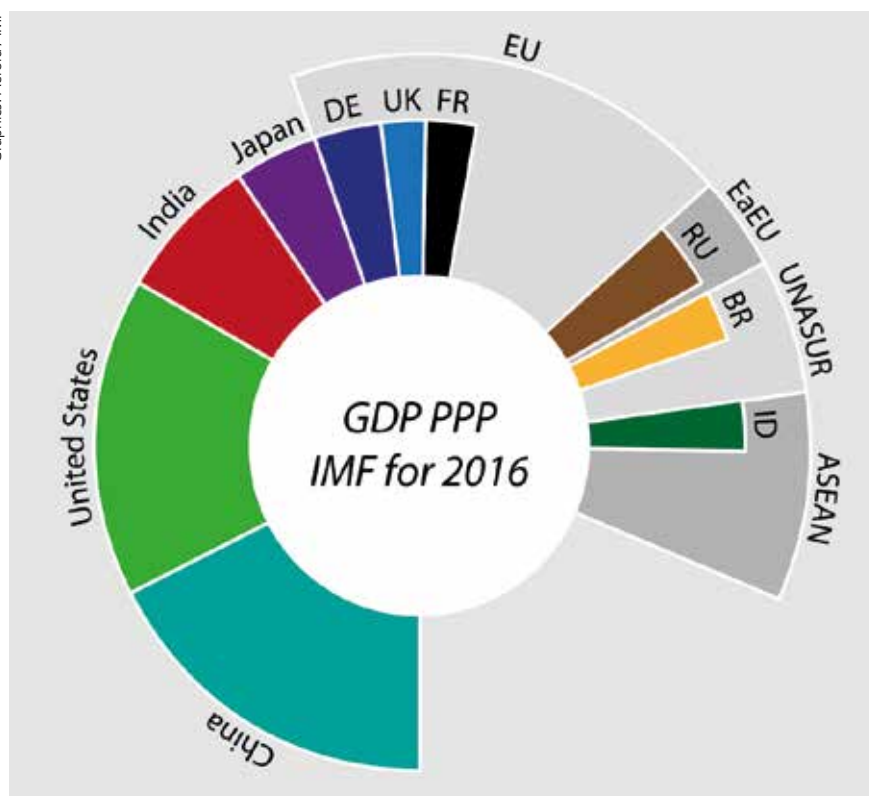
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compete with either of these trade blocs and will play only a secondary role in Asia. Furthermore, the EEU is riven with internal fissures that undermine its potential from within. It is well known that a customs bloc's main purpose is to increase trade among its members while penalising or limiting external trade through the preferential tariffs enjoyed by members within the bloc for their goods as opposed to the tariffs placed on non-bloc goods. Thus, in the EEU's case, it clearly aimed to expand Russian trade in Central Asian markets like Kyrgyzstan at the expense of cheap Chinese imports that were flooding those markets. But Russia cannot compete with Chinese investment in Central Asia and thus China's Belt and Road Initiative (BRI) will likely steamroller Russian economic ambitions, including a North-South trading network comprising Russia, Central Asia, the Caucasus, Iran, and India. Though Russia continues to make efforts to build this corridor and strengthen its presence in Central Asian economics, the realities of its own economy and of China's seemingly bottomless pit of capital for investment all but make the outcome a foregone conclusion.

Graphics: Aeroid / IMF



**A comparative look at the trading blocs' GDP in 2016.**

## Competing with China

For example, while Russia, China and four Central Asian states are discussing a free trade agreement for Central Asia, that long-standing idea has gone nowhere due to Sino-Russian divisions on the subject. In any case, the idea cannot abrogate Russia's exclusion from other proposed Asian trade blocs, namely the Chinese proposed Regional Comprehensive Economic Pact (RCEP) or the now stillborn American proposal for a Trans-Pacific Protocol TPP. Indeed Putin suggested as much in his UNGA speech in September 2015, when he attacked the creation of regional economic blocs that exclude Russia. However, he then added that Russia not only supports integrating the EEU with China's BRI, but that it also wants to integrate the EEU with the EU. This acceptance of integrating with the BRI despite earlier resentment of the proposal, which clearly confirmed Russia's regional economic inferiority, is acknowledgement of both China's dominance of Central Asian external trade and investment and the fact that Moscow must now accommodate itself to Beijing. This is because Moscow hitherto opposed this idea lest it engender Chinese domination of Central Asia. Indeed, the Russian President's representative to the SCO (Shanghai Cooperation Organisation), Ambassador Kirill Barskii, stated: "With regard to the

SCO's regional economic cooperation.... we will not consider it in the future. Integration of the Eurasian region should be that of forming a customs alliance/union under the leadership of the Eurasian Economic Union, which is currently being formed, and which could have cooperative relations with the SCO."

So Russia had and still has no alternative to Chinese dominance here. Consequently, writers who extol the BRI as a geo-economic and geopolitical benefit to Russia almost explicitly accept Chinese dominance in Eurasian economics, an outcome that inevitably entails the distasteful advent of Chinese political hegemony as well. Therefore, Russia still advocates Central Asian or Eurasian trade zones as cardinal points of its integrationist rhetoric, since Moscow also wants to forge a link up of the EEU with the ASEAN since it cannot effectuate this connection unilaterally.

## A Costly Empire

Furthermore, the EEU as Moscow's own regional economic bloc faces formidable economic and political challenges. The current crisis with Belarus underscores its lack of political cohesiveness and Russia's politically unbalanced and dominant role. Moreover, Russia's declining economy has dragged down all of Central Asia with it, while the EEU also represents an effort to exclude Chinese trade from Central Asia

and force local consumers to pay more for inferior Russian goods. Third, the EEU cannot compete with the BRI and has had to accept subordination to it. Fourth, the EEU cannot compete with or substitute for the RCEP or TPP. Fifth, recent Russian studies show that Russia actually benefits very little from the EEU, and instead it must subsidise some of the poorer EEU members. Therefore, the EEU is largely a geopolitical not a geo-economic project, and (barring major reform) will have relatively little economic utility for Moscow. Lastly, despite major Kazakh efforts to slash its prices, Kazakhstan's exports to other members have fallen steadily and by a great deal since 2015, suggesting that the EEU also offers little to Kazakhstan. Indeed, the EEU now faces great difficulties, because the devaluation of the rouble since 2014 has forced further devaluations across Central Asia and trade rows among its members that clearly have not benefitted them. The EEU has therefore not retrieved Russia's economic or political positions in either Central Asia or Asia. Indeed, members' share in Russia's trade only grew by 0.5% from 2010-2016 while the dollar value fell from US\$64Bn to US\$39Bn. Therefore, the EEU cannot be an engine of genuine geo-economic, let alone geopolitical, integration around Russia which itself increasingly depends on Chinese investment and support. Nonetheless, Putin advanced just such proposals in 2015 and 2017 as a means of overcom-



ing the economic crisis and the political isolation imposed upon Russia due to its aggression in Ukraine. But these remain tired proposals. Despite the emphasis on transportation infrastructure investment from 2001–2011, the actual share of investments in transport and infrastructure remained about 2.5% of GDP, not the targeted 4%. There have been plans to invest US\$43Bn in a Europe–Asia Transport Corridor through China and Europe, where Russia plays a profitable but not directing role as a medium for intercontinental trade. Many such projects have been announced and failed since 1991. Neither can Russia catch the wind from China's sails, as Putin said in 2012.

Typifying Russia's enforced official optimism, several Russian writers now argue that the BRI is either fundamentally different from Russia's integration efforts in the former Soviet Union or that these projects are complementary. But the evidence suggests a third alternative, namely that China is utterly self-interested and relentlessly subordinates Russian interests to its own goals, as well as being driven by a more genuine market logic that respects economic realities. In 2014, Chinese investors announced interest in a high-speed Moscow-Kazan railway that would go to Beijing. Yet, while the original MoU envisaged passing through Siberia, later on it was revealed that the line would go instead from Kazakhstan's capital Astana through Xinjiang, bypassing Russia and cutting travel time by two-thirds. And this is supposed to be a "model project of Russo-Chinese cooperation". Other options for Sino-European trade bypass Russia altogether, going through Central Asia and the Caucasus. But since maritime intercontinental trade where Russia is absent remains vastly cheaper than overland trade, land routes account for less than 1% of total cargo between China and Europe.

### Does the EEU Fail?

When Putin first publicised the idea of the EEU in 2011, Russian analysts argued that it represented Moscow's realisation that it had to strengthen its position in the world in the dialogue with the EU and China; today, it is clear that the EEU is failing. This is not merely the author's observation. A recent report for the prestigious US Council on Foreign Relations stated that, "Though there has been progress on integration, the EEU remains largely a collection of bilateral and often subsidised trading relationships rather than an integrated economic space. Indeed, rather than helping bolster Russia's own

economic weakness, it drains Moscow's limited resources, and Russia's recession and Western sanctions further cloud its prospects. Moscow's ability to provide soft loans to its neighbours has been constricted by its own loss of access to Western finance as well as by the recent economic downturn. The sharp depreciation of the rouble during the Ukraine crisis forced Kazakhstan to devalue the tenge, which meant significant losses for its firms and citizens. Finally, Russia's weak growth prospects have aggravated its deteriorating relationship with Belarus." And the EEU's problems do not end here. Recently, tensions flared between Kazakhstan and Kyrgyzstan after outgoing

Kyrgyz president Atambayev accused Kazakhstan of interfering with the elections to succeed him. But those tensions quickly came to embrace issues of trade and customs growing out of the two countries' membership in the EEU. Replying to Atambayev's charges, Kazakhstan began tightening border controls, thereby undermining Kyrgyzstan's trade with its partners. As a result, relations of all sorts between the two neighbours have quickly deteriorated and Atambayev complained on 15 November 2017 that Kyrgyzstan "has been cut off the [sic] Eurasian Economic Union at the whim of Kazakhstan's leadership." The shocking speed with which this dispute degenerated into a real trade

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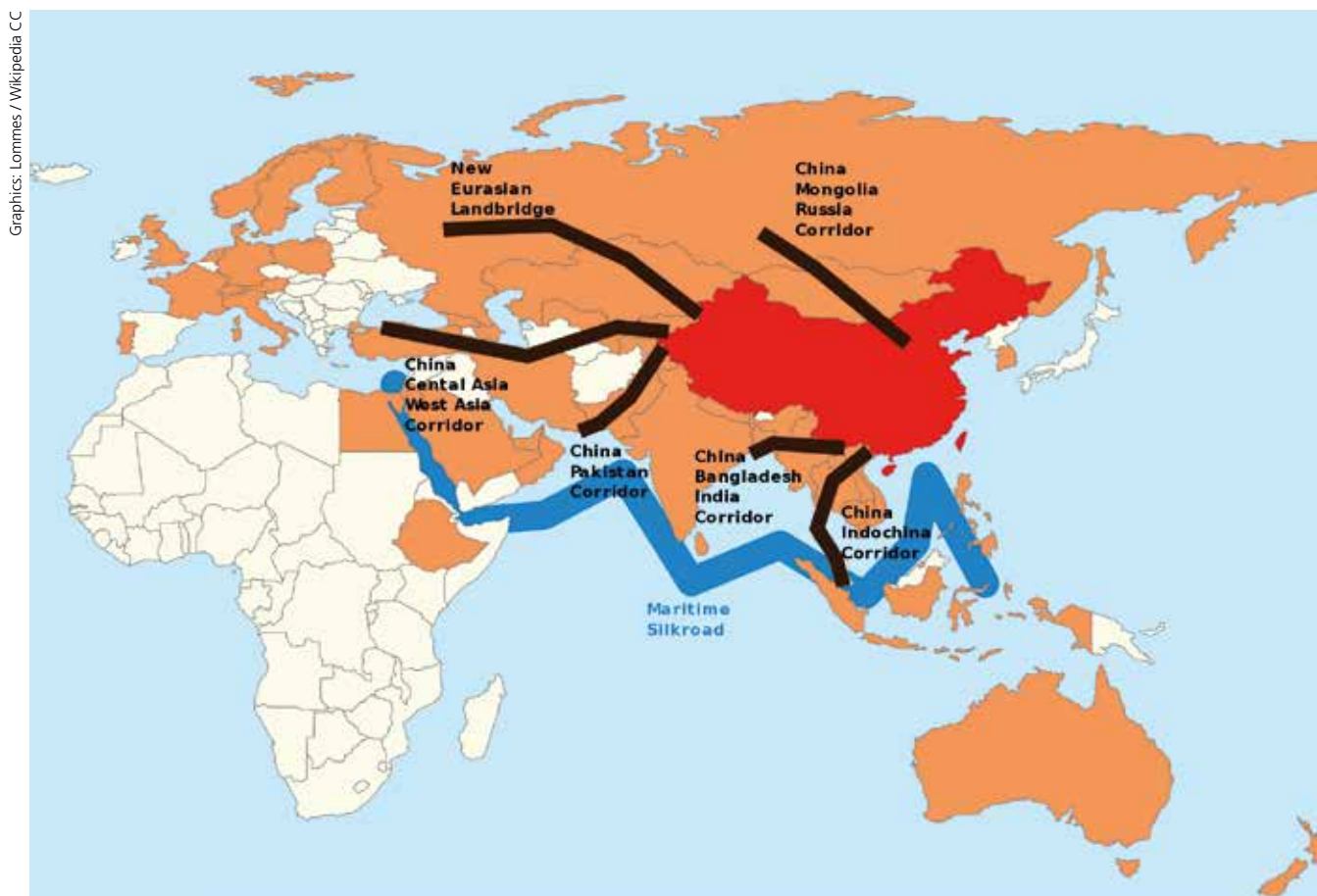


war suggests just how fragile the bonds of cooperation are among the members of the EEU and perhaps in Central Asia more generally. Even though a customs code is supposed to go into effect in 2018, this episode, along with numerous other examples where Russia or other members have resorted with impunity to high-handed economic behaviour vis-à-vis their partners, testifies to the lack of interest in genuine integration among the members and their inclination towards inter-governmental rather than supranational decision-making and agreements, quite unlike the EU. But because the members of the EEU are all autocracies (including Kyrgyzstan), this inter-governmentalism assumes a unique aspect. Anastassia Obydenkova notes that, "Above all, autocracies tend to behave in international relations the same way as they act in internal politics: looking for establishing personal contacts and bilateral agreements rather than observing laws and delegating official powers to supranational institutions. In other words, the dominance of Russia also encourages the bilateral relationship of the PSS's with Moscow, thus, creating [a] sort of "inter-presidentialism" as a form of intergovernmentalism."

## Structural Issues

Inherent structural issues that hamper its progress also adversely affect the EEU. For example, there is a substantial disparity in the aims of the members. Andrei Kinyakin observes that, "Whereas for Kazakhstan and Belarus as well as Kyrgyzstan the EEU is a sheer economic project, aimed largely at the simplification of the trade and investment cooperation within the post-Soviet space (first of all Russia) and their approach can be described as geo-economic, Russia regards the Eurasian Economic Union as a tool to institutionally "bind" the post-Soviet space for largely political reasons. In this respect the Russian approach towards the Union can be called geopolitical and the main goal is reintegration (largely by extensive integration) of the post-Soviet space into one entity." Understandably, therefore, Russia tends to try and dominate the EEU by the sheer disparity between its enormous weight in that post-Soviet space and the minimal resources the smaller states can bring to the table. That domination takes the form of unilateral decision-making, often at the expense of its supposed partners.

The most egregious case of Russia's behaviour is its forcing of Armenia to renounce an Association Agreement with the EU in 2013 and join the EEU. Moscow's heavy-handed policies detract from genuine integration and reinforce the other members' disposition to see this union in purely instrumental economic terms. It also stimulates them to look to alternatives to Russia or even raise the prospect of leaving. Thus Kazakhstan President Nursultan Nazarbayev has continuously reiterated that "Kazakhstan will not hesitate to withdraw from the EEU if it feels that its interests are threatened," and Belarus' President Alexander Lukashenko clearly shares that view. Perhaps even more graphically, Nazarbayev and his Uzbek counterpart, President Shavkat Mirziyoyev, have recently issued separate calls for Central Asian states to enhance their own regional cooperation. And those calls for enhanced regional cooperation and enhanced cooperation with the EU seem to have been welcomed throughout Central Asia, at least for now. That trend clearly points to mounting dissatisfaction with Russian policy and the EEU and underlines the failure of Russia's programme to provide genuine integration.



**The Belt and Road Initiative (BRI) underlines China's push to take a larger role in global affairs with a China-centred trading network.**



In addition, other structural factors impede genuine integration. All of the members are, to a greater or lesser extent, far removed from the oceans. Although they are not all land-locked, Armenia, Belarus, Kazakhstan, Tajikistan, and Kyrgyzstan are, and we have ample evidence to the effect that these land-locked countries within the interior of Asia all suffer from underdevelopment. Similarly, Russian territory and large parts of Central Asia have adverse climates. Consequently they all suffer from lower rates of development, lower mobility and high transport costs despite the EEU. Their remoteness from cheaper maritime forms of transport obliges them to resort to more expensive and thus less competitive production methods vis-à-vis EU producers. While these structural obstacles also provide opportunities to large countries like Russia to create a continental trading bloc, it is clear that, without substantially greater access to markets, the members of the EEU will continue to underperform, and as long as Russia and they are entrapped within a cycle of poor governance and market policies, the necessary reforms and infrastructural projects will be slow to appear and they will pay the corresponding price for this failure to reform.

## China Rules the Game

While there may be opportunities for Russia to create that bloc, from what we have seen above, it is failing to do so and Western experts point out that despite Russia's efforts to bring the EEU into being it seems to be more preoccupied with having a customs union than with making it work effectively. Paradoxically, the long-standing geographical and structural factors that inhibit economic growth throughout the EEU make the construction of China's Belt and Road Initiative, which alone seems to be the only operating programme in this regard across the entire expanse of Eurasia, all the more necessary. Many of the programmes associated with the EEU project have failed to get off the ground or are encountering numerous unforeseen obstacles to realisation. Furthermore it defies logic and history to imagine that China will actually allow Russia to recover its hegemony over Central Asia and the Caucasus under Chinese auspices and with unsupervised generous Chinese subsidies to failing or grossly mismanaged enterprises. It is more likely than not that China's Belt and Road Initiative or Silk Road will remain an exclusively Chinese affair and that whatever

crumbs it deigns to throw to the EEU will, for want of Russian reforms and due to the cupidity of the Russian elite, be wasted or realise only a fraction of their potential.

Faced with the unpalatable reality that the EEU is not working out as intended and faces numerous obstacles, many of which Moscow created by invading Ukraine, and is in danger of soon being eclipsed by China, Putin typically reacted by doubling down rhetorically. Starting in 2015, Putin began invoking a greater Eurasian vision that by 2016 came to be known as the Great Eurasian Partnership or Vision of Greater Eurasia. This new union, he said, could include the EEU, China, India, Pakistan, and Iran. At the same time, the EEU was also negotiating a trade deal with ASEAN. Nevertheless, these gambits will likely be unavailing. Indeed, despite numerous warnings years ago, little has been done to make Russia more competitive anywhere. Russian leaders have long known that failure to compete economically in East Asia entails serious disadvantages at home and in Central Asia. For if Russia fails to become "a worthy economic partner" for Asia and the Pacific Rim, the then Finance Minister Aleksey Kudrin warned, "China and the Southeast Asian countries will steamroller Siberia and the Far East." China would then also steamroll Russia in Central Asia, too. But since the invasion of Crimea and also due to the failure to reform, Russia increasingly has little or no choice and must rely more on China even if it resents doing so. Indeed, even if Russian academic discourse and political rhetoric has invoked ties to Asia much more since 2010, "these discussions, especially those that did not result in immediate recommendations for policymaking, remained in the academic domain, with Russia's policy actions in East Asia lagging behind."

## Russia First

Scholars like Ekaterina Koldunova insightfully argue that Russia should rather integrate Siberia and the Russian Far East with the rest of Russia, simultaneously raising those regions' economic level to that of their prospective Asian partners. Thus domestic reconstruction remains an unfulfilled priority. Yet Russia must move beyond proposals that have not been implemented for multilateral integration to develop economic ties with Asia comparable to those of East Asian intra-regional ties. "Russia's moderate economic engagement is curbing its 'integrative role' in the region."

This suggests that the quest for Eurasian integration with its resort to bilateral deals that reinforce presidentialism in member states and inhibits reforms is at odds with the urgent task of Russian economic development. Officials may claim that the development of Putin's grandiose Greater Eurasia scheme and its alignment with China's Belt and Road Initiative will promote regional integration under Russian or Russo-Chinese auspices. But this is whistling past the graveyard. The idea that China's initiative will promote high-tech innovation in the EEU and thus provide synergies that will be mutually beneficial is another example of the Russian addiction to grandiose visions with little foundation in reality and that invariably do not get implemented to anywhere close to the desired outcome. Indeed, it may soon be the case that the EEU will duplicate the Soviet experience whereby Moscow, to sustain its domestic and foreign empires, had to subsidise increasingly unprofitable, wasteful, corrupt, and rent-seeking enterprises and governments and collapse under the weight of that and the associated defence burden.

## Whistling past the Graveyard

Putin and his subordinates may continue to talk up the EEU and take refuge in some new variant of the various grandiose visions he has floated since becoming president in 2000. But the experience of the EEU suggests that there is no substitute for economic reform and sound administration of programmes to make them work. Russia already appears to have failed to reintegrate the EEU, though its preponderance there and the Russian reaction to anyone leaving will likely dissuade others from formally abandoning it. But it is already clear that China is about to claim the mantle by integrating Central Asia or at least major parts of it by economic means. It is not clear whether it will succeed for all the capital and momentum behind the Belt and Road Initiative. But even if, as has all too often been the case, it fails to build many of the projects now being bruited about, many of those (and smaller, but also useful) projects will get off the ground. And it also appears that as Ukraine, Moldova, Belarus, and Georgia drift back to Europe, Central Asia may have begun to grasp the necessity of ever-greater regional cooperation. Thus, while we may be seeing the imperial sunset of Russia, other suns are likely to rise, even if they do so slowly and in the long term. ■



# Viewpoint from Washington



## Trump: The First Year

Chet Negle

The anniversary of President Trump's first year in office was marked by a flurry of articles aimed at American voters by Trump supporters who applauded his accomplishments, and by "Never Trump" apostles who pooh-poohed them. This essay is aimed at Europe to better illuminate understanding of the philosophy that underlies domestic and international actions of their American ally's new president.

For most of European history, elites competed amongst themselves for power while they autocratically taxed and regulated the lives of their subjects. Then the revolutions of 1830 and 1848 blew cold winds through palaces and castles across Europe, changing absolute monarchies into constitutional republics. Nevertheless the elitist European establishment, defeated by populist movements and hampered by WWII, slowly reasserted itself. Today, Europeans again obey the dictates of elitists in Brussels who regulate their personal and financial lives and, by extension, the very sovereignty of their individual nations.

So what exactly are "populism" and "elitism?" Jeffrey Bell wrote that populism is "...optimism about people's ability to make decisions about their lives. Elitism is optimism about the decision-making ability of one or more elites, acting on behalf of other people." By that definition, Trump is a populist. He won the election of 2016 because the elites and the American populace do not agree on how to fight crime, civil unrest, drug abuse, failure of the educational system, sexual and reproductive autonomy, pornography, crimes by illegal aliens, immigration reform, gun ownership, and foreign aggressors – and they often disagree over whether these things are issues at all. And, unlike those of elitism, populist principles demand less federal government regulation and more freedom for citizens to locally manage issues that concern them. Those principles underlie all of President Trump's initiatives. And his tweets.

American domestic issues are often as opaque to Europeans as their own domestic issues are to Americans. Nevertheless, less than a year ago European and American media thrilled to accusations that the Trump election campaign colluded with Russia in order to defeat Hillary Clinton. The thrill abated when a February announcement by Robert Mueller, special counsel appointed to investigate the allegations, found no collusion. Instead, 13 Russians were indicted for meddling in the 2016 elections. That should put an end to it, but during the investigation it became apparent that senior

FBI and Department of Justice officials in the Obama administration conspired to defend Hillary Clinton from her email scandal and to assist in her election. If she lost, it appears they planned to frame Donald Trump for a crime he did not commit.

Populist Trump supporters are now demanding vengeance, but unless Hillary Clinton is indicted or conspirators brought to trial, the collusion plot and its imputation of crimes by Obama era officials will likely die a slow and scarcely noticed death. Even assuming that happens, the vocabulary minted by President Trump and his supporters remains important. It includes words like: fake news, deep state, and the swamp. What do they mean?

Photo: Donald Hudson / US Air Force



**President Donald Trump at a troop talk on 5 November 2017 at Yokota Air Base**

Fake news in America is exemplified by the 19th century "newspaper war" between Pulitzer and Hearst. It was then called "yellow journalism," the peddling of lies for political or financial gain. The difference between the yellow press of yesteryear and fake news of today is the collusion of elements of the US media with senior individuals and agencies of the government who have been dubbed the "deep state," or the "swamp."

Like fake news, the deep state has always been in America. In modern times it is usually referred to as "the establishment," and is understood to consist of powerful industrialists and members of the government's elected or appointed ruling elite who control America's domestic and international affairs, often outside regular



channels and procedures. Of course, the deep state is not formally organised and does not meet once a month in candle-lit cellars. But senior members of every agency and department in Washington know each other and cooperate to manage any issue perceived as a threat to their notions of how things should be, or as a threat to their welfare. A good example of the deep state at work is the secret meeting in 1910 of elites at the ultra-exclusive Jekyll Island Club that created the Federal Reserve Bank.

Despite opposition from the deep state and media, constitutional presidential authority and broad populist support has enabled President Trump to radically change prominent international organisations and agreements. Trump knows America's populists have more confidence in American institutions than in multi-national agreements and organisations like the UN, NAFTA, the Trans-Pacific Partnership, and the Paris Accord on climate change. As a result, he adopted the slogan "America First," and when elites and media in the United States and abroad pounced on it, in Reaganesque-fashion he modified it to "America First – but not alone."

A major plank in Trump's America First policy is a strong military. After 8 years of neglect by Obama, a new defence budget is revitalising the Pentagon. Internationally, this initiative is reflected in Trump's request that NATO members share the European defence burden and increase their spending to the agreed level of 2% of GDP. Germany, among others, has no intention of significantly increasing its defence budget, even though its military is non-functional and its treasury's coffers full. It is obvious to Trump and his populist base that Europe assumes America will continue to bear the burden of defending it. That is a dangerous assumption. Wealthy Europe should realise that post World War II Marshall Plan sympathy has evaporated under the heat of America First and the cost of recreating Fortress America.

Being more concerned about Trump's tweets and his penchant for bulling through the global crockery shop and smashing their precious porcelain, international media have paid scant attention to his domestic achievements. For example, Trump delivered on campaign promises when he appointed Neil Gorsuch, a conservative replacement for Scalia on the Supreme Court. And in his first year Trump got confirmation of 23 federal judges, 12 appellate judges (a record for first-year presidents) and 10 district court judges. Laws and Executive Orders may quickly come and go, but judges make decisions for decades – as shown by anti-Trump decisions of the 9th Circuit Court. Trump's tax bill delivered promised breaks for the middle class and business. It's already a boost to the economy, and American businesses overseas are starting to bring their money and jobs home. The bill even cancelled the hated "mandate" that fined (with a tax) all those who did not sign up for Obamacare. One of the most ignored Trump accomplishments was rolling back an essential tool of all elite establishments – stultifying government regulations. Not only has the Environmental Protection Agency rescinded 30 regulations, agencies cannot promulgate a new regulation without cancelling two old ones.

Photo: White House



**Donald Trump being sworn in on 20 January 2017 at the US Capitol in Washington, D.C.**

The question of gun control is in flux. In February, both sides of the Atlantic were shocked by the murder of American school children, a tragedy politicised in the interest of confiscating firearms. Already disarmed Europeans jeered at a nation whose founders, newly rid of a king, created an armed citizenry as a check on the tyranny of government. Still, if non-partisan polls are correct, there will ultimately be no major change to the right of Americans to bear arms. By-elections are only months away and members of congress, mindful of the general election, are leery of alienating populist constituents.

Immigration reform is also in flux. Trump has promised congress to support a path to citizenship for millions of "Dreamers" (illegal aliens smuggled into America as children) in exchange for cancelling the visa lottery, ending chain migration that allows legal immigrants to sponsor endless non-nuclear family members, and building a wall on America's southern border. He will likely prevail. Americans have learned about the danger of a large illegal alien population from reports of crime and civil unrest in Europe caused by unchecked Muslim immigration – and reports that 100,000 illegal aliens are registered to vote in Pennsylvania. Despite rancour over immigration in a hostile media, a February 2018 non-partisan poll shows Trump to be more popular than Obama was in his first year as president.

Ronald Reagan wrote, "The function of government is not to confer happiness but to give men the opportunity to work out happiness for themselves." Populists agree, and current events show that America remains a revolutionary and populist society.

# China's Threat Perception, Security Strategy and Eurasia

**Ali Erdinç**

**A crucial factor defining China's perception of security is its historical memory and socio-cultural structure.**

Historically, the most important thinker for China's security philosophy is undoubtedly General Sun Tzu, author of the well-known book "The Art of War", dating back to the 5th century BC. His conception of security and war displays great similarities to and is in line with current security paradigms. According to General Sun Tzu, preventive intelligence, scenario-based planning and preparation against threats are fundamental; the goal is to win a war without fighting and to prevent threats before they arise. Another important phenomenon in the development of China's

security philosophy after Sun Tzu is the intelligence game called Weiqi. The game can last for hours or even days; it is played on a 19-grid surface with 100 peons. It was deemed illegal during Mao's rule, as it was assumed the game would encourage the public to be lazy. But nowadays, it is allowed to play the game, and people are playing it for hours. The game is based on 36 different scenarios named Stratagems, which need to be countered with 36 opposing scenarios. A similar scenario-based and risk-based study is needed to understand China's contemporary security philosophy. The cultural

Photo: US Department of State



**China's President Xi Jinping**

used only in a critical situation. This is a Chinese cultural paradigm, especially when it comes to war, and this understanding is also the basis for the Chinese perception of security. The continental Chinese also see the Chinese living outside the continent and the Taiwanese as being subject to Western influence; they call them banana Chinese, which means that they may look yellow like the Chinese, but their thinking is white like that of the West.

## The Boxer Uprising

Chinese mistrust toward the West and white men can be better understood by examining important events of the past century, such as the Boxer Uprising organised by Chinese martial arts fighters. In 1899-1900 a Chinese secret organisation called the Society of the Righteous and Harmonious Fists staged an uprising in northern China against Western and Japanese influence there. The rebels, referred to as Boxers because they performed physical exercises they believed would make them able to withstand bullets, killed foreigners and Chinese Christians and destroyed foreign property. From June to August, the

Photo: CNSA



**Launch of the SHENZOU-11 spacecraft**

## Author

**General (Rtd) Ali Erdinç** has performed important assignments under Turkish Armed Forces and NATO auspices. He has stayed in China in 2013 and in 2016. Due to his personal interests, he has become a master of Taoism and a Tai Chi instructor.

similarity that I have pointed to is interesting; it establishes the basic paradigm of China's modern threat perception. Shame and suspicion are strong feelings for the Chinese; secrecy is a virtue and they never fully reveal their true state, especially to strangers. When necessary, they may share with a stranger only 70% of their capabilities and strengths, while the rest remain secret. Full power and capability is



Boxers besieged the foreigners' district of Beijing (then called Peking) until an international force that included American troops suppressed the uprising.

On 14 August 1900, after fighting its way through northern China, a coalition force of 20,000 troops from eight nations (Austria-Hungary, France, Germany, Italy, Japan, Russia, the United Kingdom and the US) arrived to retake Beijing and rescue the foreigners and Chinese Christians.

By the terms of the Boxer Protocol, which officially ended the rebellion in 1901, China agreed to pay more than US\$330M in reparations. The Boxer Uprising occupies an important place in today's Chinese national consciousness and its understanding of unity and security. The fighters who participated in this uprising are still commemorated with appreciation and gratitude in many Chinese martial arts schools.

## China's Geopolitics

Another factor defining China's threat perception is its geopolitical situation. The country is surrounded by the Himalaya from the southwest and by dense forests and vast landscapes from the southeast, forming a natural border, which is why China cannot be invaded from the south. In the west, China is surrounded by deserts (Taklamakan Desert) and areas ill-suited for large-scale military operations, and in the north it borders Siberia. All this makes for a geography that prohibits an invasion of China's borders from the outside. China's open flank is in the east, the Pacific Ocean, a region susceptible to a sea blockade and embargo. The importance of security in the east is obvious: the vast majority of the country's imports and exports are transited via these eastern ports, and Chinese industrial facilities, fertile soil, the majority of the population and skilled workers are located on the eastern coast. The closing-off of this region and the Pacific Route would strike a blow to the economy and internal stability and could contribute to the emergence of opposition movements and even internal uprisings.

In terms of demography, the country's different ethnic groups live in the northern, western and southern border regions whereas the Han Chinese live in the central and eastern regions of the country. While this situation creates a buffer zone for the protection of the central Chinese population, it leaves ethnic minorities in the border regions (Uyghurs in the northwest, Tibetans in the southwest, Mongols in the north and Manchurians in the northeast) susceptible to manipulation and invasion from the outside. The Uyghur region is



**General Guo Boxiong is the highest-ranking victim of President Xi Jinping's military reform.**

the most sensitive region of China, because of its autonomy, and Tibet because of local separatism; they account for almost one-fifth of China's territory and have huge natural resources. Currently, Chinese nuclear missile tests are performed in the Uyghur region and space research in the Gobi Desert (Inner Mongolia). Losing these important regions is unacceptable to China, which is why they have priority when it comes to security.

China's economic success and extraordinary growth of the past decade have led to considerable uncertainty in the US, which has taken a number of initiatives to maintain American superiority in the Pacific region. China is responding to US initiatives with the aim to secure its Pacific watercourse, which China considers vital, and to end American domination in the Pacific region. The power struggle between the two superpowers has become increasingly fierce, threatening the security in the region. Politicians, academics and intellectuals of both countries are hoping to solve the situation peacefully, as there is rising

anxiety that the two parties might drag the region into conflict. The events that have taken place since 2011 confirm these fears.

## The Pivot to Asia

In November 2011, the US adopted a new strategy named "The Policy to Rebalance the Strategy towards Asia" to increase their presence in the Pacific theatre; the US will deploy around 60% of its naval and air forces to the Pacific until 2020, and the defence budget will prioritise US naval and air forces; ground forces' manpower will be reduced to 390,000. Following this turn to Asia, the Pentagon established the Naval-Air Operations Office and Archipelagic Defence sections in 2012, and it set up programmes concerning military supplies and training programmes for Pacific riparian countries, like the Philippines, Malaysia, Indonesia and Vietnam, with the purpose of defending against China (Vietnam had a fierce war with China in 1979 after China attacked Vietnam). In response, China published in

Drawing: Johannes Koekkoek



**The Boxer Uprising in 1899 was organised by Chinese martial arts fighters, depicted here by a contemporary painter.**

2013 an article in its semi-official publication WEIWEI PO. The article listed possible methods of a US attack against China and concluded that China's border problems with its neighbours and territorial claims are likely to cause a war before 2060. According to this article, China is planning to take back its lands: Taiwan by the year 2025, the islands Spratly and Paracel in the South China Sea by 2030, South Tibet by 2040, Senkaku and Okinawa allegedly occupied by Japan by 2045, outer Mongolia by 2050 and by 2060 lands in Siberia which were occupied by Russia at the beginning of the twentieth century. It did not take long for the US to respond to this article; in February 2014, the official

US Navy publication published an article titled "Deterring the Dragon... from (under) the Sea", which spelled out in detail how the US could use submarines and mines to block China's coastlines and sea routes in the Pacific, thereby creating havoc in China after interrupting its sea trading routes. The article also pointed to uprisings being staged in Xinjiang (in the west) and in Tibet (in the south-western region) with outside support. The article caused considerable discontent in the Chinese government and military circles. In the wake of this article, China emphasised its claims on the Paracel and Spratly Islands in the South China Sea and accelerated the construction of fortifications, military airports and defence

positions on islands and atolls whose ownership claims are controversial. Such activities are ongoing despite objections by the countries of the region and the US; the Philippines have sued China in the International Court of Arbitration in this regard and won the case in July of 2016. China on the other hand does not recognise the verdict and continues to exercise its claims in the region.

## One Belt, One Road

Meanwhile, China is looking for alternative routes to the Pacific waterway. The Chinese One Belt One Road Initiative (OBOR) and a road to link Gwadar, a port in Pakistan's Indian Ocean, with the Xinjiang region, seems like a feasible route for trade with Europe, Africa and the Middle East. The friendship between China and Pakistan is the counterpart to the Indian-Russian friendship. The former has developed enormously in the last half-century, due to the partition of India and Pakistan and the Chinese occupation of Indian Tibet.

Thus, securing the Pacific sea route is the most important issue for China and the cause of many territorial controversies with its neighbours. But that's not all: China is in a dispute with India over transnational rivers originating in Tibet and the Himalayas. Chinese efforts to channel the Brahmaputra River into Yarlung Canyon to fill the Brahmaputra Dam in China have intensified tensions between the two countries as the river is important for India. Siberian territories once belonging to China and now part of Russia might also become a contested issue and, therefore, a security problem. Even though this issue appears to be merely smouldering due to the good economic and political relations between China and Russia, it will likely come up in the distant future.

## China's Military Reform

In recent years, the Chinese People's Liberation Army (PLA) has undergone major changes. Established in 1927 by Chinese peasants and workers, reform programmes have modernised the Army; today, the Chinese Army is essentially the most important instrument of the Communist party. China's head of government Xi Jinping is also the head of the Defence Committee, responsible for controlling the armed forces. As soon as he came to power, Xi began to modernise the Army; just recently, he enacted a rigorous programme against corruption which has been plaguing the Army for some time; General Guo Boxiong, the former Vice Pre-

Photo: Joe Mabel



**During Mao's rule, the board game Weiqi was banned, but nowadays people are playing it for hours.**

Photo: Open Domain



**Gwadar Port is part of China's network of military and commercial facilities along its sea lines of trade.**



sident of China's Security Committee, and General Zhou Yongkang, the former Minister of Internal Security, were arrested for bribery. More than 60 senior officers were removed, and 200,000 members of the Communist Party are being investigated for the same reason. Currently, the fight against corruption continues at high-pace among civilians and in military circles.

President Xi has also made important changes in the structure of the Defence Committee with the aim of increasing civilian control over the Army. Previously, the presidents of the Defence Committee held this position only for a limited time, but Xi wants to make the presidential position permanent for himself. The Army, which consisted of seven military regional commands, was restructured into five front orders and common commands (with land, sea and air elements together). The re-organisation of the Army reduced staff by about 300,000 people. Meanwhile, the capabilities of the Army (especially the naval and air forces) in the Pacific theatre are being rapidly modernised and expanded. In addition to the Land, Sea, Air and Strategic Rocket Force Commands, the last organisational change established a

Strategic Support Command and a Logistics Support Command in the Chinese Army, the former being responsible for space and cyber warfare and electronic warfare operations, whereas the latter is charged with logistics support like replenishments, maintenance and finance. The military modernisation is in full swing and will be completed by 2020. The defence budget has increased by an average of 10 percent annually, with the aim to bring the Chinese Army to a level where it can compete with modern armies; the budget was US\$146Bn as per 5 March 2016.

### Chinese on the Moon

China has a space programme with 60 years of experience; the first space base (Code 20) was established with Russian support in 1958. Chinese enthusiasm for space research is striking: between 2011 and 2016 alone, more than 100 rockets were launched into orbit. In September and October 2016, the space laboratory TIANTONG-2 and the space shuttle SHEN-ZOU-11 were launched and the astronauts remained in space for 30 days. Two years ago, a Chinese news agency said that the

Space programme CHANG-4 plans for a landing on the dark side of the moon in 2018 and, allegedly, there are efforts to send Chinese spaceships to Mars in 2020. That is public news, but it would not be surprising if the Chinese space programme were much more advanced. The most important security issue for China today is to ensure the country's stability and Communist Party rule over the country. Accordingly, the priorities of the Chinese Army are to maintain domestic stability, to protect the unity and integrity of the country and to prevent all sorts of separatist rebellions and terrorist activities, the latter mainly in the Xinjiang and Tibet districts, as China cannot accept the separation of these regions under any circumstances. China's rule over these two districts is a question of existence for China; the loss of these regions would be a serious blow. For the Chinese economy and for domestic peace and stability, keeping the Pacific trade routes open is vital, and China will take all measures to protect its vital interests. However, China would escalate tensions in a controlled manner and prefer diplomatic and peaceful means first. ■

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# Russian-Turkish Relations and their Impact on NATO and the EU

**Eugene Kogan**

**President Erdogan's Turkey might increasingly come under President Putin's control until the parliamentary and presidential elections in Turkey in November 2019.**

**T**he Black Sea region is one of the regions in which Turkey has lost its influence to Russia. NATO and the EU have no influence on relations between Russia and Turkey, as the Presidents of both countries either ignore the EU's efforts or, as in the case of Erdogan, despise their at-

tempts to appease him. In addition, NATO has no mechanism for excluding Turkey as a member state. Although the EU has implicitly suspended negotiations on Turkey's possible EU membership, it is not prepared to make a clear statement that Turkey will not join the Union in the fore-

seeable future. The leaders of both organizations continue to hope that Erdogan will change the authoritarian course of the country and return to a European way and reconsider the comfortable relations with Putin. Erdogan has other plans, and as a result the leaders of NATO and the EU are likely to wait in vain.

It must be emphasised that Erdogan was and is not an equal partner in the Turkish–Russian relationship, although both President Vladimir Putin and Recep Tayyip Erdogan have a similarly authoritarian style of government. Erdogan called Putin "my dear friend Vladimir" at a press conference in St. Petersburg on 9 August 2016, shortly after the restoration of bilateral relations, which were damaged by a Turkish F-16 fighter plane on 24 November 2015 after the launch of a Russian Su-24 bomber. But Putin did not call Erdogan "my dear friend" Tayyip. There is a saying that Russia has no friends. As the Russian Tsar Alexander III previously said: has only two allies – the army and the navy." And in the 21st century, Russia also has nuclear deterrence and the right of veto in the UN Security Council. It can therefore be said that Putin does not regard Erdogan as a friend, but as an unequal counterpart.

In addition, Murat Bilhan, former head of the Turkish Foreign Ministry's Strategic Research Centre, said: "Behind Putin's smile, Russia remains a great state and can show its talons whenever it suits him. Turkey could never compete with Russia. Russia is a superpower, while Turkey is a regional power." Turkey should not be under any illusions about its role in relations, namely that of the second fiddle.

While Erdogan's authoritarian rule has alienated allies in Europe and the United States, it has strengthened Putin's control over Turkey and embarrassed Erdogan. Putin's economic sanctions against Turkey in November 2015 caused serious damage to the Turkish economy when Russian tourists stayed away from Turkey. Putin can impose these economic sanctions and travel

Photo: Kremlin.ru



**Russian President Vladimir Putin and Syrian President Bashar al-Assad met with representatives of the Russian Defence Ministry to discuss Russian "counter-terrorism operations" in Syria.**

Photo: Kremlin.ru



**On 13 November 2017, Vladimir Putin met with President of Turkey Recep Tayyip Erdogan in Sochi to discuss bilateral relations and current issues on the international agenda.**



restrictions on Turkey if he feels that Erdogan is not listening to him. In addition, Putin can impose sanctions at any time and without warning, which he can promise. Therefore, the relationship is one of senior and junior partners, even though Erdogan does not see this reality. But as Atilla Yesilada of Global Source Partners, a consultancy firm based in Istanbul, said in January 2017: "The Turkish government has completely decoupled itself from reality. This is not the case with Putin, who is playing a tough, well-calculated and manipulative game against Erdogan and at the same time knows how to deal with the volatile Erdogan correctly, compared to the rather timid attitude of Turkey's Western allies."

There is no doubt that Turkey did not only push itself into Russian orbit in 2015, but already in 2008, because Turkey was already dependent on 60 percent of gas supplies from Russia at that time. Today, the figure is 55 percent. Turkey has no choice but to rely on Russia's good will, and Turkey pays in hard currency. The idea that Turkey must diversify its gas imports away from Russia and become a gas hub has remained an idea. In 2014, according to Turkey's foreign trade statistics, exports to Russia amounted to US\$5.9Bn, while imports from Russia amounted to US\$25.2Bn. The first six months of 2016 were Turkey's worst export result since 2004, and the most striking aspect of trade with Russia is that it has been in favour of Russia from the outset. Russia sells more to Turkey than Turkey sells to Russia. Turkey's dependence on Russian gas and oil (10 percent of oil comes from Russia) is a major factor in this imbalance. The current situation is unlikely to change, as Turkey's energy requirements will double in the next decade. Another factor in this imbalance is the increasing number of Russian tourists in Turkey.

In addition to Turkey's dependence on Russian gas and Russian tourists, the Russian-Georgian war in August 2008 sent a clear message to Ankara, namely that Ankara can only increase its influence in its immediate neighbourhood, namely in the Black Sea region, by coordinating with Moscow and not with its NATO allies. And that is exactly what has happened since then. Turkey's failed coup d'état on 15 July 2016 has further consolidated relations between Russia and Turkey. In a telephone call with Erdogan on 17 July 2016, Putin stressed the "categorical inadmissibility of anti-constitutional acts and violence in state life" and reaffirmed his intention to meet Erdogan in Russia. Putin's reaction was in stark contrast to that of the Western allies. Turkish Foreign Minister Mevlut Cavusoglu said on 25 July 2016: "Unlike other countries, we



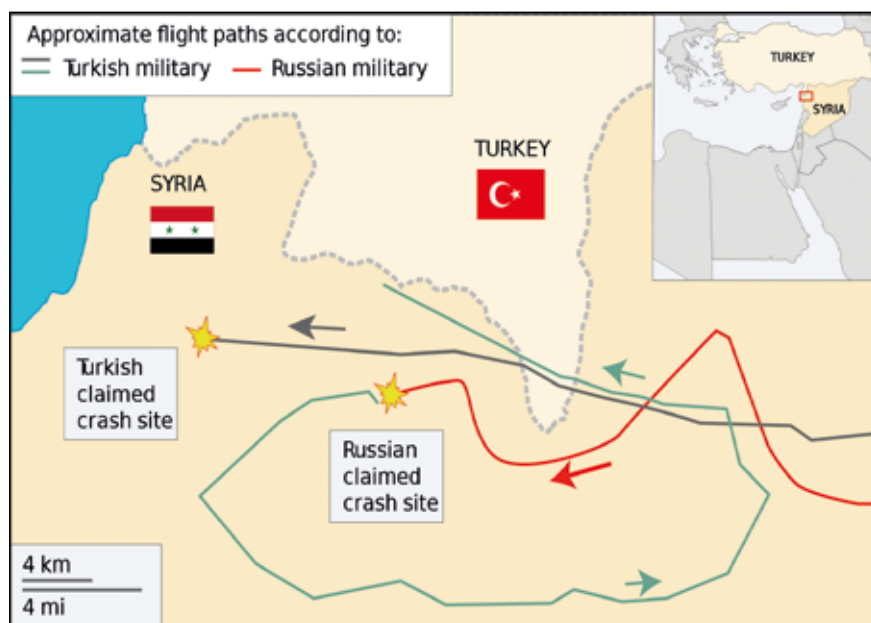
Photo: Vitaly Kuzmin, Wikipedia CC

**A Russian S-400 Air Defence System on a BAZ trailer chassis**

have received unconditional support from Russia. The cost of unconditional support from Russia remains high and has a long-term impact. In addition, the renewed co-operation between Ankara and Moscow is to take place on Russian terms, and Turkey reluctantly accepts this reality."

The never-ending story of Erdogan's decision to buy the S-400 air defence system from Russia is an example of Putin's view of Moscow's support for Turkey. Turkey buys a system that is not compatible with NATO standards and cannot be integrated into NATO's air defence system. That is why

Turkey must confine itself to its own architecture. Even if Russia is ready to carry out maintenance work, maintenance is carried out by Russian and not by Turkish workers. At the same time, Russia is not prepared to supply software codes, IFF systems, joint production with Turkey and certainly no technology transfer to Turkey. And this despite the Turkish side's persistence to gain access to the software codes and the IFF system. In addition, the system cannot be delivered to Turkey before 2020. This is a high price paid by Turkey for unconditional support from Russia. The statement by Ca-



Graphics: Donor Furfur, Wikipedia CC

**On 24 November 2015, a Turkish F-16 fighter aircraft shot down a Russian Su-24 aircraft near the Syrian-Turkish border. The Turkish Air Force claimed that the Russian aircraft violated Turkish airspace. The Russian pilot Capt. Konstantin Murakhtin said on Russian TV there was "no way" the jet could have violated Turkish airspace. Turkey says the pilots were warned 10 times before the plane was shot down. Capt. Murakhtin was rescued from rebel-held territory in Syria in a 12-hour operation involving Russian Special Forces. The incident strained Russian-Turkish relations.**

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pusoglu that "Ankara can refuse to buy the S-400 if Moscow refuses to stop joint production in Turkey on 9 October 2017" should be taken with a grain of salt. Cavusoglu is not the one who decided to buy the S-400. Cavusoglu's attempt to put the Russians under pressure is not taken seriously by Moscow and the Russians laugh behind Cavusoglu's back. After all, the Turkish cash deposit of around US\$100M for the purchase of the S-400 will not be repaid.

Finally, General Petr Pavel, Chairman of the Military Committee, said on 25 October 2017: "Although the principle of sovereignty obviously consists in the procurement of defence equipment, as the nations are sovereign in decision-making, they are also sovereign in coping with the consequences of this decision." It remains to be seen whether Pavel's statement can be interpreted as an explicit warning to Erdogan, but it is obvious that NATO is not satisfied with Erdogan's decision to buy the S-400.

The unequal bilateral relations are a major headache for NATO and the EU, as relations between Turkey and its Western allies have deteriorated since the failed coup d'état in Turkey. Let us recall the state of bilateral relations between Germany and Turkey, and in particular the USA and Turkey, as well as the bitter relations between Austria and The Netherlands and Turkey. It is obvious that relations between Turkey and its Western allies will not change as long as Erdogan remains president. Although Turkey remains an ally of NATO, Turkey has become a difficult ally. Erdogan is fully aware of this fact and will not change his behaviour, making the NATO and EU response difficult. NATO Secretary General Jens Stoltenberg's polite statement that Turkish officials told him that "Ankara remains a strong NATO ally" is without substance. Erdogan is acting in bad faith, knowing that Western allies cannot punish Turkey in the present circumstances. On the other hand, Putin behaves like a spectator and enjoys the confusion without moving a finger.

As long as NATO does not succeed in including an article on the right of expulsion and penalties for misconduct of a member of NATO in the North Atlantic Treaty, Erdogan will continue to behave boldly. As long as the EU heads of state and government disagree on the fate of Turkey's possible membership and therefore do not take a unanimous decision, Erdogan will treat these heads of state and government with contempt. It is an opportunity for Putin to bind the Turkish Gulliver to the land of the Lilliputians, to continue his policy of changing the military balance in the Black Sea region (with intensive militarisation of the Crimean peninsula) in his favour and to scorn the NATO alliance.

NATO and the EU are in an unprofitable position because of consensus and compromise, while Putin and Erdogan continue to behave with impunity, knowing the internal weaknesses of the EU, which is unable to make a final decision on Turkey's EU membership. As long as NATO's language remains vague and ambiguous, Erdogan will not do anything to shake NATO's boat, but will enjoy the protection of NATO and Russia's embrace. Whether the Turkish formula of NATO protection and Russian embrace can also apply to other NATO member states goes beyond the scope of this article. Nevertheless, it can be said that other NATO members are carefully evaluating the Turkish experience.

Putin will continue to draw Turkey into its sphere of influence by offering smaller trade, energy and tourism concessions and with the unresolved conflict in Syria, as Erdogan is also in an unprofitable position. The author can only repeat what Bilhan said above: "Behind Putin's smile Russia remains a great state and can show its claws whenever it suits it." And this is something that Erdogan and his government should remember well. ■



# Malaysia's Defence Dilemma

David Saw

**Although the modernisation of Malaysia's defence is imminent, a number of factors appear as obstacles that delay essential processes.**

Inevitably the economic situation of the country is a critical factor in this regard. In the case of Malaysia though, while the economic situation is important, it is politics that is decisive in terms of the development of a Malaysian strategic vision and in terms of defence acquisition programmes. As the dynamics of Malaysian politics have become more complicated and beset by controversy in recent years, this has had a negative impact on defence acquisition. Malaysia has a population of 31 million people, the ethnic breakdown of which is 61.7% Bumiputra or Malay and indigenous peoples, 20.8% Chinese origin and 6.2% Indian origin. Ethnic background and religion play significant roles in Malaysian politics. The national economy was at one stage dominated by the production and export of primary and agricultural commodities. These included tin, oil and natural gas, bauxite, iron, copper and timber. Agricultural commodities include palm oil and rubber.

The development strategy of Malaysia has been to broaden its economy from dependence on commodities and primary products, looking to diversify into a range of different industrial sectors, encouraging foreign direct investment and building the momentum to move into higher value economic sectors. All things considered, Malaysia's economic development strategy must be considered a success. However, the challenge for the Malaysian government is to consistently keep delivering economic growth.

In April 2017 the International Monetary Fund (IMF) released a report on the Malaysian economy and this gave a very favourable view of the Malaysian economy and its future prospects. The IMF noted that, "Despite a challenging global economic environment, the Malaysian economy performed well over the past few years. Notwithstanding the impact of the global commodity price and financial markets volatility, the economy remained resilient, owing to a diversified production and export base; strong balance sheet positions; a flexible exchange rate; responsive macroeconomic policies; and deep financial markets."

IMF figures for the economic growth in Malaysia showed a positive trend in Gross Domestic Product (GDP) growth. Over the five years from 2012 to 2016, GDP growth was on average 5.08% per annum, according to the IMF. At that time they had projected 4.5% GDP growth in 2017 and estimated GDP growth in 2018 at 4.7%. In fact the IMF would release a statement in December 2017 that they believed that Malaysian GDP growth in 2017 would be

a major boost as it works towards winning the next Malaysian elections which must be held this year.

## Political Theatre

If the economic situation is positive, the same cannot be said for the political situation. Malaysian politics used to be very predictable; since independence on 31 August 1957, Malaysia has only had six dif-

Photo: Lieutenant Jonathan Pfaff / US Navy



**A Sukhoi Su-30MKM of the Royal Malaysian Air Force (RMAF) taking part in an exercise with the US Navy**

in the region of 5.5 to 6.0%. They also changed their estimate for growth in 2018, noting that: "Real GDP growth is projected at 5.0–5.5% in 2018."

The IMF has drawn a positive picture of the Malaysian economy, but they do have some concerns in areas such as consumer price inflation, which is running at about 4% and in credit growth. Despite that, the fact of the matter is that the IMF have endorsed the economic policy of the Malaysian government and this, added to ongoing economic growth, gives the government

ferent Prime Ministers. The dominant political party was the United Malays National Organisation (UMNO), which as the name implies has its core constituency in the Bumiputra community; it would lead the Barisan Nasional (BN) coalition, which also included ethnic Chinese and Indian political parties, which would form the Malaysian government.

UMNO and the BN coalition face a real challenge in the 14th Malaysian General Election, which has to be held by 24 August 2018, and current Prime Minister





Najib Tun Razak is waiting for the right time to officially schedule the election. In the previous election in 2013 UMNO/BN achieved the worst result in its history, although it was still enough to form a government. Since then the main opposition coalition has imploded and two new opposition coalitions have emerged to take its place. As might be expected, predicting an election winner in these new and complicated circumstances is very difficult. What is certain though is that no major defence procurement activity can take place before the election is resolved.

### Can Najib Win?

Now the key question is: Can Najib win? One figure who will play a major role in deciding the fate of the election and the future of Malaysian politics is former Prime Minister Mahathir Mohamad. Mahathir became Prime Minister in July 1981 and relinquished power at the end of October 2003, and he could be described as the architect of the current Malaysian political system. One man who saw himself as the potential successor to Mahathir was Anwar Ibrahim, Deputy Prime Minister from 1993 until 1998, but he fell from grace.

Anwar would become the symbol of opposition to UMNO/BN and would be the leader of the 'Reformasi' movement for political change in Malaysia. Today, Anwar remains an important part of the anti-UMNO/BN opposition, but these days, as we shall see, the political opposition contains all sorts of surprising figures.

When Mahathir unwillingly resigned as Prime Minister in October 2003, he was succeeded by Abdullah Ahmad Badawi. The Badawi government was initially popular, but by 2005 it had lost its lustre and Mahathir had emerged as a vocal critic of Badawi. Failure to obtain a decisive majority for UMNO/BN in the 2008 general election was the beginning of the end for Badawi and by April 2009 he was replaced. This opened the way for Najib Tun Razak, seen as a protégé of Mahathir, and son of Abdul Razak, the second Prime Minister of Malaysia, to become Prime Minister.

At the start Najib was popular and appeared to have restored the fortunes of UMNO/BN, but this was an illusion as demonstrated by the poor results in the 2013 election. On the other hand, the opposition Anwar-inspired Pakatan Rakyat (PR) coalition that fought the 2013 election is no longer a factor after it broke apart in 2015. Najib will be facing two new opposition blocs in the upcoming election; the first of these is Gagasan Sejahtera, the primary component of which is the Islamist Pan-Malaysian Islamic Party (PAS). The other opposition coalition, and potentially the most threatening to UMNO/BN is Pakatan Harapan.

Pakatan Harapan, includes two parties that were originally in the PR coalition. There is also Amanah, formed by former members of PAS and, most controversially, the Malaysian United Indigenous Party (PPBM). Mahathir Mohamad is the Chairman of the PPBM; he resigned from UMNO in protest against Najib in February 2016, and is now in the frontline of the Pakatan Harapan effort to win the upcoming election, having been elected chairman of the coalition in July 2017. The reinvention of Mahathir as a reformer in opposition to UMNO/BN is extremely ironic.

What this all means is that we are in uncharted political territory in the build-up to the 2018 election. Should UMNO/BN win and Najib continue in power, it is business as usual in Malaysia and that would boost confidence in the economy. As far as defence procurement is concerned, a UMNO/BN election victory ought to see real progress on a number of major acquisition programmes.

There are no suggestions that the Gagasan Sejahtera coalition could win the election,

Photo: Dr. Andreas Zeitler / Eurofighter



**A Luftwaffe Eurofighter combat aircraft departing on QRA from Neuburg Air Base. BAE Systems are taking the lead to offer 18 Eurofighter TYPHOON to the RMAF to replace their MiG-29N/NUB fleet.**

Photo: Staff Sergeant Jerry Battles / US Air Force



**Refuelling from a US Air Force KC-135 tanker, a French Air Force Dassault Rafale combat aircraft taking part in a combat mission over the Middle East (Syria/Iraq) in July 2017. Dassault has long targeted the RMAF future fighter requirement as a potential victory for RAFALE.**



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but they could complicate matters for the other parties. Realistically the main threat to UMNO/BN is Pakatan Harapan and, assuming that their internal problems do not get any worse, they will be a real challenge. Even now it is still unthinkable that UMNO/BN might lose, but if the unthinkable did happen it would change everything in Malaysia. The impact on defence programmes would be significant and most likely current acquisition plans would be scrapped in the event of a new government coming to power. The significance of the 2018 elections for the future direction of Malaysia should not be underestimated.

## Costs and Benefits

Once the election is resolved and the Malaysian government is content to start moving forward on defence acquisition, the next obstacle is how Malaysia intends to pay for its acquisitions and what it hopes to gain in terms of industrial involvement, technology transfer and accompanying

Malaysia has also looked to use elements of countertrade in its defence acquisition process. Over the years this strategy has seen the use of primary commodities that have been taken in lieu of cash by suppliers. Other countertrade arrangements have seen manufactured products used as a countertrade commodity, for example Malaysian-manufactured cars. This is a perfectly normal payment strategy and is often included in the offset arrangements linked to defence acquisition programmes. One commodity that Malaysia has used as a part of paying for its defence acquisitions is palm oil. The order for 18 Sukhoi Su-30MKM fighters for the Royal Malaysian Air Force (RMAF) placed in 2003, with deliveries from 2007 to 2009, cost some US\$900M. Of this total some US\$270M was covered by the transfer of primary commodities, with palm oil providing a major proportion of that figure. Using palm oil as a countertrade commodity makes a great deal of sense for Malaysia; it is a commodity that they have no

component in biodiesel. The WWF states that "While palm oil is the most efficient source of vegetable oil, its rapid expansion threatens some of the planet's most important and sensitive habitats. Palm oil grows in tropical rainforests, and the uncontrolled clearing of these forests for conventional palm oil plantations has led to widespread loss of these irreplaceable and biodiverse rich forests. Plantations have also been connected to the destruction of habitat of endangered species, including orang-utans, tigers, elephants and rhinos."

It is a classic case of the environment versus development and the WWF is not alone in their opposition to palm oil, although they do say that palm oil "can be produced in a responsible manner that respects the environment and the communities where it is commonly grown." Others opposition to palm oil is less nuanced, in October 2017 the European Parliament environment committee voted to ban the use of palm oil in bio fuels, in November they were supported in their call for a ban by the parliament's industrial, research and energy committee. Then in January 2018 the European Parliament voted to ban the use of palm oil in biofuels from 2021 onwards. In June 2017 the Norwegian government banned public procurement of biofuels containing palm oil.

Both Malaysia and Indonesia protested the vote to ban palm oil, with some Malaysian politicians calling for a retaliatory ban on products from the European Union (EU). Many European governments, such as France amongst others, have already come out in opposition to the ban on palm oil in biofuels. It should be noted that turning a European Parliament vote into enforceable EU-wide legislation is not guaranteed. That being said, the potential economic cost of a ban or restriction of use of palm oil is a significant factor for Malaysia. All of which means that those countries that are looking to make major defence sales or other major deals with the Malaysian government, ought to be lobbying hard to block a palm oil ban.

## Key Programmes

After the election is resolved the expectation is that the long-awaited programme to acquire a new combat aircraft to replace the MiG-29N/NUB in RMAF service will finally move towards a successful conclusion. In 1994 Malaysia acquired 16 MiG-29N and two MiG-29NUB aircraft from Russia and these were delivered in 1995, with the aircraft subsequently being modernised to extend their capabilities

Photo: US Navy



**KD KELANTAN (175) is one of six KEDAH Class offshore patrol vessels built to the Blohm + Voss MEKO 100 design. Of the six units, four were built by Boustead Heavy Industries at Lumut in Malaysia. As the Royal Malaysian Navy (RMN) moves to rationalise the number of ship classes it operates, it hopes to add new KEDAH Class units.**

economic benefits. As previously noted the policy of the Malaysian government has been to transition the country away from being dependent on the export of primary commodities, to having a diversified economy operating in increasingly high technology and knowledge-based industrial and service sectors.

shortage of. However, palm oil has now become somewhat controversial. According to the World Wildlife Fund (WWF), "Palm oil is the most widely consumed vegetable oil on the planet, and it is in about half of all packaged products sold in the supermarket." Palm oil is in food, it is in soaps and detergents and it is a key





and service lives. By 2010 two aircraft had been lost in accidents and of the surviving fleet of 16, only 10 were operable.

It is worth noting that prior to the arrival of the MiG-29, the RMAF fleet consisted primarily of western equipment, such as the Northrop F-5E/F and the Douglas A-4PTM SKYHAWK. In the 1990s a diverse range of combat/jet trainer aircraft entered RMAF service. These included eight Boeing F/A-18D, 18 BAE Systems HAWK 208 and 10 HAWK 108. These were followed by the 18 Sukhoi Su-30MKM and eight Aermacchi MB339CM (to add to the existing RMAF MB339AM fleet that was later retired) between 2007 and 2009. Malaysia has never been shy of acquiring equipment from an incredibly diverse range of suppliers, despite the inevitable difficulties in operating and supporting Russian and NATO-standard equipment at the same time.

As regards the MiG-29N/NUB fleet the plan had been to replace them with an aircraft known as the Multi-Role Combat Aircraft (MRCA), with 18 of these to be acquired initially allowing the MiG-29N/NUB to be retired in 2015. Assuming all went well with the first 18 MRCA aircraft, there was even a plan to acquire a second tranche of 18 more aircraft. This was therefore a seriously attractive requirement and a number of contenders emerged; these included: Boeing F/A-18E/F SUPER HORNET, Dassault RAFALE, Eurofighter TYPHOON (with BAE Systems taking the lead in Malaysia) and the Saab GRIPEN. At one stage Malaysia was likely to issue a Request for Proposals (RfP) in late 2010/early 2011, but this never happened and the fighter programme has drifted for years.

Assuming a government victory in the upcoming election, the belief is that work will begin on acquiring up to 18 new fighters, with the contract expected to be worth in excess of US\$2Bn. The acquisition process could get underway in 2019, with a decision potentially as early as 2020. The Eurofighter TYPHOON proposal by BAE Systems features long-term British government financing to reduce the payments burden on the Malaysian customer.

Another important RMAF requirement is the acquisition of a new maritime patrol capability, with substantially more performance than that provided by the current fleet of four Beechcraft B200T aircraft. The types under consideration include options from Airbus, Boeing and Leonardo. At this stage a complete definition of the desired MPA capability and the available budget has yet to be determined.

For the Malaysian Army the main ongoing procurement programme is the entry into service of the Deftech AV8 GEMPITA 8x8 armoured vehicles. Some 257 AV8, which is based on the FNSS PARS design, were ordered in 12 different variants, with production series vehicle deliveries commencing at the end of 2014. Technical issues, changing requirement and funding limitations have delayed the AV8 programme, which was originally due to complete in

ship classes down to five from the current 15. The five would include: the two SCORPENE class submarines, with two more required, the Multi-Role Support Ship, up to three required, and the KEDAH class OPV, six units in service, with four built locally by Boustead Heavy Industries, and potentially 12 more required. Also included in the five classes are the Littoral Combat Ship (LCS) or Second Generation Patrol Vessel (SGPV). Six units of the LCS

Photo: US Navy



**The Royal Malaysian Navy (RMN) ordered six Leonardo (formerly AgustaWestland) SUPER LYNX 300 helicopters in 1999, with deliveries in 2003/2004. These were the first true embarked maritime helicopters in RMN service. The RMN is now looking at new naval helicopters, with the Leonardo AW159 as a potential contender.**

2018, and it will be at least 2020 before the first batch of vehicles are all delivered. The delays with the AV8 and a need for more protected mobility in the Malaysian Army have led to a decision to keep the Thyssen-Henschel CONDOR 4x4 APC in service. Some 460 of these vehicles entered service between 1981 and 1984, with over 300 still in service. Deftech has developed an upgrade proposal for the CONDOR fleet and potentially these vehicles could remain in service for many years yet. The Malaysian Army also ordered 24 M109A5 self-propelled guns from the US and this will be a major enhancement to fire support for armoured units. Bearing in mind the significant number of modern tanks have entered service in Southeast Asia recently, the Malaysian Army might have to start seriously considering an upgrade to the 48 PT-91M PENDEKAR tanks supplied by Poland from 2007 to 2010. Bumar, the OEM for the PT-91, has made a number of upgrade proposals for the Polish Army PT-91 fleet.

For the Royal Malaysian Navy (RMN) the aim is to bring the number of combatant

are required; the first unit was launched by Boustead in August 2017, with the design being based on the Naval Group GOWIND corvette. A second tranche of six LCS is wanted by the RMN. The last of the five classes is the Littoral Mission Ship (LMS) to be sourced from China, an intention to acquire four LMS, with two to be built in China and two to be built by Boustead has been agreed in principle, though a full contract for these patrol vessels has yet to be signed. The RMN is also looking to acquire more naval helicopters.

Once the election is resolved, the Malaysian government and military can take serious steps to action defence modernisation procurement. It will not all be about new systems though, there is significant work to be done in upgrading existing capabilities and in retiring obsolete/obsolescent equipment that remains in service, added to which ongoing programmes such as the AV8, the LCS and the A400M transport aircraft still have to be paid for. Even taking all of that into account, for the first time in many years the defence acquisition picture is finally becoming more positive. ■

# Malaysian Army and Police Requirements

**Dzirhan Mahadzir**

With a general election to be held this year in Malaysia, it is not surprising that for the time being, the Malaysian government has not unveiled any major procurement plans for the Malaysian Army and the Royal Malaysian Police.

After the elections are concluded, both organisations are expected to press for a series of procurement and development programmes to be implemented from 2019 onwards. Meanwhile, the Malaysian Government has made funds available under the 2018 budget for a number of programmes, including artillery and Special Forces procurement for the Army and the modernisation of communication systems for the Royal Malaysian Police.

## The 2018 Budget

While detailed allocations are not disclosed, the Malaysian Government and its ministers occasionally publish specific talking points or fact sheets which disclose either the amount allocated under the budget for some programmes or programmes that will be undertaken, although no amount is mentioned. For the Army, it was stated that under the 2018 budget they would receive self-propelled 155mm M109A5 howitzers and 105mm howitzers, though no amount was mentioned. It was also disclosed that the Army's Gerakhas Special Forces unit would receive MYR50M (€10.33M) for the purchase of equipment.

The purchase of the M109A5s is the conclusion of a letter of intent signed between Malaysia and the United States, which stated that up to 29 units are to be acquired by Malaysia under the US Excess Defence Article programme.

Once delivered, the self-propelled artillery systems will be refurbished by Malaysia's Deftech together with BAE Systems,

Photos: Dzirhan Mahadzir



**Members of the Royal Malaysian Police's Unit Tindak Khas (UTK) during the National Day Parade. The Malaysian Police will beef up the unit's equipment and capabilities, given the ongoing threats posed by terrorism.**

which is the original manufacturer of the artillery system.

Little information has been released on the 105mm procurement, but sources have indicated that a small batch of approximately 18 105mm LG1 howitzers manufactured by Nexter will be procured. The Malaysian Army currently operates the 105mm Model 56 pack howitzer, but the gun is showing its age. It remains to be seen, though, whether the purchase of the LG1, should it materialise as no formal contracts have been signed yet, will replace the Model 56 or is just a one-off purchase. Malaysia has been making one-off purchases in relation to maintaining a stronger capability in the East Malaysian state of Sabah since the 2013 Sulu incursion. During this incident, about 200 fighters of the self-appointed Royal Sulu Army staged an incursion with the aim of securing the Sulu Sultanate's long-standing claim to Sa-

bah. Since then, Malaysia has established a specific security command in the region, the Eastern Sabah Security Command (ESSCOM), to coordinate military, police and other civilian security agencies along with the state government in maintaining security along the Eastern Sabah coastline. At the same time, programmes were carried out to bolster the military there, such as the establishment of mobile seabases by the Royal Malaysian Navy and the purchase of 20 Deftech AV4 MRAPs for the Army for use in patrol duties in the ESSCOM area. That is why the purchase of the LG1 might be specifically for East Malaysia and not a prelude to replacing the Model 56s. The MYR50M (€10.33M) allocation to the Army's Gerakhas unit is for small purchases of tactical equipment, such as body armour, weapons, helmets and communications and surveillance devices. The Special Forces have a re-

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quirement for specialised tactical vehicles to replace their existing custom Glover Webb 4x4 tactical vehicles, but no money appears to have been earmarked for it so far. Under the 2018 budget, the Royal Malaysian Police has received MYR100M (20.66M)

lery, Malaysia will also be seeking targeting support equipment for these systems. Malaysia currently operates the Saab ARTHUR counter-battery radar system, but there are indications that Malaysia might be looking for another system soon.

The Malaysian Army's plan for its Army Air Corps is for a regiment comprising of three helicopter squadrons, one each of light observation, tactical transport and attack. The light observation role is being fulfilled by the AW109s, while tactical transport is currently fulfilled by the S-61s. The Army's plan for the attack helicopter squadron envisages a conventional attack helicopter rather than a light attack helicopter prior to the purchase of the MD530Gs, and Malaysian Defence Minister Hishammuddin Hussein has stated that the purchase of the MD530Gs were specifically to boost the military forces in Sabah. It is thus likely that, in the future, the Malaysian Army will be looking for an attack helicopter once the MD530Gs are fully operational.

Currently, the Malaysian Army is pondering a potential upgrade of its CONDOR 4x4 armoured personnel carrier fleet; approximately 200-300 vehicles are left of the 459 vehicles originally purchased in the 1980s. Originally, it was planned that the AV8 8x8 AFV built by Deftech of Malaysia would phase out the remaining CONDOR; however the costs of the vehicles have prompted the Malaysian Government to ask for a slower delivery rate for the 257 vehicles ordered. Delivery was scheduled for the end of 2018 but has been rescheduled to the end of 2020, and it remains to be seen whether further vehicles will be ordered. As a result, the Malaysian Army is considering having Deftech upgrade the CONDOR fleet. Sources have stated, however, that the Army may obtain a 4x4 or 6x6 AFV to replace the CONDORs if sufficient funds are available.

The Malaysian Army is still investigating whether it needs another tank regiment to complement the sole regiment of 48 PT-



**The Model 56 howitzer is showing its age; the Malaysian Army is likely to replace it with a more modern system.**

to upgrade its communications systems, though no details have been released as to what these upgrades entail. The Royal Malaysian Police maintains a paramilitary unit, called the General Operations Force along with an at-sea element in the form of the Marine Police. Both units naturally operate in areas where communications are scarce; it is possible that the communications upgrades are wholly or partly in relation to the two units.

## Future Army Requirements

The Malaysian Army does have a number of future requirements under both the Malaysian Army 2010 plus 10 Plan and the Fourth Dimension Malaysian Armed Forces Plan. However, both plans are more focused on the targeted capability and acquisition than on formalised procurement and capabilities timeframes. Much will depend upon the fiscal situation of the Malaysian government and its willingness to fund the military. The Army has a number of aging and obsolete pieces of equipment which will eventually require replacement as well. As mentioned earlier, there is the Model 56 105mm Pack Howitzers, of which an estimated 100 are in service. A long-term plan for the Malaysian Army is the establishment of a third Multiple Rocket Launcher System Regiment to fully flesh out its Rocket Artillery Brigade, which currently has two regiments equipped with the ASTROS II MLRS. However, Malaysian Army sources have indicated that a third regiment, if funding is available, will not necessarily be equipped with ASTROS II. With the procurement of M109A5 self-propelled artil-

The Malaysian Army Air Corps is currently slowly absorbing a transfer of 12 S-61 NURI Helicopters from the Royal Malaysian Air Force to fulfil the tactical transport role. These 12 helicopters are only a temporary measure until the Army obtains funding to purchase a more suitable helicopter. At the same time, by the end of this year, the Army Air Corps is expected to receive the first two out of six MD-530G helicopters. The six helicopters are to be deployed to a forward operating base in Lahad Datu, Sabah, as part of the measures to beef up military capabilities under ESSCOM. It remains open to question as to whether the MD 530Gs will mean the end of the Army's requirement for an attack helicopter squadron.



**The National Special Operations Force, seen here during a display announcing its formation, will likely seek new equipment rather than continuing to draw upon the equipment of other Malaysian Special Forces units.**



91M main battle tanks. Long-term plans for the Army call for an armoured brigade comprised of two tank regiments and a mechanised brigade with supporting elements, but little has developed in regard to such. At one point, it was planned that the second tank regiment for the proposed brigade would be substituted for a cavalry regiment comprising the AFV-30 variant of the AV8 AFV, but that regiment is now under consideration for a permanent deployment of either the entire regiment or parts of it to the ESSCOM area. With the Army's focus on setting up a fifth division (currently the Army has three infantry divisions and one combined arms division) for the purpose of ensuring security in the state of Sabah, the formation of the armoured brigade has been given less priority.

While Malaysia is receiving an undisclosed number of STARSTREAK NG MANPAD systems from 2019 onwards, a requirement still exists for a medium-range surface-to-air missile. This is nominally a tri-service requirement, but it is expected that the bulk of any such purchase will be sent to the Army's Air Defence Artillery Group (Grup Artileri Pertahanan Udara, GAPU) which manages all air defence systems, be it guns or missiles, for the Malaysian Army. Already in 2016, GAPU was recommended to acquire a medium-range SAM for the Malaysian Army, though the Government yet to allocate funding for it. Between 2008–2014, China tried to sell its KS-1 system to Malaysia, and Russia tried to sell its BUK and TOR systems, but the Chinese pitch made little progress, and Russia was forced to stop marketing its SAM systems in 2014 due to the MH17 incident, in which a Malaysian commercial aircraft was shot down by a Russian BUK SAM system over Ukraine.

The Malaysian Army continues to test its version of a military system, the Soldier Advance Combat Technology Integrated (SACTI) system; an experimental platoon performs tests on SACTI, with Malaysia's Sapura producing a large part of the electronic systems for this system. The main problem for the Army was the lack of money to carry out sufficient research and development on it, and Malaysia's limited research and development capacity has little in the way of developing specific and tailored systems for SACTI. Much of the trials has involved establishing whether a soldier system is viable for the Malaysian Army and how best to proceed with an actual system that will be made for operational use.

Other than combat systems, there is also a long-standing requirement for the Army in regard to transport vehicles beyond the 3-tonne cargo capacity, which is adequately fulfilled by the Deftech Handalan



**CONDOR APCs of the Malaysian Army. An upgrade programme to keep the vehicles in service is being considered.**

series of trucks. Currently, roles beyond three tonnes are filled by a mix of vehicles purchased from various manufacturers and customised vehicles. Of course, this mixture has made the logistics, support and maintenance of vehicles more difficult, to say the least, and there has been talk of a standardised fleet of heavy vehicles within the Malaysian Army. As always, however, the problem is that the funds must be made available for such vehicles.

### Royal Malaysian Police Requirements

The main requirement of the Royal Malaysian Police is to replace AFVs operated by its paramilitary unit General Operations Force (GOF). The GOF is trained for paramilitary roles, which include counter-terrorism and border security and it operates field units up to battalion size along with armoured car squadrons; there are 20 battalions distributed among five brigade headquarters. The unit has around five armoured squadrons operating SAXON and V-150 AFVs, which are due to be replaced owing to their age, though funding has yet to be made available. Deftech has offered the AV4 to meet this requirement, but nothing has materialised so far.

Given also the continuing threats of terrorism and concerns about so-called Islamic State and IS-inspired militants, there is a continuing need for equipment such as surveillance systems, bomb disposal equipment along with various weapons and equipments for the Royal Malaysian Police's Unit Tindak Khas (UTK) intervention unit, though all such purchases will be small scale and for specific use rather than issued to all police units or members. The Royal Malaysian Police Air Wing received two AW139 helicopters in 2016 for various operational uses, but the RMP has a requirement for an additional four helicopters, though no funding has been issued yet. Another re-

quirement still outstanding concerns assault rifles; the RMP is supposed to sign a contract with Malaysia's SME Ordnance, which is licence-building the Colt M4 (15,000 rifles), but there are no signs so far that the contract has been signed or executed. With the increasing threats posed by drones, it is expected that the RMP will also be looking at counter-drone systems to protect high-value targets and locations at international summits, meetings and foreign VIP visits during which the RMP is responsible for security. The 2017 assassination of Kim Jong Nam at Malaysia's Kuala Lumpur International Airport using chemical agents is also likely to lead the RMP to seek to obtain additional chemical, biological, radiological and nuclear detection and protection equipment.

### National Special Operations Forces

In October 2016, Malaysia launched a new special operations unit, the National Special Operations Force (NSOF), as a prime response unit to any terrorist incidents. The move to establish NSOF was part of an overall Malaysian Government restructuring of its security laws and apparatus to better deal with the threat of Daesh militants. NSOF consists of 187 personnel from the Special Operations Forces of the Royal Malaysian Police, all three services of the Malaysian armed forces and the Malaysian Maritime Enforcement Agency (MMEA). At the moment, much of the unit's equipment comes from the various Special Forces from which they were drawn, but it is expected that the unit will receive equipment tailored to its needs. Apart from personnel equipment, the unit is expected to require communication and surveillance equipment and intervention vehicles. NSOF is under the National Security Council (NSC) of Malaysia, which is headed by the Prime Minister, though day-to-day responsibilities and administration fall under the Director General of the NSC. ■



# Malaysia and Europe

## European Defence Companies as Contractors of the Malaysian Armed Forces

**Dzirhan Mahadzir**

**A considerable amount of equipment for the Malaysian armed forces is sourced from overseas.**

Like all countries, Malaysia seeks self-reliance and self-sufficiency in its defence equipment. However, given the country's size, industrial base and research and development level, there are limitations to how much can be achieved in regard to them, and a significant amount of equipment in all three services of the Malaysian armed forces is sourced from overseas.

Malaysia does not discriminate on choices of countries to supply its armed forces and thus the Malaysian armed forces operates a variety of equipment from all over the world, including PT-91M Polish Main Battle Tanks, Turkish and Korean armoured personnel carriers in the form of the ACV-300 and KIFV respectively, US F-18 HORNETs and Russian Mig-29 and Sukhoi Su-30

equipment from different foreign sources, and not just a single country, is that Malaysia does not want to be too dependent on one country to meet its defence needs, and at the same time wants to procure platforms and systems that best meet its needs and criteria, regardless of the country of origin. As a result, there is always strong potential for European defence companies



Photos: Dzirhan Mahadzir

***KD LEKIR, one of two KASTURI Class corvettes built by HDW of Germany, carries French EXOCET missiles and uses the Thales TACTICOS combat management system, illustrating Malaysia's preference for a mix of systems from various sources.***

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fighter jets and naval ships whose designs originate from France, the UK, Italy, Germany and South Korea. Even within some platforms there is a multitude of origins for the platform's systems. For instance, the Royal Malaysian Air Force Sukhoi Su-30MKM is an Su-30 equipped with avionics by Thales of France and a laser warning system from the Swedish-South African joint company Saab Avitronics. The reason for this mix of

in the Malaysian market, despite the Government's push for local manufacturing and indigenous design in the procurement of major items, as can be seen in the AV8 AFV programme, which is designed and manufactured locally, and the six-ship MAHARAJA LELA Class Littoral Combat Ship programme from RMN, which is based on Naval Group's GOWIND design, but built solely in Malaysia.

## Offset Requirements

With Malaysia's defence industry having only a limited industrial and research base, such in-country defence programmes depend upon a large amount of foreign systems, equipment and components. Malaysia will continue to be highly dependent on foreign companies both in the short and long term.

Due to the offset requirements, it will require foreign companies to partner with local companies. However, offset requirements will not be called on where a Malaysian company is selected as the prime contractor with foreign companies being subcontracted by the prime contractor. All

fulfilling the offsets offset requirements may not only be in a defence-related form but can also be in non-defence fields, such as educational scholarships and the transfer of non-defence-related technologies.

## European Companies in Malaysia

A large number of European companies are involved in Malaysia through ongoing procurement, support and services of existing equipment or aiming towards meeting future requirements. Airbus, Leonardo, Naval Group, Thales, BAE, Saab, SAFRAN, MBDA and FNSS are among the major European companies in Malaysia, with some

SMART-S Mk2 3D multibeam radar, Rheinmetall's TMEQ Mk2 – TMX/EO Radar/ Electro-optical tracking and fire control system – and a Thales CAPTAS-2 towed array sonar. Weapons systems include BAE's 57mm Mk.3 naval gun which will be provided in a stealth cupola, two MSI-Defence SEA-HAWK 30mm cannons, two J+S Ltd Triple Tube Torpedo Launcher Systems, while the anti-ship missile will be the Kongsberg Naval Strike Missile and the anti-air missile being the MBDA MICA. Construction is now ongoing on three ships with another three to follow soon. Up to now, there have been no problems with the ships' construction, although it should be noted that the weapons and combat systems have not yet been installed and tested.

In 2002, DCNS (now Naval Group) and Izar (now Navantia) were awarded the contract to supply two SCORPENE Class submarines to the Royal Malaysian Navy. Both submarines were delivered in 2009, and currently Naval Group has a joint venture company with BHIC called Boustead DCNS Naval Corporation, set up specifically to handle maintenance and support for the two submarines with facilities in the RMN's Kota Kinabalu naval base to conduct such work.

## Leonardo

Leonardo has a number of involvements in Malaysia, stemming from a legacy of the various companies that are now part of Leonardo, having made sales to Malaysia. For instance, the Leonardo subsidiary Selex sold air defence radars and air traffic control systems for civil aviation to Malaysia. Malaysia's Army Air Corps operates the AW109, while the RMN operates SUPER LYNX helicopters. The RMAF also previously operated MB-339As in the ground attack role before retiring them, and it currently operates MB-339CMs in the fighter trainer role. Leonardo is currently offering its ATR MPA for the RMAF Maritime Patrol Aircraft requirement of four aircraft. No formal timeframe or tender has been issued, though the RMAF has announced in 2017 the go-ahead for the programme and is now assessing potential aircraft for its requirement. Another programme Leonardo is aiming for is the RMN's requirement for six ASW helicopters. Although a formal programme has yet to materialise, the RMN has indicated that a minimum of six ASW helicopters will be required to operate off the Maharaja Lela LCSs. On 20 April 2016, Leonardo signed a teaming agreement with Global Komited, a Malaysian defence company, to jointly promote and distribute the AW159 WILDCAT to the Malaysian Government.



**Italian IVECO trucks are used to transport the Army's Polish-made PT-91M main battle tanks.**

defence procurement contracts awarded by the government to foreign equipment manufacturers that total RM50M (€10.29M) or more involve offset obligations of 100% of the main contract value under the Malaysian Finance Ministry's official requirements. As a general rule, Malaysia often requires foreign companies selling it military equipment to provide a local MRO company or to train a designated company to be able to conduct MRO on the equipment. This is particularly stressed for C4I systems and equipment, where for operational security, the Malaysian Armed Forces requires that MRO and support for such be done by its own personnel or a Malaysian company. It should be noted that

of them, such as Airbus, Leonardo, Thales and Safran, also being involved in Malaysia's civil sector. An overview of several of the major European companies and their programmes in Malaysia are as follows:

## Naval Group

The French Naval Group currently is working together with Malaysia's Boustead Heavy Industries (BHIC) on building the RMN's MAHARAJA LELA class Littoral Combat Ship, of which six have been ordered. The 3,000-tonne ships are based on Naval Group's GOWIND class design and will use Naval Groups' SETIS combat system. Sensor systems include a Thales





## FNSS

FNSS of Turkey's involvement in Malaysia began in 2000 with an order for 211 of its ACV-300 AFVs in 10 variants for the Malaysian Army. The Malaysian government designated Malaysia's Deftech to be the recipient of the technology transfer by FNSS, and Deftech co-produced and assembled 65 of the vehicles in Malaysia. A further order in 2008 followed for 48 more vehicles and 8 ACV-Stretched (ACV-S) vehicles fitted with a 120mm TDA 2R2M rifled mortar system. In 2011, FNSS signed a contract with Deftech for the design, development and manufacture of the AV8 AFV, which would be based on the FNSS Pars AFV. Malaysia has contracted Deftech to produce 257 vehicles in 12 different configurations. The IFV-25 variant of the AV-8 features FNSS's SHARPSHOOTER turrets, while the ACV-30 variant carries the Denel LCT-30 turret. The ATGW version also utilises the Denel LCT turret with box launchers for the Denel Ingwe ATGW. Thales was awarded a subcontract by Deftech in September 2011 to provide advanced open vehicle electronic architecture systems for the new AV8 armoured vehicles. Malaysian defence communication technology provider Sapura Thales Electronics (STE), a joint venture between Malaysia's Sapura and Thales was selected to supply HF and VHF radio communications systems for the AV8. So far, around 100 of the 257 vehicles have been delivered. Delivery was originally targeted to be completed by 2018 but has been pushed back to 2020 owing to the Malaysian Government's fiscal constraints, which prompted the Government to ask for a slower delivery rate than scheduled.

## Airbus

Airbus' defence business in Malaysia relates to the A400M transport and earlier Eurocopter sales of H125M helicopters to the RMN and H225M helicopters to RMAF; both services continue to officially use the old Eurocopter names FENNEC and EC725. Airbus currently continues with its support of the RMAF's A400M capabilities with Full In-Service Support (FISS), where Airbus is not only providing maintenance for RMAF's A400M ATLAS fleet but also logistics, training and information services management. Airbus is also part of the joint venture firm BHIC Aero Services (BHICAS). BHICAS is a JV between the Malaysian company BHIC Defence Technologies (51%), a unit of BHIC, the Malaysian company Prestige Pillar (30%) and Airbus Helicopters Malaysia (19%). BHICAS has the MRO services contract

for all Airbus helicopters operated by the Malaysian Government and military. The RMAF has currently 12 H225Ms, though long-term plans call for more of the type to be procured.

## BAE Systems

BAE Systems has a wide range of involvement in Malaysia, ranging from RMAF HAWK fighter ground attack aircraft and the RMN's two LEKIU class frigates, to a joint venture with BHIC called BHIC Bofors Asia. The latter deals with sales and marketing of Bofors naval guns in the region and production of Bofors gun parts and components along with maintenance, training and obsolescence management of legacy Bofors guns. BAE Systems also provides cybersecurity services in Malaysia, and it is believed that the company is assisting the Malaysian Ministry of Defence in enhancing its cybersecurity capabilities. BAE Systems has been heavily marketing the Eurofighter TYPHOON to Malaysia for its multi-role combat aircraft requirement. That programme has yet to be funded or formally announced; Malaysia's Defence Minister Hishammuddin Hussein has stated that 2020 would be the time for Malaysia to begin looking for an MRCA. BAE Systems, as the original equipment manufacturer, is also awaiting the planned upgrade of the RMAF's HAWK 108 and 208 fleet of 18 aircraft in total. Another programme being targeted is the planned Malaysian purchase of 29 surplus 155mm M109A5 self-propelled howitzers (SPH) under the US Excess Defence Articles programme. BAE, as the current OEM for the M109 series SPH, together with Malaysia's Deftech, hopes to get the contract to refurbish the SPHs for operations.

## Thales

Thales has had a presence in Malaysia since the 1980s, and the company has a joint venture with Malaysia's Sapura in the form of Sapura Thales, which produces and supports Thales' range of tactical radios used by the Malaysian armed forces and also for other armed forces globally. Since 2005, Thales has been operating a Naval Service & Support Centre (NSSC) based in Lumut, to support the numerous Thales systems used by the Royal Malaysian Navy with a new NSSC soon to be inaugurated in Kota Kinabalu. More recently, Thales, together with Deftech has set up a maintenance centre for thermal imagers located in Nilai. Thales supplies to the Royal RMN various sensors and mission

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systems installed on RMN ships including the TACTICOS Combat Management System on the RMN's two KASTURI class frigates. It will supply six SMART-S Mk2 naval surveillance radar systems, as well as six CAPTAS-2 towed sonar systems for the RMN MAHARAJA LELA class LCSs. Along with providing the Malaysian Army with

avionics to the Royal Malaysian Air Force, both for its AMASCOS surveillance system on the B200T maritime patrol aircraft and the DAMOCLES targeting pod on the Su-30MKM. In 2014, Global Komited, a wholly-owned subsidiary of the Malaysian Weststar Group was appointed by Thales to develop, market, and distribute



**Malaysia is the only non-European customer for the Airbus A400M.**



**H225M helicopter of the Royal Malaysian Air Force, Malaysia has 12 such helicopters in service.**

secured digital communications systems, Thales also provides the communication systems for Malaysian Army vehicles along with being a subcontractor to Deftech on the AV8 AFV programme, being responsible for providing an integrated and scalable vehicle electronic architecture for the AV8. Thales has also been supplying advanced airborne mission systems and

a wide range of ground-based air defence systems to the Malaysian armed forces. And in August 2015, Malaysia signed a deal for the procurement of the Thales STARSTREAK Very Short Range Air Defence (VSHORAD) missile system, GM-K1 vehicles and lightweight multiple launchers, radars and command and control systems.

## MBDA

MBDA has supplied a number of missile systems to Malaysia including the JERNAS, SEA SKUA, EXOCET and SEAWOLF systems. The company will supply the VL MICA system for the MAHARAJA LELA class LCS and is promoting the CAMM (Common Anti-air Modular Missile) as the replacement for the SEAWOLF systems on the LEKIU class frigates and the JERNAS systems used by the Malaysian Army.

## Future Prospects

With Malaysia's limited industrial base and defence research capabilities, the country will continue to depend on foreign sources for much of its defence needs, though it will try to alleviate that by insisting on partnerships with Malaysian companies on key programmes. In the coming years, there will be significant opportunities, considering Malaysia's need to replace obsolete and aging equipment. The new coastal mission ships being built – currently four vessels are under contract, although a final target of 18 ships has been set – could offer opportunities due to the need for mission equipment for the modular mission bay. However, the problem with the LMS lies with the fact that the ships are of Chinese origin with two ships to be built in China and another two in Malaysia by BHIC, so there may be limitations as to how much European companies can be involved in this programme. European countries are likely to continue to be major suppliers for Malaysia as both the US and Chinese defence industries, notwithstanding the LMS programme, have made little inroads into meeting Malaysia's defence needs. The defence equipment relationship with Russia has been on the wane since Prime Minister Mahathir Mohammad left office in 2003; it was during his tenure that the MiG-29s and Su-30MKMs were purchased. Malaysia's relations with Russia have been strained since the MH17 incident. Prior to the incident, Russia had been extensively marketing its SAM systems, including the BUK-M1 which shot down the Malaysian airliner, to meet Malaysia's requirement for a medium- to long-range SAM system. Given the current environment where US, Chinese and Russian defence companies have been unable to significantly capture the Malaysian defence market, European companies are expected to continue their strong position of supplying Malaysia's defence needs. ■



# “Procurement of an additional Tranche always remains a possibility.”



Photo: NETMA

**LtGen. Gabriele Salvestroni has been the General Manager of NETMA since August 2017.**

## Interview with LtGen. Gabriele Salvestroni, General Manager, NETMA

Discussions are ongoing about the option of service life extension for national TORNADO fleets to beyond the year 2025 and the replacement of the EUROFIGHTER TYPHOONS at some point in the future. Against this background, ESD spoke with LtGen. Gabriele Salvestroni, the General Manager of the NATO EF 2000 and TORNADO Development, Production & Logistics Management Agency NETMA.

**ESD:** In the course of NATO's agency reform, a number of former agencies have been integrated into what is NSPA today, but NETMA has not – contrary to initial plans. How can that be explained?

**Gen. Salvestroni:** As you know, NETMA is an agency of NATO working to deliver very specific aircraft capability programmes to Germany, Italy, Spain and

the UK. Despite these nations fully supporting the initiatives of NATO to improve efficiency and cost effectiveness across the procurement programmes, it was perceived that integration of the very large, complex and well-established NETMA programmes (TORNADO since 1969 and EUROFIGHTER since 1987) into a centralised procurement entity could add a level



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of risk that the nations could not accept at that time. Core nations' intention not to integrate the NETMA EUROFIGHTER and TORNADO programmes into a NATO procurement entity, now known as NSPA, was taken and communicated through the Joint Steering Committee (JSC) as request-

the supporting key performance indicators to enable NETMA to fulfil its mission of "Enhancing and Sustaining an affordable EUROFIGHTER and TORNADO Capability". Within this context, NETMA is structured accordingly to satisfy the priorities set by nations for the EUROFIGHTER and the

respect to the TORNADO, it is a known fact that the UK is presently in the process of retiring its TORNADO aircraft. Nations are currently working together in order not to interrupt the long-lasting and fruitful cooperation among them for the support of the remaining TORNADO fleets after this date. The principles developed now may also apply when a second nation retires its fleet. This will, however, also depend on the circumstances of that retirement and on the objectives and decisions of the nations concerned. NETMA will provide any support requested and continue the good service and cooperation that the nations have valued over many years.

**ESD:** Are there challenges with regard to obsolescence management?

**Gen. Salvestroni:** Actually, obsolescence management is indeed a serious challenge. It becomes quite obvious when you consider that the EUROFIGHTER is a very modern, quite complex weapon system with more than 80 computers that will continue to fly over several decades. If you now consider how fast personal computers or mobile phones appear and disappear on the market you can appreciate the issue. If you had a computer that is older than 5 years, would you find someone to replace or fix it if it breaks? In principle, this is precisely our challenge. To cope with this NETMA has established obsolescence management with Industry. Through this we are made aware of, within the wide spread supplier base, where we might run into issues. In addition we receive recommendations on how to resolve them, whether through procuring sufficient parts to cover the remaining service life or looking for a new component or computer.

**ESD:** In contrast to that for TORNADO, EUROFIGHTER/TYPHOON production is continuing, but the final assembly lines at Casselle, Getafe and Manching will be closed at some time in the future. Will that have an effect on the operation of the agency?

**Gen. Salvestroni:** Speaking of the closure of the final assembly lines is premature, either due to export orders or the expansion of the fleet by some core nations. NETMA, over the years, has demonstrated its ability to adapt its structure to meet the tasks mandated by the nations, and the nations have always shown their confidence in the initiatives proposed by NETMA. The end of production will be, effectively, an important milestone that NETMA will proactively prepare and adapt for, to ensure it continues to meet the needs of the nations.

Photo: SAC Ben Stevenson, UK MoD



**A TYPHOON F2 fighter aircraft (top) from 11 Squadron, RAF Coningsby, in in close formation with a TORNADO F3 aircraft formerly from the same squadron.**

ed by NATO in 2014. Nations' concerns were centred on the lack of information regarding the organisational, structural, governmental and financial establishment of such an entity. Nevertheless, NETMA has worked very closely with NATO in the execution of these initiatives and has implemented appropriate improvement initiatives within the agency.

**ESD:** NETMA stands for NATO EF 2000 and TORNADO Development, Production & Logistics Management Agency. How do you prioritise the agency's work in these three areas, and are the priorities the same for both types of aircraft?

**Gen. Salvestroni:** NETMA's work is directed and prioritised by its Management Plan, which is defined through the EUROFIGHTER and TORNADO Board of Directors, the core nations' governance bodies controlling NETMA. The NETMA Management Plan defines the strategic objectives and

TORNADO weapon systems. At this time, the EUROFIGHTER activities represent the majority of the work done by NETMA staff, which simply reflects the different stages of the two programmes in the life cycle. Nevertheless, we are now at the point in the EUROFIGHTER programme where we will transition from development and production towards support and sustainment, whereas this is already the case in the TORNADO programme.

**ESD:** According to current plans, Germany will operate its TORNADO fleet until beyond 2025. Will it influence NETMA's cooperation with Germany if the UK and Italy retire their TORNADO fleets?

**Gen. Salvestroni:** NETMA's cooperation with Germany will generally remain as good and effective as ever, already due to the continued operation of the EUROFIGHTER by all member nations. With



"When you're in a hostile environment, miles from a safe landing area, the last thing you need is a question mark about reliability.

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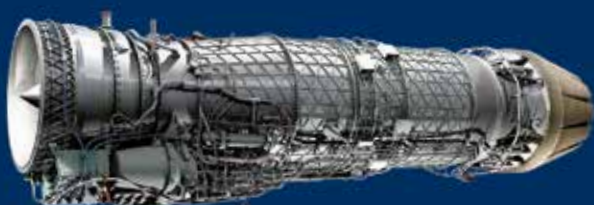
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**A EUROFIGHTER TYPHOON displaying its versatile weapons fit with BRIMSTONE, ASRAAM, PAVEWAY IV and METEOR**

Photo: Luftwaffe



**A total of 992 TORNADO twin-engine multi-role combat aircraft were built between 1979 and 1998. In three primary variants (IDS, ECR, ADV), the aircraft is in service with the air forces of the UK, Italy, Germany and Saudi Arabia. Shown here is a German IDS aircraft.**

**ESD:** What are the advantages of the "Agreement to Streamline the Type and Airworthiness Certification Process and Reduce the Workload on Nations and their Military Aviation Authorities" for the EUROFIGHTER/TYPHOON programme?

**Gen. Salvestroni:** Nations and Industry have adopted the principles of the European Military Airworthiness Requirements (EMAR) for EUROFIGHTER to allow granting design organisation privileges for minor changes and repairs. Since its first step of

implementation in 2016, it has released nations' scarce resources from involvement in the certification of many minor changes and at the same time reduced the processing time of those changes by two-thirds, helping production deliveries.

Reliance on the respective 'lead' certification officials in the progression of major changes is now underpinned in a fully regulated compliant manner by mutual recognition and can therefore free three-quarters of effort from nations at a system level. Still, we do not see the full benefit because of a surge of national clearances.

The next steps are related to repair, and this is expected to help in-service fleet maintenance by allowing repairs developed once to be applied everywhere without further approval loops.

Retrospectively, a big effort for processes and approval of design organisations has been necessary. On the other hand, we have commonly achieved the first conversion of a 'legacy' fighter aircraft to EMAR principles, which has future-proofed the EUROFIGHTER programme.

**ESD:** What chance do you envision for subsequent EUROFIGHTER Tranche 3B or 4 production programmes?

**Gen. Salvestroni:** At present, Tranche 3 production and assembly for core nations is continuing, along with production orders for our export customers in Oman, Kuwait and Qatar. While the core nations continue to regularly review the composition of their air forces, the procurement of an additional Tranche always remains a possibility and of course the German Air Force recently released a request for information for a possible procurement of additional aircraft to replace its TORNADO fleet and will be considering several candidates including the EUROFIGHTER.

**ESD:** Your previous position was that of the Comandante Logistico dell'Aeronautica Militare, thus offering insight into the spare parts supply to the Italian Air Force. What is your opinion of the spare parts management in the scope of the EUROFIGHTER programme?

**Gen. Salvestroni:** In the late '90s, the four nations set up arrangements to manage the supply chain for the in-service phase of the EUROFIGHTER in a centralised manner, via two main contracts: one for the procurement of new spares and one for the repair of repairable parts. The former was based on best endeavour, while the latter required a turn-around time for a selected number of items (avionics), with the others managed on a case-by-case basis. For both contracts, IT tools were available, which provided full



visibility on the status of the procurement or repair orders placed by the customer.

Around 2012, nations decided to change this spare management construct, with the aim of increasing their fleet availability and reducing the sustainment costs. A new suite of contracts was agreed with Eurofighter GmbH and the former repair contract was replaced by Contract No.3 (Dec 2016), where each nation defined its specific requirements for a support solution based on availability at platform, equipment or component level. Thus, nations moved from centralised spares management to national support solutions agreed with their respective industries, with specific performance measurements, terms and conditions.

It is premature to say whether the new course undertaken by nations is delivering the envisaged benefits. At the moment, nations are satisfied in terms of increased fleet operational availability, but cost savings are still marginal. Moreover, the new construct has implied a loss of transparency and visibility of the spares management at international level, since the activities are directly performed by the national industries. What I can say is that the new course for support undertaken by nations cannot be reversed for a number of good reasons, but I am convinced that some corrections shall be applied to fully exploit the significant advantages that an international programme can offer to the participating nations.

**ESD:** What is the status for the retrofit of an AESA radar?

**Gen. Salvestroni:** As with any project of this complexity, there are still technical challenges to be overcome, but overall efforts

to fit an AESA radar to TYPHOON are proceeding well. The AESA system will bring a step-change in capability and will also be supported by a fundamental reworking of the methodology used to manage sensors on board the aircraft. Furthermore, nations are already looking at the next evolution of the TYPHOON's radar systems, to make sure the platform continues to be credible as the threat environment develops.

**ESD:** Considering the lessons learned from the TORNADO programme, what measures are taken by NETMA to prevent a separation of technology standards between the four nations in the EUROFIGHTER/TYPHOON programme?

**Gen. Salvestroni:** The TYPHOON programme is built around consensus between the four core nations, and so it is essential that they have a very clear process for maximising commonality in their requirements. Presenting industry with a single joint requirement helps to minimise divergence within the technical solutions which they then develop. Inevitably, there will be times when a nation requires something unique – in support of current operations, for example – but the programme philosophy is to draw these individual technology solutions back into the common baseline as quickly as possible. Without this, the programme would soon be managing numerous variants of TYPHOON for each nation, with all the cost and complexity this would entail.

**ESD:** Does NETMA have a role for the export customers like Austria, Saudi Arabia or Oman? Do you support the EUROFIGHTER export campaigns?

**Gen. Salvestroni:** The role and relationship of NETMA with Austria and the Kingdom of Saudi Arabia is clearly defined through specific Association Memorandums Of Understanding (MOU) between the four core nations and each export partner nation. Under the umbrella of these MOUs, both export partners have a Programme Liaison Office (PLO) within NETMA. The objective of these PLOs is to share information and participate in meetings of the International EUROFIGHTER TYPHOON programme (managed by NETMA) in several areas: new developments, operational experience, flight safety, in-service support, configuration management, and so on. In the case of Oman, since there is not an agreed Association MOU, NETMA does not have any relationship with this export nation.

With regard to supporting the EUROFIGHTER export campaigns, NETMA provides advice to nations and industry partners on programme impacts and potential mitigations, provides access to shared assets, coordinates the release of appropriate documentation, controls MOU support and contracting action, gives advice on accession planning for NATO member customers as well as association activities. Also, during early stages of each export prospect or campaign, NETMA, on behalf of NATO, represents the core programme nations as the governmental defence organisation, at least until a lead nation is agreed at ministerial level for the specific export campaign.

**The questions were asked by Jürgen Hensel and Ulrich Rapreger**



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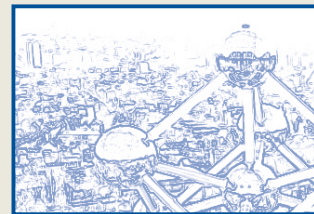
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# The Brussels Backdrop



## NATO versus Russia in the Baltic Region

**Joris Verbeurgt**

The Baltics is a geopolitical term that refers to the sovereign states of Estonia, Latvia, and Lithuania, situated in Northern Europe on the Eastern coast of the Baltic Sea. Although the Baltic countries do not share the same national, cultural or linguistic identity, they have a lot in common that distinguishes them from their neighbours Russia and Belarus (Lithuania also shares a small border with Poland). The World Bank classifies all three Baltic states as high-income economies, and their societies are democratic, developed and open. In 2004, they all joined NATO and became full members of the European Union. A few years later, they acceded to the Eurozone. On the

tions by building his new capital Saint-Petersburg just 160 kilometres to the East of Estonia. In the 19th century, the russification process gained momentum but met with fierce resistance from the Baltic peoples, who refused to become Russian. In the turmoil that followed the World War I and the Russian Revolution, the Baltic states regained independence for a short period of time. In 1939, they were occupied by Soviet Russia as part of the deal between Hitler and Stalin to divide Poland. Then, and again from 1944 to 1953, the Soviets 'purified' the Baltics from anti-Russian sentiment by oppression and terror, mass deportations and executions.

USSR and in 1991, the Soviet Union collapsed. Estonia, Latvia and Lithuania became independent nations once again. Determined never again to be subjected to Moscow, the newborn states turned to the West for support and protection. NATO and EU membership has become a top priority for democratically elected governments and the necessary political, economic, social and military reforms have been implemented.

### The Baltic Air-Policing Mission

However, the Baltic states have a number of disadvantages vis-à-vis Russia: Firstly, there is an enormous difference in the size of the territory and population as well as in political, economic and military strength. Second, from a strategic point of view, the Baltic region is clammed between the Baltic Sea, Russia and the Russian exclave of Kaliningrad. It can easily be cut off from the European hinterland and from allied support. Thirdly, centuries of Russian occupation and Stalin's forced resettlement and population transfer have led to significant Russian minorities living in all the Baltic states. Their allegiance to Moscow is beyond any doubt and they can easily serve as a pretext for Russian mingling into Baltic affairs. In short, the Baltic republics are in themselves an easy and desirable prey for Russia. NATO's first measure to defend the sovereignty of the newly acceded members was to secure their airspace. As early as March 2004, NATO launched the Baltic Air Policing Mission. NATO Air Policing is a collective task and a purely defensive mission with round-the-clock fighter interceptor aircraft ready to respond quickly to violations and infringements of the NATO airspace. On a three- or four-month rotation basis, practically all major NATO Allies contribute to the

Photo: Press Office / President of the Russian Federation

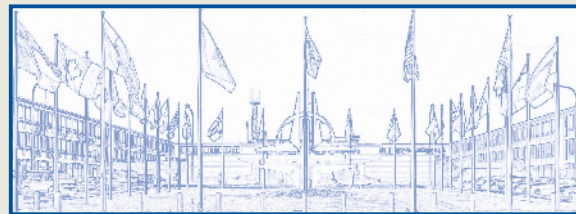


**Russian HIND helicopters during the "Zapad" exercise, the largest show of force in Europe since the end of the Cold War**

regional level, the three countries cooperate in several intergovernmental organisations. However, the most unifying factor for the Baltic nations is their distrust of, and fear from, Russia. At the beginning of the 18th century, the Russian Czar Peter the Great conquered large parts of the Baltics to give Russia access to the Baltic Sea. He stressed the importance of this historic shift in Russian power aspira-

But from behind the Iron Curtain, the Baltic peoples never stopped looking towards the West and it was their thirst for liberty that placed the first nail in the coffin of the USSR. In 1988, under the leadership of the Lithuanian Algirdas Brazauskas, the Baltic nations removed themselves from Moscow and gradually gained their independence. Their example inspired other republics in the





Baltic Air Policing mission. The mission is based on Šiauliai International Airport in Lithuania and, starting in 2014, also on Ämari Air Base in Estonia. Usual deployments consist of four fighter aircraft with between 50 and 100 support personnel.

bases lack hardened aircraft shelters make them vulnerable to attack. And Russia has long range Anti-Aircraft Artillery (AAA) deployed in Kaliningrad and near Saint-Petersburg. In a war scenario, air operations from this area would be seriously hampered.

## Tensions are Rising

Tensions in and around the Baltics are rising. In September 2017, Russia and Belarus conducted massive military exercises along their Western borders and in the Russian exclave of Kaliningrad. The exercises known as “Zapad” (sunset or West) are perhaps the largest show of force in Europe since the end of the Cold War. Although Russia claims the exercises are purely defensive, the estimated number of 100,000 participants and the Kremlin’s lack of transparency surrounding the exercises, alarmed Poland and the Baltic states. In the same period, approximately 19,000 troops from Denmark, Estonia, Finland, France, Lithuania, Norway, Sweden, and the United States, were mobilised as part of a three-week exercise called “Aurora”.

In February, Russia send twenty warships from Baltiysk Naval Base in Kaliningrad to the Baltic Sea for war drills, as NATO members in the region prepared their citizens for invasion. Missile ships, mine-sweepers, military aircraft and helicopters took part in this combat training mission. Anti-ship and air-defence operations were trained, including artillery fire against air and naval targets, mine-laying and depth bombing. Sweden, Lithuania and Latvia issued warnings to their citizens, measures echoing the heydays of the Cold War. Tensions have come to the fore again after NATO accused a Russian jet of risking a collision with a civilian plane by attempting to avoid detection near European airspace. And on 15 January, Belgian F-16s intercepted two Russian TU-160 BLACKJACK bombers over The Netherlands that were heading for the UK.

Since the end of the Cold War, NATO and Russia have maintained a balance of power in the Baltic region. The recent provocations, large-scale exercises and the military build-up on both sides may disturb this balance or lead to a renewed arms race that will not be limited to the Baltics. The rhetoric of the Cold War can be heard again in Moscow, Brussels and Washington. The last word on this subject has not been spoken, but the Baltic states are a serious cause for concern.



Photo: US Air Force

**US Air Force F-15 EAGLE conducting air policing over Lithuania**

NATO members support the Allies who do not have the necessary resources to conduct airpolicing on their own. The Supreme Allied Commander Europe (SACEUR) is responsible for the conduct of the NATO Air Policing Mission, which is part of the NATO Integrated Air and Missile Defence System.

## Responding to an Assertive Russia

The smooth manner in which Putin annexed the Crimea in 2014, without NATO or Western powers being able to do anything about it, heightened fears in Tallinn, Riga and Vilnius, the respective capitals of Estonia, Latvia and Lithuania. In response to the changed security environment, air policing has been intensified. The US Air Force deployed six F-15C EAGLE fighter jets to Šiauliai, together with two KC-135 aerial refuelling aircraft. The US also heightened its NATO presence by establishing a second airbase in Ämari near Tallinn, while the French Air Force reinforced the Polish Air Force at Malbork Air Base (Poland). However, the fact that the Baltic air

As a result of the Russia-Ukraine crisis, NATO has deployed four multinational battlegroups, totalling approximately 4,500 troops, to the Eastern flank of the Alliance. The decision was taken at the Warsaw Summit in 2016 and a year later, the four battlegroups were operational and certified. NATO’s Enhanced Forward Presence is a defensive and proportionate deterrent force, fully in line with NATO’s international commitments. Canada leads the battlegroup in Latvia and Germany leads the battlegroup in Lithuania. The battlegroup in Estonia is led by the United Kingdom and the battlegroup in Poland by the United States. Enhanced forward presence forces are complemented by the necessary logistics and infrastructure to support pre-positioning and to facilitate rapid reinforcement. The four battlegroups are under NATO command, through the Multinational Corps Northeast Headquarters in Szczecin, Poland. The contributions made by a number of NATO Allies convey a clear message that an attack on one Ally will be met by troops from across the Alliance.

# Polish Procurement, Naval Industry and the Navy

Eugene Kogan

Poland's naval procurement programmes are drafted by the Ministry of National Defence (MoND), implemented by industry and delivered to the country's main customer, the Navy. In the last decade, the MoND has prioritised hardware deliveries to the land forces and the Air Force. As a result, the Navy has become the most underprivileged service of the military, as funds were not allocated for modernisation and renewal of the fleet. The situation has changed recently, but the final results will only be known in 5 to 10 years' time.

The procurement plans of the Polish Navy have changed significantly since their announcement in January 2017. Colonel Dariusz Pluta, a new chief of the MoND's Armaments Inspectorate (AI), said: "A large number of programmes were behind schedule, although some new programmes had been announced. In line with the PLN13Bn (US\$3.2Bn) mo-

lose rather soon its ability to operate effectively in the Baltic Sea region. In addition, Lukasz Kister of the Jagiellonian Institute in Warsaw said: "The acquisition of submarines, where Poland is to acquire three ships, is crucial for maintaining the operational capacity of the Navy. The submarines of the Navy entered service 50 years ago and are therefore no longer

## Programmes behind Schedule

- 1) Construction of the three 2,600-tonne MIECZNIK class coastal defence vessels. Commissioning of the first of the three ships is not expected until 2024, six years later than expected.
- 2) The construction of the three 1,700-tonne patrol boats of the CZA-PLA class is currently being delayed by five years, with the first boat scheduled to be commissioned in 2022.
- 3) The modernisation of the diesel-electric submarines of the ORKA class is currently being delayed by five years, with the first submarine due to be commissioned by 2024-25.
- 4) The construction of the 1,800-tonne offshore patrol boat SLAZAK has been delayed by 18 months. The first sea trials are scheduled for March-April 2018, and delivery of the boat is scheduled for the third quarter of 2018.
- 5) A programme for three new KORMORAN II mine countermeasures vessels (MCMC or mine hunters) is underway, with the command ship being delivered to the Navy on 30 November and not, as previously reported, in March 2017. During the MoND briefing on 27 December 2017, it was announced that two more KORMORAN vessels are scheduled to be delivered in January 2020 and November 2021.

Just as with Poland's battle fleet, there were also delays in the country's support and auxiliary boat procurement plans. The delivery of nine TANSZOL class utility boats has been delayed by three years until 2021. The RATAJ class rescue vessel delivery has been delayed until 2023, while six HOLOWNIK class tugboats have been delayed until the end of 2020, with the first tugboat scheduled for delivery in 2019.



Photo: Jan Szurgot / Wikipedia CC

**Christening of a SLAZAK offshore patrol vessel in 2015**

dernisation programme approved on 7 October 2016, the Navy will undertake 22 different modernisation tasks, including the commissioning of 30 new vessels." According to Polish unnamed analysts, without accelerated efforts to purchase new ships and equipment, the Navy might

be capable of performing their basic tasks." Kister added: "It is essential to closely link the planned procurements to another priority programme with which the Ministry aims to acquire cruise missiles." These two purchases should be made at the same time in order to "avoid unnecessary delays in the armament of submarines", and to bring the Navy up to date with the latest technology and revive its capability profile. Before we look at the current situation of the Polish naval industry and its main customer, the Navy, let us highlight the current state of the country's naval programmes.

## Author

Eugene Kogan is a defence and security expert based in Tbilisi, Georgia.



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## New Programmes

The first new programme envisages the construction of the MURENA class fast-attack missile craft to be commissioned between 2027 and 2030. The second programme foresees the purchase of 10

KIJANKA unmanned autonomous vessels by 2030 for mine hunting and minesweeping missions. A single MARLIN class joint operation support ship is due to enter service by 2026. The plans also provide for the commissioning of DELFIN class electronic warships by 2022.

In March 2017, Michael Jach, Chairman of Parliament's National Defence Committee, said: "The MoND is expected to decide in 2017 on the supplier of three new submarines for the country's Navy. The first submarine will be built around 2023 and will cost about US\$500M." Three companies have applied to take part in the procurement procedure: Naval Group (formerly DCNS) of France, Saab Kockums of Sweden and ThyssenKrupp Marine Systems (TKMS) of Germany. The ministry officials have stressed that they expect the selected supplier to cooperate closely with the Polish naval industry on the contract. It appears that the Polish Armaments Group (known under its Polish acronym PGZ) will be the designated partner for potential foreign suppliers, since PGZ is a large state-owned defence industry conglomerate, which includes naval facilities. The MoND has not yet decided on the supplier of submarines. In January 2018 it was reported that the French offer was the only one that included cruise missiles. It remains to be seen whether it could put Naval Group in a privileged position to secure the deal.

In April 2017, Saab Kockums was awarded a contract to build a special-purpose Signal Intelligence (SIGINT) ship for the Swedish Navy. Following the award of the contract, Saab Kockums chose Nauta Ship Repair Yard from Gdynia as a subcontractor. Nauta is a subsidiary of PGZ. Whether cooperation between the Swedish and Polish companies will give them with leverage over German and French competitors is open for discussion.

On 28 June 2016, an MoU was signed on the establishment of a joint German-Polish submarine authority. The offers of the three competitors should be assessed in terms of cost, benefit and overall contribution of each competitor to the security of Poland.

In April 2017, the MoND also initiated a thorough analysis of the acquisition of new MPAs for the country's armed forces. The new aircraft will replace the M28 BRYZA and M28B BRYZA, which are upgraded variants of the An-28 aircraft. The MoND said that the procurement should be carried out under a programme aimed at "increasing the capacity for comprehensive naval reconnaissance and combatting submarines and ships". Concrete information on the time schedule, the procurement procedure and the amount and value of the planned purchase will only become known after the end of the analysis phase.

Poland is also reviewing two submissions it has received in March 2017, which would fulfil Poland's ASW helicopter requirements. Airbus Helicopters is bidding its

Photo: Jan Szurgot / Wikipedia CC



**A SLAZAK offshore patrol vessel being outfitted in 2017**

Photo: Andrzej Otrebski / Wikipedia CC



**A KORMORAN minehunter in the Northern Shipyard in Gdansk**



H225M, while Leonardo Helicopters is proposing the AW101 for ASW missions. The unnamed MoND official said that the naval helicopters will not be required until 2019, but the ministry might purchase them in two batches of four, depending on the delivery schedule.

There is no doubt that the Polish government has an ambitious programme for its outdated Navy, and the country's naval industry is playing an active role in modernising the Navy.

## The State of Poland's Naval Industry

PGZ's prime intention was and still is to consolidate the shipbuilding industry to protect national security interests related to the Polish Navy and then implement the "Acting Against the Naval Threats" programme. The latter is part of the Technical Modernisation Plan drafted for the Polish armed forces. PGZ's take-over of the Polish Naval Shipyard Company (Stocznia Marynarki Wojennej – SMW) headquartered in Gdynia in February 2017 was a first step in the consolidation process. PGZ agreed to modernise SMW's industrial infrastructure and to pay off the company debts. According to Cezary Cierzan, the PGZ representative, "SMW will undergo a certain transformation but without radical human resource changes and lay-offs. No plans exist to implement such radical decisions. Nevertheless, certain personnel adjustments will be made." Cierzan did not elaborate any further on the company's transformation and human resources, and there is no information on PGZ actually paying off the company's debts. The most important task of the SMW, however, is to complete the construction work for the aforementioned SLAZAK offshore patrol boat and to deliver the boat to the Navy. SMW will also participate as a subcontractor in the construction of the new submarines mentioned above. For the naval industry, it is worthwhile to acquire the necessary technology to modernise and repair submarines. A next step could be to secure the capacity for the construction of submarines and not to rely on the export of submarines from foreign suppliers. This, however, requires funds, skills and know-how that Poland does not currently have. On the other hand, it could be a long-term plan that the MoND intends to develop and revise/update over time. In addition to SMW, the Polish shipyard Remontowa Shipbuilding, a subsidiary of Remontowa Holding Capital Group, must be mentioned. Formerly known as Northern Shipyard based in Gdansk, it is the main supplier of naval vessels to the Navy, includ-



Photo: Grzegorz Jereczek / Wikipedia CC

**Poland wants to replace its fleet of M28B BRYZAs with new aircraft. The M28 BRYZA is an upgraded variant of the An-28.**



Photo: Airbus Helicopters

**Airbus Helicopters is bidding its H225M helicopter for Poland's ASW helicopter programme.**

ing the aforementioned KOMORAN II class built by the shipyard and the HOLOWNIK class tugboats currently under construction. The Centre for Maritime Technology (CTM, also known as OBR CTM), as an important research institution in the field of military marine technology, should also be included. CTM is a member of the PGZ group and developer of subsystems for the rescue vessels KOMORAN II MCMV and RATOWNIK.

Finally, in January 2019 it was reported that PGZ and OBR-CTM have joined 40 European companies participating in the OCEAN 2020 programme. The aim of the project is to expand the potential of unmanned technologies in the field of surface vessels, submersibles and aircraft for monitoring and reconnaissance missions in the maritime sector. PGZ and OBR CTM

would provide European partners with expertise in the development and integration of land-based and ship-based sea observation systems. Polish companies would also support the Navy in carrying out project-related exercises and training operations. OCEAN 2020 is the first all-European military research project whose central importance for the Polish naval industry should not be underestimated.

## The Customer – Navy

The Polish Navy is the smallest service of the country's armed forces. It has about 7,000 employees with the 3rd Flotilla in Gdynia and the 8th Coastal Defence Flotilla in Swinoujscie. In addition to the usual frigates and submarines, it has a small fleet of naval aircraft, including fixed wing and helicopters. It

is true that the current fleet has been somehow neglected; in the last decade the Polish Government's main objective has been the renewal of land forces and the Air Force. However, the Polish Government's focus has recently shifted to the Navy, which is to become a robust force supported by a modernised fleet and new ships and submarines under construction. The Navy will also receive new MPA and helicopters for ASW. The above-mentioned KORMORAN II class ship is used to search for mines and take countermeasures against them in the waters of the Polish Exclusive Economic Zone (EEZ) and to participate in tactical forces in the Baltic and North Sea. The HOLOWNIK

class multipurpose tugboats are used for military and logistical operations to assist at sea and in harbours, for technical evacuation operations, SAR missions and for the recovery of oil spills.

As a member of NATO and the EU, the Polish Navy joins forces with other NATO members such as Denmark, Germany and The Netherlands as well as the non-NATO but EU-member states Finland and Sweden on patrol activities in the Baltic Sea.

In order to strengthen cooperation, in particular between Germany and Poland, the aforementioned MoU on the establishment of a joint German-Polish submarine authority was signed on 28 June 2016.

The authority is to be integrated into the Maritime Operations Center (MOC) of the German Navy in Glücksburg and will take bi-national operational control of German and Polish submarines. In February 2018, no information was available on the integration of the authority. However, the command of the submarines remains with the respective countries. Nevertheless, two Polish naval officers will be permanently stationed in the German MOC. A spokesman for the German Navy also pointed out that other countries could possibly be included in the joint authority. An offer has already been extended to Norway, but as of February 2018 the Norwegian reaction was not yet known. However, the MoND stated that it had no information whatsoever about the desire to extend the joint German-Polish submarine authority, which was signed as a bilateral agreement, to other countries.

As expected, Russia has condemned the German-Polish move as unnecessary provocation. Sergei Shoigu, Russian Defence Minister, said in June 2016: "The military-political situation along [Russia's] Western borders remains unstable. The United States and other NATO members continue to build up military capabilities, especially in the neighbouring countries of Russia," while Russia sits on the fence and does nothing against Western encroachment, to say the least.

In conclusion, the next five to ten years will be crucial for the implementation of Polish procurement programmes for the Navy, for the ability of Poland's domestic industry to learn, acquire and use new technologies and for the revitalisation of the Navy. The participation of Polish companies in the OCEAN 2020 programme would further improve the skills and expertise of Polish industry and contribute to the surveillance of the EU's maritime borders. It remains to be seen whether the formula of bilateral German-Polish submarine cooperation can be extended to other countries or other types of ship cooperation. Russia is, in fact, still an opponent of NATO in the Baltic Sea, and it is therefore to be expected that the Russian Navy will strengthen its position in the region by increasing its fleet presence and carrying out naval exercises. The statements of high-ranking Russian military officials should be carefully evaluated, but not exaggerated. A Russian defence and security policy aiming to harass and intimidate the naval forces of NATO and EU countries in the Baltic Sea should be expected, and NATO and the EU's navies should react accordingly, that is to say, be prepared to counter Russia's hostile movements, but react with restraint. ■

Photo: Nikodem Nijaki



**As a first step to consolidate Poland's naval industry, the naval shipyard Stocznia Marynarki Wojennej (SMW) in Gdynia was taken over by PGZ.**

Photo: Andrzej Otrebski / Wikipedia CC



**The Polish shipyard Remontowa Shipbuilding in Gdansk, formerly known as Northern Shipyard (Stocznia Polnocna), is the main supplier of naval vessels to the Navy.**



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**Esteban Villarejo**

**The government will promote seven new programmes in the next 15 years: 8x8 vehicles, F-110 frigates, MRTT aircraft, upgrading the CHINOOKs, NH-90 helicopters, jet trainers and a new command and control system.**

Spain is ready to launch a new investment cycle in the defence sector “to renew equipment and weapon systems that have become obsolete, and update the military capabilities,” the Minister of Defence, María Dolores de Cospedal, told European Security & Defence (ESD). The plan of the Spanish Government is to approve “a first phase with seven major projects,” according to Minister Cospedal: “A new 8x8 armoured fighting vehicle, frigates of the new class F-110, tanker aircraft, a new command and control system, upgrading the 17 CH-47D CHINOOK helicopters in service, and purchasing new NH-90 CAIMAN helicopters.” This investment could reach the amount of €25Bn in 15 years, according to other official sources.

In addition, the Spanish government will invest €1.5Bn in the construction of four ISAAC PERAL class (S-80) submarines, the original design of which had to be changed due to some setbacks in the design phase. The initial investment was estimated at €2.1Bn.

The Spanish Air Force will also acquire four General Atomics MQ-9 REAPER surveillance UAVs and replace its F-18 HORNETs in the upcoming years.

## 1.53% of the GDP in 2024

All these initiatives follow Spain's commitment to progressively increase its defence expenditure from 0.92% of GDP to 1.53% by 2024. The Spanish authorities sent a letter to NATO Secretary General Jens Stoltenberg informing him of this forecast “as long as the economic and budgetary situation allows it,” Minister Cospedal told ESD. The 1.53% of the GDP – which is still far from the NATO goal of 2% – would increase the Spanish Defence budget from €10.74Bn in 2017 (according to the latest statistics of NATO) to €18Bn in 2024. Therefore, it is expected that the Spanish expenditure in Defence will increase by 67.6%.

However, there is a hurdle the Spanish Government will have to overcome: The new budget for 2018 has not yet been adopted due to the political situation in Catalonia. The Nationalist Basque political party PNV does not want to support Mariano Rajoy's cabinet until a new Catalan government is formed after the regional elections in December. The liberal party Ciudadanos and PNV are the two main parties that could support Rajoy's cabinet to approve the budgets for this term of office, which should end with general elections in 2020.

## 348 PIRANHAS

The so-called “VCR 8x8” project is the main priority of the Spanish Ministry of Defence; it plans to acquire 348 PIRANHA 5 8x8 wheeled armoured fighting vehicles from General Dynamics European Land Systems (GDELS) as a first procurement lot. There will be 13 different configurations of the vehicle. In other acquisition phases, the total number of vehicles for the Spanish Army could be around 1,000.

The objective of the VCR 8x8 programme is to obtain an 8x8 wheeled armoured ve-



Photo: General Dynamics

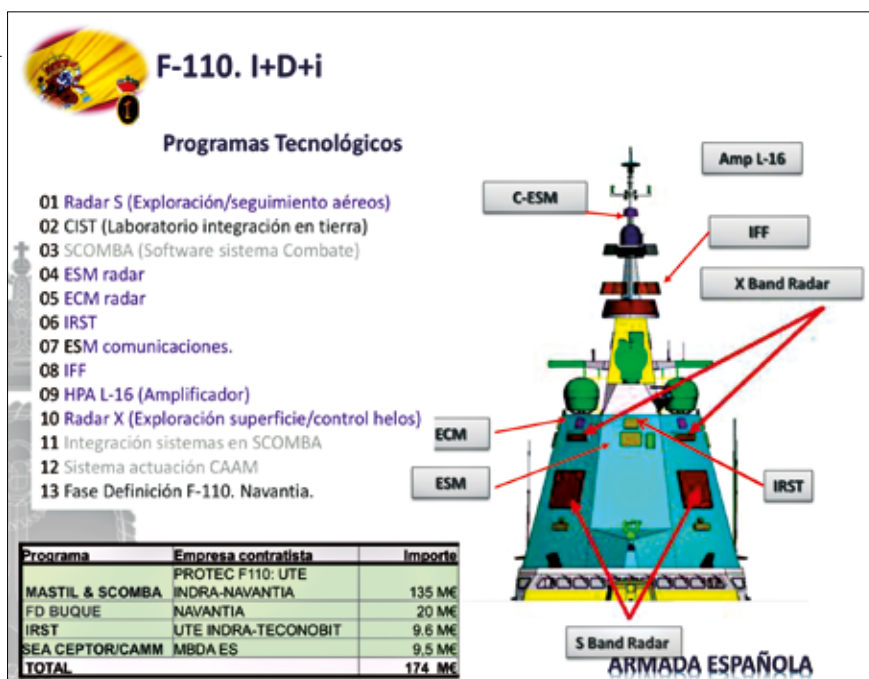
**348 PIRANHA 8x8 are to be acquired in the scope of the VCR 8x8 effort.**

But, despite the difficult political scenario, the Spanish Government and the armed forces made some steps to launch the new investment cycle. Some details on the “seven major projects” and three other important capabilities (submarines of the S-80 class, MQ-9 REAPER and the replacement of F-18 fighter aircraft) have already been revealed:

hicle to replace the obsolete 6x6 wheeled PEGASO BMR, the MLV LINCE, RG-31 and TOA M-113. The new 8x8 armoured fighting vehicle is expected to weigh 33 tonnes and surpass 100 km/h over a 72-hour mission duration.

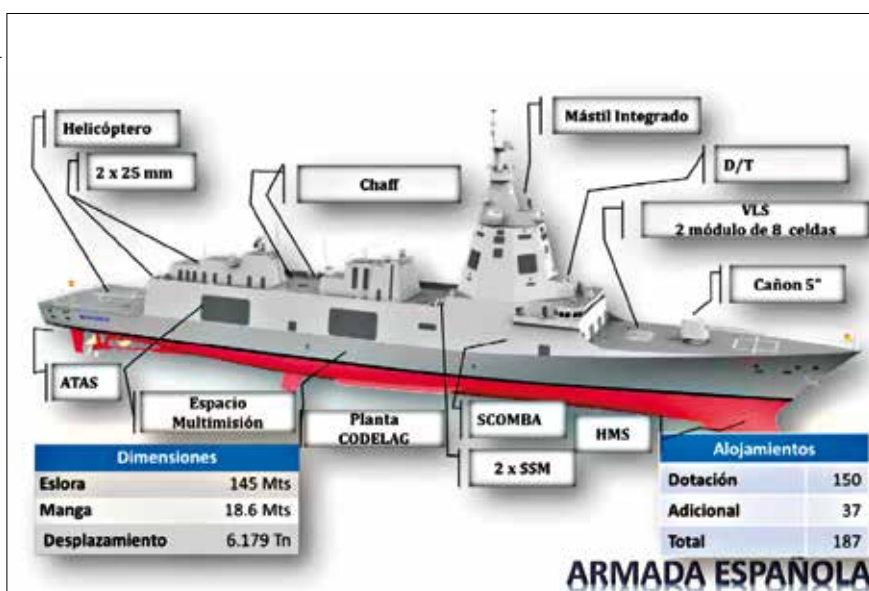
The State Secretary for Defence, Agustín Conde, told the National Congress that the total budget for this programme is es-

Photo: Armada Española



The technological features of Spain's new F-110 frigates

Photo: Armada Española



The first F-110 frigate will be operational by 2024.

timated at €3.8Bn: €1.6Bn for the acquisition itself and €2.25Bn for maintenance and modernisation over the 30 years of the programme's useful life. Three Spanish companies – Santa Bárbara Sistemas (the Spanish subsidiary of GDELS), Indra and Sapa – are already drafting a first research and development (R&D) contract worth €181M in a temporary joint venture called "UTE VCR 8x8."

Other companies involved in the project are Elbit Systems (UT-30 Mk2 turret), Rafael (SAMSON MK-II and MINI SAMSON turrets and SPIKE anti-tank guided missile), the Spanish Escribano Mechanical & Engineering (GUARDIAN 2.0 turret), Leonardo (HITFIST turret), Alliant Techsystems

(ATK MK44-ABM BUSHMASTER II chain gun), and Wegmann (76 mm protection system).

The R&D programme is developing six different technological projects related to security measures, situational awareness, long-range vision, fuel efficiency, and command and control. After three years of R&D, the Spanish Army plans to start testing the prototypes in November. Industrial production of the first 348 vehicles is expected between 2019 and 2024.

### Five New Frigates

The Spanish government has given the go-ahead for its new generation of frigates,

having approved four R&D contracts worth €174M since 2015. A temporary joint venture of two Spanish companies, the shipbuilder Navantia and the technology company Indra, was formally set up that year.

The construction contract from the Spanish government is expected before June. The Chief of the Staff Admiral Teodoro López Calderon told ESD that the Spanish Navy estimates that the first new F-110 frigate will be commissioned in late 2023 to be fully operational by 2024.

The purpose of the R&D contracts is to implement the following programmes: Integration of sensors on the mast and integration of new capabilities into the SCOMBA combat system, the infrared search and track system, the design phase of the new frigate, and the SEA CEPTOR missile system capability. The companies involved in the F-110 frigate project are mainly Navantia, Indra, Tecnobit (Oesía Group), Saes, Raytheon, Sener, MBDA and Lockheed Martin. The budget of this programme is still unknown.

The F-110 frigates will replace the six SANTA MARÍA class frigates (F-80) between 2023 and 2027; they will operate in high-threat scenarios, forming battle groups at sea or acting in littoral areas. The Spanish Navy intends to use the new frigates for the following missions and with these features: anti-aircraft, asymmetric warfare, maritime safety, naval power projection, military-civilian cooperation, deployment flexibility, hybrid propulsion, and space for unmanned vehicles.

The new generation F-110 will be equipped with the SCOMBA combat system developed by Navantia under technology transfer agreements with Lockheed Martin for the former ÁLVARO DE BAZÁN class (F-100) frigate programme. The five F-110 frigates will also be equipped with the Lockheed Martin-developed AEGIS combat system.

The F-110 programme is considered to be a key component of future Spanish military exports. "This type of frigate could replace about 65 frigates or corvettes in international military markets in the decade between 2025 and 2035," said an official Spanish Government source.

### Three MRTT Aircraft

Since 2016, Multi-Role Tanker Transport (MRTT) has been a priority for the Spanish Air Force, having lost its refuelling capability that year. In 2015, the Ministry of Defence had almost signed a contract with Airbus for the purchase of three A330 MRTT aircraft for €600M, but because of the elections that year, the final



decision to sign the agreement was postponed. Based on the A330-200 passenger aircraft, the A330 MRTT model will be converted for military missions at the Getafe (Madrid) Airbus facility.

### Upgrading 17 CHINOOK Helicopters

The Spanish Army Airmobile Force will upgrade its 17 CH-47D CHINOOKs to the CH-47F version. Originally, they were acquired as CH-47C in 1973, and in 1989 the manufacturer Boeing upgraded them to the "D" version. "With this investment, we can extend the service life of this heavy-lift helicopter for another 30 years," military sources told ESD. The CH-47F has a fully integrated, digital cockpit management system, a common aviation architecture cockpit and advanced cargo-handling capabilities to bolster the aircraft's mission performance and handling characteristics.

The Chinook is commissioned or operated by 20 countries, including eight NATO nations (Canada, Greece, Italy, The Netherlands, Spain, Turkey, the United Kingdom and the US).



Photo: Airbus DS

**Spain's new tanker transport aircraft A330 MRTT is based on the civilian A330-200 passenger aircraft.**

### 23 New NH-90 Helicopters

The Ministry of Defence will acquire a second tranche of NH-90 CAIMAN helicopters developed by Airbus Helicopters

and assembled in Albacete, Spain. The value of this order is still unknown, but according to the industry there will be 23 helicopters, of which 8–9 will be ordered in the naval version. The Ministry of Defence originally forecasted that the

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**Spain will pay an estimated €3.7Bn for its four new submarines.**

Spanish Armed Forces would have a requirement of 108 helicopters (48 for the Army, 28 for the Navy and 28 for the Air Force). So far, the Army has received 8 helicopters under the first phase of the NH-90 programme. It is expected that the Air Force will receive its first NH90 in 2019. Due to the crisis, the number of helicopters for the first phase of this programme was reduced from 45 to 22 in May 2013.

### Jet Trainers to Replace 65 C-101

The Spanish Air Force wants to replace 65 C-101 jet trainers in service since 1980 and to have new jet trainers fully operational by 2021. There are four possible replacements: the Beechcraft T-6 TEXAN II, the Pilatus PC-9, the Pilatus PC-21 and the PZL-130 ORLIK 3.

The Director-General for Armaments and Material of the Spanish Ministry of Defence (DGAM) set up a special office to deal with this task last December. The preferred option for the Spanish Air Force is

the Beechcraft T-6 TEXAN II (a Raytheon company), as some of the studies on cost and efficiency have already shown.

### A New Command and Control System

The new Command and Control System for the Spanish Army is the most unknown of the projects that the Spanish Ministry of Defence intends to implement. Minister Cospedal confirmed this interest to ESD in January last year. Indra, Navantia Sistemas and Thales Spain could be the main companies involved in this new C2 capability.

Apart from these seven major programmes, there are three other current priorities in this chapter of investment:

- Four S-80 class submarines: The Spanish Ministry of Defence and the national shipbuilder Navantia have reached an agreement to invest an additional €1.5Bn in the construction of four submarines to replace the three AGOSTA-class submarines currently in service with the Spanish Navy. As a result, the final budget will be

around €3.7Bn. This is a key programme for the Spanish industry, following a few setbacks due to construction errors in the design phase that were resolved by increasing the length by 10 metres. The American shipbuilder Electric Boat (General Dynamics) and the US Navy assisted Navantia in redesigning the submarine. The Spanish Navy expects to commission the four new submarines between September 2022 and July 2027.

- Four MQ-9 REAPERS: In November 2015, the Spanish government approved the purchase of four General Atomics MQ-9 REAPER surveillance drones as a transitional solution for €158M. The REAPERS will be equipped with MTS-B electro-optical/infrared (EO/IR) sensors and GA-ASI's Block 20A LYNX multi-mode radar, two Block 30 Ground Control Stations (GCS), and Satellite Communications (SATCOM) and Line-of-Sight (LOS) data link capabilities by means of a Spanish-US Foreign Military Sales agreement. The Spanish Air Force expects to reach Full Operational Capability of the four MQ-9 REAPERS in early 2019. They will fly out of Badajoz (Southwest of Spain) and Lanzarote (Canary Islands). On 4 January 2017, the US Department of Defence announced a first payment of €53.6M from the Spanish Department of Defence to the US manufacturer General Atomics Systems (GA-ASI). The contract must be paid before 31 January 2019.
- Replacement of 20 F-18 fighter aircraft: the Spanish Air Force currently has 85 F-18 HORNETs in service. Twenty of them will be out of service in 3-5 years, according to military sources. The other 65 aircraft are to be replaced by 2026. There are three possible options: EUROFIGHTER, F-18 HORNET and F-35 LIGHTNING II. "We have already sent a Request for Information to Airbus, Boeing and Lockheed Martin," Spanish Air Force officials told ESD.



**Spain bought four MQ-9 REAPER drones for €158M.**



# The Chilean Air Force: “Stretched Only in Terms of Geography...”

**Georg Mader**

The Fuerza Aérea de Chile (FACH) is one of the world's oldest military air forces; it preceded the US Air Force by nearly seventeen years.

Of all the Latin American air forces, the FACH with more than 12,000 employees and over 100 aircraft has the closest relationship to its “gringo” colleagues. And this “privilege” is very useful, because there were exciting times and a challenging task, which is characterised by the unique form of Chile: 4,300 km long and with an average width of only 170 km. The result is an air force that is both small and the most modern in South America.

The FACH entered the jet era in 1954 via 16 British VAMPIRE trainers (until 1980) which were soon replaced by 15 and 18 similarly outdated T-33/F-80 COMBO aircraft (until 1977 and 1974, respectively) delivered by the US. COMBO aircraft are very common in almost all Latin American countries. These were replaced by 44 other classics, the Cessna A-37B DRAGONFLY (until 2010) and 54 Hawker HUNTERS (until 1995). Since 1980 and 1995, respectively, 17 Israeli-modified Mirage-50 PANTERAS (until 2007) and 25 ex-Belgian SABCA Mirage-5 ELKANs (until 2006) have been the mainstay of the FACH. And after more than 60 years of close cooperation between the USA and Chile, the F-16 has become the backbone of the FACH.

When the introduction of the MiG-29 in neighbouring Peru required a superior and newly built fighter, the CAZA 2000 procurement programme opted for the FIGHTING FALCON over the GRIPEN, Mirage-2000 or F/A-18C. In 2003, a US\$600M FMS contract was signed with the US DSCA and Lockheed Martin (LM) for the supply of six F-16C and four F-16D Block-50M units code-named PEACE PUMA. Starting in 2006, FIGHTING FALCON equipped Chile with the latest multi-purpose fighter air-



Photo: FACH

*An A-36 HALCON known in Chile as TOQUI. FACH is considering modernising the TOQUI fleet.*



Photo: FACH

*The first PHALCON radar system to be installed was fitted to a Boeing 707 and delivered to the Chilean Air Force, where it is known as the CONDOR. The system was manufactured by the Israeli companies IAI and ELTA.*



Photo: FACH

*In 2013, Chile bought two CIRRUS light aircraft to monitor its northern border to prevent drug trafficking.*

## Author

**Georg Mader** is a defence correspondent and freelance aerospace journalist based in Vienna, Austria, and a regular contributor to ESD.

craft, thus strengthening the region's air defence capability. As part of the ongoing efforts to replace obsolete aircraft such as the AT-37B and expand its current fleet, Chile acquired 36 used MLU Upgrade F-16AM/BMs from the Royal Netherlands Air Force (RNLAF) in two batches (AM-STEL-I and -II) between 2005 and 2009 for US\$185M and US\$278M. LM received an additional US\$7M for the modification of the jets, as the US specifically requested that the NATO/Dutch jets have their inherent HARM and SHRIKE anti-radar capabilities deleted.

### Supplier Mix Shaped by External and Internal Crises

The USA and Britain were the main suppliers of FACH during the critical mid-1970s. A regional dispute over three groups of islands in the Beagle Channel almost led to a war with Argentina in 1978, and the Chilean Air Force was in an inadequate position to fight the then more modern, but never rebuilt and thus now obsolete Argentine



Photo: FACH

Air Force (FAA). The territorial dispute over the southern tip of South America was mediated and settled by the Vatican, but the border conflicts lingered for years; Chile's borders are a controversial issue with Peru and Bolivia in the north. Even when Chile's (real) "Atacama" war was won 135 years ago, diplomatic relations were only restored in 1978, and there are still thousands of landmines. The right-wing government that laid the mines had few friends, especially since the Pinochet dictatorship was repeatedly accused of repression and human rights violations. Political isolation meant that spare parts for aircraft were difficult to obtain and their availability was largely dependent on American and British administrations. This ultimately helped to establish a broad procurement policy based on multiple sources that would not bind the combat fleet to a single supplier. During these critical years, France became a unique supplier of jets and Israel contributed to the FACH with various upgrade packages, and its technology transfer was a 'push' for the local Chilean aerospace industry. Spain also became an important source in this decade.

### A Unique Source of Funding – and "NATO Doctrine"

Chile has about 20% of the world's copper reserves; in 2016, the state-owned CODELCO produced about 1.8 million tonnes of refined copper, which is about 11% of the world's total and US\$123Bn according to the prices at the end of 2017. In the first decade of the 2000s, the introduction of democracy, the high international copper price and a booming economy generated a financial surplus for the Chilean armed forces; due to the Chilean Copper Act of 1958, 10% of total copper export earnings have to go toward procurements for the armed forces. On the basis of the Copper Act, procurement authorisations are issued, such as the one for PEACE PUMA. In the fiscal year 2018, the FACH will have a consolidated budget of US\$418M, which is a slight increase of less than 1% compared to 2017.

Similar to what the author experienced in Azerbaijan, the state of Chile is also striving for its armed forces to come as close as possible to the level of NATO, even though Chile will not join NATO. In 2004, the then Minister of Defence, Michelle Bachelet, who later became Chile's first President, adopted a directive on the "National Common Doctrine of the Armed Forces". This document explicitly calls NATO doctrines "the highest and most advanced doctrine on international standards."

Photo: FACH



*In 2010, Chile bought three KC-135s decommissioned in the US.*

Photo: Policía Nacional de Colombia



*Chile purchased two Basler BT-67 aircraft for transport missions and to connect Punta Arenas with the Chilean Antarctic bases.*



## FALCONS Are up...

Currently, there are considerations to upgrade FACH's inventory of 46 F-16 aircraft to extend the aircraft's service life until the 2030s. A resulting programme would be a top priority for the service, as the programme to be launched between 2018 and 2021 aims to equip the Chilean F-16 with a new mission electronics package based on a synthetic aperture, an active electronically scanned array (AESA) radar. A new mission planning and management system, new Electronic Countermeasures (ECM)/Electronic Support Measures (ESM) system, and upgrades in the cockpit would also be included. It is also considered to increase the number of new Block 50 aircraft by adding another six to eight to the current fleet of 10. The entire programme would cost an estimated US\$450M to US\$540M for 30 to 36 platforms, which is US\$15M for each aircraft. Thus far, it has not yet been decided how many of the 36 ex-Dutch MLU aircraft would see an upgrade.

In 2012, the US company ITT Exelis upgraded the 10 C/Ds' EW-systems similar to the Block-52's Advanced Integrated Defensive Electronic Warfare Suite (AIDEWS) via the ALQ-211(V)4. For this reason, literature sometimes refers to these aircraft as Block 50Ms, because they differ from their former RNLAf companions by their two-tone FS25237 and FS26152 'low-vis' camo, roundels and stencils.

Perhaps the greatest capability underscoring FACH's reputation in the region was revealed just recently, when FACH officially became the only Latin American member in Link 16 Multinational Working Group (MNWG). The MNWG is an ad hoc support/working group that provides a forum for all nations using or intending to deploy Link 16 or similar systems, for nations affected by Link 16 operations, for federal aviation authorities, operators and network designers to address and resolve frequency access issues in the 960-1215 MHz frequency range. As early as 2014, RNLAf recommended that VIASAT of Carlsbad, CA, work closely with RNLAf to provide an end-to-end Link 16 capability and multi-level training to assist FACH's Concept of Operations (CONOPS) in controlling and exploiting airspace, both during peacetime and in times of war and against unknown, illegal or hostile threats. The FACH has 360° situational awareness, real-time air-to-ground interoperability and the ability to perform more successful and efficient missions. As a result, Chilean pilots conducted operational missions to support Link 16 in less than a year's time and participated in their first coalition exercise ("Blue Sky V") in 2015.

### FACH F-16 Inventory

| Source | Version        | Delivery     | Number | Tactical Numbers | Remarks       |
|--------|----------------|--------------|--------|------------------|---------------|
| LM     | F-16C Block 50 | 2006         | 6      | J-851 to J-856   |               |
| LM     | F-16D Block 50 | 2006         | 4      | J-857 to J-860   |               |
| Fokker | F-16AM         | 2006 to 2007 | 11     | J-721 to J-731   | ex-RNLAf; MLU |
| Fokker | F-16BM         | 2006 to 2007 | 7      | J-732 to J-738   | ex-RNLAf; MLU |
| Fokker | F-16AM         | 2010 to 2011 | 18     | J-741 to J-759   | ex-RNLAf, MLU |

### Organisation

FACH is organised into three main commands – Combat, Personnel, and Logistics. Air assets are deployed among five air brigades with a total of five wings and twelve groups (Aviation Groups) or squadrons. The main operational formation is the Air Brigade (Brigade Area) with the wing serving as an administrative unit concentrated at a single base wing.

Base Aérea "Los Cóndores", Iquique, Región de Tarapacá, 1. Brigada, Grupo de Aviación N° 1 (C-101), N° 2 (Beech 99, C-212, UH-1) and N° 3 (F-16C/D)

- Base Aérea "Cerro Moreno", Antofagasta, Región de Antofagasta, 5. Brigada, Grupo de Aviación N° 7 (F-5) and N° 8 (F-16AM/BM, Bell 412, C-212)
- Base Aérea Pudahuel, Capital Santiago de Chile, Región Metropolitana, 2. Brigada, Grupo de Aviación N° 9 (UH-60, UH-1H, Bell 206, BK-117) and N° 10 (C-130, 767, 737, 707, G-IV, Beech 200)
- Base Aérea "El Tepual", Puerto Montt, Región de los Lagos, 3. Brigada, Grupo de Aviación N° 5 (Citation, DHC-6, UH-1H)
- Base Aérea "Chabunco", Punta Arenas, Región de Magallanes y de la Antártica Chilena, 4. Brigada, Grupo de Aviación N° 4 (F-16) und N° 6 (Bell 412, DHC-6, UH-1H)

### On the mainland, the FACH also is running the following airfields:

- Base Aérea "El Bosque", Santiago, Región Metropolitana
- Base Aérea "Los Cerillos", Santiago, Región Metropolitana
- Base Aérea "Maquehue", Temuco, Región de la Araucanía
- Base Aérea "Quintero", Valparaíso, Región de Valparaíso

Furthermore, it runs the 'Teniente Rodolfo Marsh' airbase at 'Presidente Frei'-Station on Furthermore, it (Región de Magallanes) and holds a small presence on Matorero airport on famous Easter Island. Also called "Rapa Nui" and inhabited by ~6,000, this also is sovereign Chilean territory.



**FACH just bought 12 new Bell UH-412 support platforms for SAR duties.**

For the planned radar-upgrade, the following three AESA radars are under consideration: Raytheon's RACR (selected by the South Korean Air Force), Northrop Grumman's AN/APG-83 SABR (chosen by the air forces of Bahrain, United States, Taiwan and Singapore) and possibly Israel's ELTA EL/M 2052. Local sources say that the NG SABR radar may be preferred, as conditions for its acquisition under the FMS programme

FMU-52 fuses from Kaman in Orlando, FL, and Middletown, CT, were to be delivered to the FACH by 28 February 2019. These can only be associated with the JDAM kits, for which Chile paid US\$3M for integration and testing and 12 guidance kits in 2002. In June 2015, a registry reported the purchase of 210 JDAM kits and detonators for US\$8M. Other air-to-ground ammunition includes AGM-65 Maverick

Meanwhile, continuous logistics and maintenance support for the FALCON fleet is secured until at least 2020, as a contract was signed in September 2017 that LM will provide the services for US\$47.8M. As with the last 10-year contract, support includes the supply of spare parts and the maintenance and repair of components handled by the USAF's Life Cycle Management Center (LCMC) in Ohio. Another important element is depot maintenance for the GE F110-GE-129 IPE and PW F100-PW-220s engines of the Block 50, which power the former Dutch AM/BM airframes.

## Other Jets

On 25 November 2017, a FACH KC-130R landed in Gando, a Spanish Air Force base on the Canary Islands. It came from Jordan with spare parts and components from the Jordanian Air Force's decommissioned fleet of 16 CASA C-101-CC04 aircraft which the FACH purchased in its entirety and which will enable FACH to keep the nine operational aircraft – domestically known as A-36T TOQUI – in service until at least 2022. The Israeli-controlled Chilean aerospace manufacturer ENAER (Empresa Nacional de Aeronautica de Chile) installed eight C-101BB-02s (T-36 HALCON) in 1980 and another 22 C-101CC-02 light/attack trainers (AT-36) in 1983. Of these, nine remain, and since the FACH is considering modernising the TOQUI fleet by integrating digital avionics and cockpits, a replacement seems far away. It still looks as if the FACH has decided to postpone the purchase of 12 new tactical fighter aircraft, with the possibility of opting for the winning US TX programme model to achieve economies of scale. There is also interest in Leonardo's M345 HET-Trainer documented in the signing of an MoU; this is to the disappointment of Chile's neighbour Argentina which has offered its IA-63 PAMPA III produced by Fábrica Argentina de Aviones (FAdeA). Also still in use are nine of the 18 original Northrop F-5E/F TIGER II aircraft (since 1974); there are considerations to replace them with additional F-16s.

## Force Multipliers ...

In April 2015, LM delivered the first of four KC-130R HERCULES refuelling or transport aircraft to the FACH. The KC-130Rs were previously flown by the USMC and have been offered as Excess Defence Articles by the US DSCA since September 2012. A second, third and fourth KC-130R was offered in August 2013 and delivered in May and August 2016 and April 2017. The aircraft, which were transferred to Chile at a

Photo: FACH



**The FACH supplies its outposts in Antarctica with either C-130s or a handful of DHC-6 TWIN OTTER turboprops purchased in the 1970s. They are part of the 4th Air Brigade located in Punta Arenas on the Magellan Strait.**

Photo: FACH



**Chile acquired 36 used F-16AMIBMs from the Royal Netherlands Air Force.**

were already accepted by Chile in a 'letter of offer and acceptance', signed before the purchase of the 10 new-built aircraft. With regard to air-launched weapons and other ordnance, the most recent development was Chile's mention in November last year (among 18 other nations) when the US DoD issued an FMS message, according to which joint programmable

rockets, MK-82 and MK-83 and MK-84 bombs, which are controlled by IR (OPHER IR) and laser (LIZARD) systems of the Whitard family from Elbit. There are also PAVEWAY II guided bombs from Raytheon. In the air-to-air sector, the FACH uses Rafael PYTHON IV and AIM-9M IR-WVRAAMs as well as AMRAAM AIM-120C5 and -C7 BVRAAMs.



cost of US\$700,000 each, did not carry the underwing refuelling pods, had to be overhauled before delivery and are intended as an emergency measure until new or additional transporters can be acquired. The FACH already operates two C-130Hs and one C-130B, but has tried to expand the fleet. For a while it was also interested in buying four to six medium-sized (two-engine) turboprop transporters, but the thrust of the C-130s made the interest in turboprop aircraft disappear. On the other hand, Chile (6) is one of the countries like Brazil (28), Colombia (12), Argentina (6), Portugal (6) and the Czech Republic (2) which have signed declarations of intent for the twin-jet transport EMBRAER KC-390. However, so far only Brazil has ordered the model.

Since October 2010, three former USANG KC-135Es have taken over refuelling missions. The aircraft were taken over from the AMARC centre in Davis Monthan and were overhauled prior to delivery. This was certainly necessary, because their original US serial numbers – always with the FY in which they were budgeted – start at 57. Before their arrival, these planes supported the multinational search for the missing Argentinean submarine SAN JOSE in flying-in sonobuoys. The FACH had to make do with KC-707 tankers with drouge-baskets and no refuelling boom.

For many, the most bizarre – or the most interesting – airframe in FACH's inventory is the only Boeing 707 PHALCON AEW&C platform. Its main sensor behind the giant nose is IAI's EL/M-2075 PHALCON, an active, electronically scanned array radar system developed by IAI and ELTA Electronics Industries of Israel. Under a contract signed with Chile in 1989, the first system was installed in a former LAN Chile Boeing 707 and flown for the first time in 1993. In May 1994 the aircraft was delivered to the FACH, where it is known as "CONDOR". Subsequently, however, the Andean vulture developed a temporary blindness; FACH repeatedly complained to Israel about reliability problems and system failures.

### ... and Workhorses

The expansion of Chilean territory into wild, largely uninhabited but sometimes contested territories around the Magellan Strait and Cape Horn on the southernmost tip of the South American continent has already been mentioned. There are harsh conditions all year round, especially on Isla Rey Jorge or King George Island, 120 km (75 miles) off the Antarctic coast in the Southern Ocean. Today, the 1,150 sq km island is only inhabited by research stations from Argentina, Brazil, Chile, China,

the Czech Republic, Ecuador, South Korea, Peru, Poland, Russia, Uruguay and the US. Chile demanded the island from the British in 1940 as part of the "Chilean Antarctic Territory." But the island was also claimed by Argentina in 1943 as part of the Argentine Antarctic and named after the Argentinean national holiday "Isla Veinticinco

6/400s from VIKING Air. They are part of the 4th Air Brigade located in Punta Arenas on the Magellan Strait. A new Antarctic programme is the purchase of two BT-67 aircraft (a modified version of the venerable DC-3/C-47 'Dakota' offered by Basler Turbo Conversions of Oshkosh, WI) for passenger and cargo transport missions and for



Photo: FACH

**An FACH C-130H landing on an unpaved runway on King George Island**

de Mayo" (25 May). Chile – like Argentina and the United Kingdom – considers the entire Antarctic Peninsula and the South Shetland as their country, but the US and Russia never recognised these claims. Under the provisions of the Antarctic Treaty, however, Chile is allowed to colonise the Fildes Peninsula without openly pursuing territorial claims. The Chilean base "Presidente Eduardo Frei Montalva" on the Fildes

connecting Punta Arenas with the Chilean Antarctic bases. The project has an estimated cost of approximately US\$20M and is expected to be operational before 2020. The BT-67 will enable the FACH to reduce the number of C-130H and KC-130R HERCULES flights from Santiago to the Antarctic by being permanently stationed in the Magallanes region and deploying its crews from the southernmost base Punta Arenas.



Photo: FACH

**In 2009, Chile bought 12 EMB-314 SUPER TUCANOs for US\$120M.**

peninsula is operated as a permanent village with a runway and a large hangar and control tower as well as buildings, cafeterias for the staff of the various local agencies, a bank, a post office and comfortable family houses in ranch style with children. The FACH supplies its southernmost outpost with either C-130s or a handful of DHC-6 Twin-Otter turboprops purchased in the 1970s, with additional DHC-

The head of the 4th Air Brigade, Gen. Cristian Eguia, said in August 2017 that the military is investigating the procurement of fixed and rotary wing aircraft to increase overall capacity as well as to operate in the Antarctic. Expert opinions are intended to identify requirements and possible solutions and help the government to establish a cost base for the programme. They should have been completed by the end

of 2017, but no further details have been released since then. The Airbus C295 and the Leonardo C-27J, competing for a similar Antarctic requirement in neighbouring Argentina, are likely options for such a fixed-winged medium transport role.

In February 2017, the Chilean armed forces with international support helped combat major forest fires, which destroyed thousands of hectares and claimed at least eleven lives. The following summer, the Chilean regions were again hit by severe forest fires which destroyed small towns and forests owned by companies producing pulp for paper. Subsequently, a study was commissioned and it became known that the FACH is investigating the Russian amphibian BERIEV (Betair) Be-200E ALTAIR to buy an effective fire extinguishing platform. The aircraft can carry 12 tons of water and flame retardant in tanks. The interest was officially confirmed at the end of July 2017 by the FACH Commander, General Jorge Robles Mella, after returning from an official visit to Russia. He hinted that up to three aircraft could be purchased and would fulfil a secondary SAR and community support role in the seasons when the risk of fire is lower.

Photo: FACH



**A B767 operated by FACH**

### Training, Rotary, and Observation Assets

The latest addition to FACH's inventory was 12 EMB-314 SUPER TUCANOs for US\$120M between 2009 and 2010, comprising a large integrated logistical support package and a state-of-the-art training and operations support system (TOSS). This includes not only the aircraft with its fully digital cockpit, but also an integrated suite for various ground stations such as mission

planning, mission debriefing and flight simulator. At the Air Base Los Cóncores (45 km from Iquique) they will be used for tactical instruction at the 1st Air Brigade and will allow the students a smooth transition between the basic trainer Enaer T-35 PILLAN and the F-16.

While most Chilean military helicopters are operated by the Army and Navy, the FACH maintains Bell UH-1H and -412 support platforms. Of the latter type, 12 brand-new models for SAR duties were delivered in 2017. New additions are six S-70i BLACK HAWK International helicopters,, assembled by PZL-Mielec in Poland. Contract negotiations with Sikorsky were successfully concluded in December 2016 with a volume of US\$180M, with deliveries expected this year and 2019. Since 1998, the service has been operating a single S-70A BLACK HAWK aircraft built in the US, and on this aircraft, as well as on the Bell UH-1H and Bell 412EP, FACH has begun to integrate the Aircrew Ballistic Helmet (ABH) model HGU-56/P into its rotorcraft crews, as shown by photos from the FIDAE 2016 and the Great Military Parade 2017.

In May 2013, the monitoring capability was slightly increased with the delivery of two CIRRUS SR 22 T light aircraft equipped with day and night observation equipment to monitor the northern border to prevent drug trafficking. When the original order was announced, a possible repeat order was hinted at, although there are no indications of such an order.

Last but not least, FACH leads the region when it comes to UAVs. In May 2011, Chile became the first export customer for the Elbit HERMES' 900 MALE UAV when it ordered three units on an unknown delivery date. These were put into operation in 2014 by the FACH in ISR roles over land and coastal areas. According to local colleagues, Chile hopes that they will ultimately be able to procure six to nine HERMES 900s, depending on budget priorities.

Photo: FACH



**General Jorge Robles, Commander in Chief of the FACH**



# US Navy Littoral Combat Ship & Frigate Programmes

**Conrad Waters**

In the scope of the US Navy's Littoral Combat Ship programme eleven of a planned total of 32 vessels had been delivered as of the start of 2018; a further 18 are currently under contract.

Meanwhile, the various mission packages that form a key part of the Littoral Combat Ship (LCS) concept have been steadily transitioning from design to testing as they progress towards achieving initial operational capability. With LCS orders largely complete, attention is increasingly turning to the follow-on FFG(X) frigate programme.

Photo: US Navy



*The LCS programme is showing increasing signs of maturity. The Austal USA-built CORONADO (LCS-4) completed a deployment to Southeast Asia in 2017. FREEDOM (LCS-1) and FORT WORTH (LCS-3) have previously undertaken similar deployments.*

## LCS Programme Background

The LCS programme was launched in November 2001. At its heart was a 'sea frame' or platform capable of deploying any one of a number of interchangeable mission packages focused on supporting US Navy operations in littoral waters. Ships developed by teams led by Lockheed Martin and General Dynamics were selected for prototype construction in 2004. It was ultimately decided to adopt both for series production. This possibly reflected the varying merits of the two quite different designs that had been proposed. The Lockheed Martin FREEDOM (LCS-1) type is based on a semi-planing, steel mono-hull with an aluminium deckhouse whilst the General Dynamics INDEPENDENCE (LCS-2) class is an all-aluminium trimaran. A total of 55 ships was initially envisaged.

The subsequent trials and tribulations of the LCS project have been well documented, and there have been a number of major programme restructurings. As of early 2018, the cumulative consequences of these changes can be summarised as:

- Reduced numbers: LCS orders are now expected to cease at 32 units; 16 for each type. Production of smaller US Navy surface combatants will then transition to the planned new FFG(X) frigate.

The frigate will be significantly more capable than the LCS and be better suited for open ocean operations. It will also be substantially more expensive.

- A new operating concept: The modular nature of the LCS design was intended to allow it to shift quickly between missions by embarking appropriate packages of mission modules and associated crew. However, it has now been decided that ships will be allocated to divisions focused on a specific mission and semi-permanently equipped with the relevant equipment and crew. Clearly this largely negates the interchangeability inherent in the original concept.
- Mission package revisions: There have been significant changes to the planned composition of the mission packages and associated modules to be shipped by the LCS, which currently encompass anti-submarine, mine countermeasures and surface warfare operations. The forthcoming US FY2019 defence budget request will also propose changes to the number of modules being acquired,

reflecting both the reduced LCS numbers and the revised operating concept.

## LCS "Sea Frame" Progress

In spite of these considerable revisions to the original plans, the LCS programme is now demonstrating greater stability. The assembly yards – Fincantieri's Marinette Marine facility in Wisconsin for the LCS-1 variant and Austal USA's Mobile, Alabama, complex for the LCS-2 type – are delivering completed ships to budget and progress is being made towards a targeted delivery 'drumbeat' of two units of each type per year. Austal USA is some way ahead of its Wisconsin rival in this latter regard. It delivered its sixth ship – OMAHA (LCS-12) – on 15 September 2017, whilst MANCHESTER (LCS-14) underwent acceptance trials in the Gulf of Mexico in December. By contrast, the fifth LCS-1 variant, LITTLE ROCK (LCS-9), was only delivered towards the end of September 2017. The sixth, SIOUX CITY (LCS-11), is scheduled to undergo acceptance in the early months of 2018.

## Author

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Photo: Lockheed Martin

**The Lockheed Martin type LCS, LITTLE ROCK (LCS-9), seen on trials in the summer of 2017. Commissioned in December 2017, she is the fifth of this variant to be delivered.**

Progressive delivery of LCS sea frames is allowing a start to be made on implementing the divisional structure envisaged under the new operating concept. Operational ships will be allocated to either the Atlantic or the Pacific Fleet littoral combat ship squadron according to variant. LCS-1 type vessels will serve with LCSRON-2 based at Mayport, Florida, whilst the LCS-2 trimarans will be homeported in San Diego, California, as part of LCSRON-1. Both of these two squadrons will include a number of divisions comprising four ships. Three ships will embark alternate 'Blue' and 'Gold' crews devoted to operations. The fourth will have only a single crew focused on training. The initial divisions established under this structure will focus on the surface warfare role, with subsequent divisions covering mine countermeasures and anti-submarine warfare. The first operational LCS division is likely to be Surface Division 11. Based at San Diego as part of LCSRON-1, it will comprise LCS-6, LCS-8, LCS-10 and LCS-12. It will subsequently be joined in the Pacific Fleet by MCM Division 12 and ASW Division 14. The equivalent Atlantic Fleet divisional structure has yet to be published.

LCSRON-1 will also retain responsibility for LCS-1 through to LCS-4. Regarded as prototypes, they will operate as a separate unit focused largely on evaluation and testing. Turning to ongoing orders, FY2017 saw three littoral combat ships authorised. Two of these – LCS-28 and LCS-30 – were allocated to Austal, with Marinette Marine being contracted for LCS-27. The FY2018 Presidential Budget Request solicited funds for two more vessels and there has been Congressional support for a third. If ultimately approved, this would complete the planned 32-ship programme. However, both builders are strong contenders for the FFG(X) project, and there are arguments to maintain production at their yards to allow a smooth transition to the new frigate should either company's proposal be accepted. It is therefore possible that additional littoral combat ships will be ordered to achieve this objective.

## LCS Mission Packages

The different rates of progress seen in sea frame construction are also reflected in varying progress with the development of the

LCS mission packages. Of these, the surface warfare package – which is intended to provide protection from small boats and asymmetric threats – is the furthest advanced. A basic version – including gun-based and maritime security (RIB-based) modules and supporting aviation assets – has already completed deployments to South East Asia in both LCS variants, most recently on-board CORONADO (LCS-4) in the course of 2017. Additionally, the navy has stated it is on course to complete tests of an add-on surface-to-surface missile module (SSMM) based on the AGM-114L LONGBOW HELLFIRE during 2018. Results to date suggest a satisfactory success rate of over 80% against targets out to ranges of ten nautical miles. The aim is to achieve initial operational capability (IOC) for the new module on the LCS-1 type before the end of the year, with deployment on the LCS-2 variant following around a year later. This would essentially complete development of the full surface warfare mission capability.

Deployment of the full surface warfare mission package is likely to be followed by operational testing and evaluation of the anti-submarine warfare mission package during 2019 prior to declaration of IOC around the start of 2020. As for the surface warfare package, it is likely this will be cleared for operational deployment on the LCS-1 variant first. The main components of the package are an escort mission module comprising a variable depth sonar integrated with a multifunction towed array and a lightweight torpedo defence module. The latter will eventually be installed onboard all littoral combat ships irrespective of mission specialisation.

The mine countermeasures mission package has proved the most difficult of the three currently envisaged to bring into service. It relies heavily on integrating a wide

Photo: Hensoldt



**Hensoldt's TRS-4D has been selected to equip the FREEDOM Class as a surveillance and target acquisition sensor. The system is based on latest Gallium Nitride AESA technology and supports missions in blue waters and littoral environments.**



Photo: US Navy

**Progress is being achieved in the development of the mission packages that are a central part of the LCS concept. This photograph shows a trial of the surface-to-surface missile module based on the LONGBOW HELLFIRE from DETROIT (LCS-5) in February 2017.**



range of cutting-edge technologies, mainly robotic, to work as an effective whole. Although a number of aviation-based modules have successfully achieved IOC, the termination of the Remote Minehunting System – an autonomous semi-submersible – in early 2016 due to poor reliability has had a significant impact on overall package development. Whilst it is currently hoped to achieve IOC of the integrated system by 2021, this may prove optimistic.

Beyond the mission packages, work is also underway to upgrade the overall LCS fleet's strike potential through selection of a new over-the-horizon (OTH) surface-to-surface missile. This ties in with the in-vogue concept of 'distributed lethality' – spreading firepower more widely across the US fleet – and goes some way to addressing concerns over the littoral combat ship type's perceived lack of warfighting capability. The missile will equip later members of the type from build and will be retrofitted to at least some of the early vessels. It is widely believed that Kongsberg's Naval Strike Missile (NSM) – being offered in association with Raytheon – will secure the contract. The decision is an important one, as the chosen missile is also likely to equip the new FFG(X).

## FFG(X) Programme Announcement

The announcement of the FFG(X) frigate programme has undoubtedly been the most significant development to impact US Navy procurement of smaller surface combatants over the past year. The plan to transition from littoral combat ship to frigate construction is, of itself, nothing new. This was initiated in February 2014, when the then-US Secretary of Defense, Chuck Hagel, determined LCS production would be terminated at 32 units in favour of a more lethal small combatant with frigate-type capabilities. However, thinking at this time quickly focused on a multi-mission evolution of one or both of the existing LCS designs. The resulting FF frigate would incorporate limited enhancements to warfighting abilities, sensors and protection. The revised FFG(X) frigate procurement plan was included in the US Navy's FY2018 budget submission. Further detail was provided in a request for information to industry published in July 2017. In contrast to the previously planned frigate, FFG(X) acquisition will be managed as a freestanding programme rather than as part of the wider LCS project. Compared with the LCS and the evolved frigate, the

Image: Austal USA



**The requirements of the FFG(X) programme may still be met by the evolution of one of the existing LCS designs; this image shows Austal USA's FFG(X) concept equipped with VLS technology.**



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Photo: Lockheed Martin



**The “FREEDOM-Variant Frigate” is Lockheed Martin’s proposed evolution of its LCS-1 design for the FFG(X) programme.**

Photo: Conrad Waters



**The FFG(X) programme is also open to the evolution of foreign designs to meet the requirement; Spain’s Navantia has teamed with General Dynamics Bath Iron Works to propose a development of the Spanish company’s AEGIS-equipped ships.**

FFG(X) will also be a much more capable ship by virtue of enhanced warfighting systems, greater survivability and a better capacity to integrate with other US Navy warships in the performance of oceanic, ‘blue water’ missions. To a large extent, this change of emphasis reflects the significant shift in the international background since the LCS was first conceived, particularly the much greater likelihood of naval conflict with a near-peer competitor. The US Navy has been clear that the FFG(X) is not intended to be a substitute for its large surface combatants, the guided-missile-armed cruisers and destroyers that form the high end of a high/low surface force mix. However, the addition of a ‘G’ to the ‘FF’

designation – indicating that the ship will be equipped with an area-defence air warfare capability – arguably positions it closer to these vessels than to the existing LCS designs.

### FFG(X) Procurement Plan

The current intention is to procure the first FFG(X) during FY2020, moving to a two ships p.a. drumbeat in FY2022. A total of 20 ships is envisaged to meet the US Navy’s maintained total 52-ship small surface combatant target set out in the 2016 Force Structure Assessment. This timescale effectively prevents development of an entirely clean sheet design. Instead, between four and six contracts will be awarded early in

2018 to evolve existing ‘parent designs’ – ship designs that have already been constructed and operated at sea – to meet the FFG(X) requirement. This will be followed by an open competition to select one final design during FY2020.

The FFG(X) procurement plan does not rule out selection of an evolved LCS design. For example, Lockheed Martin has successfully developed a multi-mission variant of the LCS-1 type to meet a Saudi Arabian requirement and is actively promoting a ‘FREEDOM-Variant Frigate’ for the FFG(X) project. Similarly, Austal USA has evolved a frigate proposal from its own LCS-2 design. However, the field is far more open to competition than it was previously. It seems likely that a number of European frigate ‘parent designs’ will be selected for further development, whilst Huntington Ingalls Industries’ LEGEND class national security cutter has frequently been viewed as a potential indigenous contender. The specification of a substantial amount of standardised US Navy equipment for the FFG(X) may well tilt the selection process in favour of a domestic design or, alternatively, a foreign frigate placing heavy reliance on US systems. For example, Navantia and General Dynamics’ Bath Iron Works have announced an alliance to offer an evolution of the Spanish company’s AEGIS-based frigates for the competition.

Whatever the outcome of design selection, the new ships will place further pressure on a strained US defence budget. Target cost of the series-built ships (that is, excluding the lead ship) has been capped at US\$950M compared with a maximum of just over US\$580M for an LCS and a little more than US\$700M for the previously planned FF. However, it is still considerably less than the approximately US\$1.75Bn required for a DDG-51 class destroyer.

### Conclusion

The last twelve months have been eventful ones for US Navy small surface combatant procurement. Deliveries of series-produced littoral combat ships have now reached the stage where the transition to normal operational use can soon commence, a process supported by the growing maturity of the more advanced LCS mission package modules. Whilst it will still be some years before the LCS can demonstrate its full potential, the type will be of steadily increasing operational value in the years ahead. Meanwhile, clarity with respect to the follow-on FFG(X) programme will continue to grow as progress is made towards the final design selection scheduled for FY2020. ■



# Stealth Reshapes the Modern Warship

**Doug Richardson**

**Given that warships can be detected by visual, radar, infrared and acoustic methods, it is hardly surprising that some navies are applying the concept of stealth technology to their vessels.**

The concept is not new – the oldest and most basic method of reducing a ship's detectability is the use of camouflage. When the human eye was the only sensor available, measures intended to reduce a ship's visibility proved worthwhile. An early application of this technique was described by the ancient Roman writer Vegetius, who recorded how light naval reconnaissance vessels known as *speculatoriae* (spies) were painted to reduce their detectability. "Their sails and ropes are dyed blue, the colour of sea-water; and even the wax with which the hull is painted is similarly coloured, while the soldiers and sailors aboard them likewise dye their clothes."

In the era when ships relied on sails for propulsion, warships were not camouflaged, but as sail gave way to steam they took on the all-grey paint schemes that have endured to the present day. In many cases, a light grey colour intended to delay detection under overcast skies is used, but experience has shown that this was not suited to ocean regions where sunlit conditions were more common. For example, in recent years the Royal Australian Navy has abandoned its 'Storm Grey' paint scheme for a new 'Haze Grey' finish better suited to Australian waters.

Even submarines have on occasion been forced to adopt revised colour schemes. Having realised that the clear waters of the Mediterranean can sometimes allow a submarine running 30 m or deeper to be visible from an aircraft, the UK Royal Navy adopted a combination of light and dark green for boats assigned to that area during the 1939-45 war, and they changed to a Mediterranean Blue paint scheme for diesel-electric boats operating there in the post-war era. Even today, a maritime-patrol aircraft operating over clear water

can sometimes visually detect a shallow-running submarine whose paint scheme is not a good match for the sea conditions. Camouflage schemes for ships enjoyed minimal success, so 1918 saw the introduction of measures intended to make it hard for an enemy observer to discern the course of the ship. This was done by paint-

Acoustic signature took on a new importance as improved submarines were developed with the potential to attack enemy submarines. Their primary sensor was passive sonar intended to detect the sounds created by any type of ship. This is a combination of hydrodynamic noise created as the ship pushes its way through the water,



***Saab's next-generation corvette is based on experience gained from the VISBY class. Proposed in configurations ranging from 70 to 110 m in length, these could have a hull made entirely from composite materials or could combine a steel hull with a composite superstructure.***

ing a false perspective pattern on its sides and superstructure. The usefulness of this technique ended when the growing use of radar and sonar gave the attacker a better method of determining the range and course of a potential target.

The 1939-45 conflict saw the introduction of magnetic and acoustic mines. Earlier mines needed to collide with a ship in order to detonate, but these new types responded to the magnetic field or sound of a nearby ship. Magnetic mines were countered by a process known as degaussing. To deal with the acoustic mine, navies developed towed sound sources when conducting minesweeping operations.

machinery noise generated by a ship's engines and other on-board systems, and the cavitation noise generated by the creation of gas bubbles by the ship's propellers. Machinery noise is the main component of a ship's acoustic signature when travelling at low speed, but hydrodynamic noise is the most important component when the ship is travelling at high speed.

## Minimising Signatures

In recent years, naval architects have found it necessary to minimise the radar and infrared (IR) signatures of surface ships. This will make the ship harder to detect by radar or

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IR sensors. The latter can be shore-based, mounted on ships or aircraft, or can take the form of seekers installed in anti-ship missiles. Ships have a much higher radar cross-section (RCS) than aircraft. While a fighter could have an RCS of up to 100 sq m, a warship could present around 10,000 sq m. Major RCS-reduction measures are needed to make the ship much less detectable.

In some respects, the application of anti-radar stealth technology is easier for a surface ship than for an aircraft. As a fixed-wing or rotary-wing aircraft manoeuvres, its upper or lower surfaces may be exposed to enemy radar, so signature-reduction measures must be effective over the entire surface. For a warship, most radar threats will originate from land-based or sea-based radars, from distant maritime patrol aircraft, or from sea-skimming anti-ship missiles. In all these cases, the enemy's radar signal will arrive from a location near or slightly above the horizon. However, the naval architect faces the problem that most metallic surfaces yield highly concentrated specular reflections at radar frequencies. Traditionally-configured warships also incorporate many features which act as highly efficient radar reflectors. These include vertical metal surfaces, right-angle junctions between metal surfaces, cavities, and round shapes, such as smokestacks. Large numbers of metal fittings will also help to increase the vessel's RCS.

The radar reflectivity of the hull can be reduced by adopting a tumblehome configuration in which the hull becomes narrower with greater distance above the water-line. Superstructures can use sloped rather than vertical surfaces, and avoid the use of reflective dihedrals.

In a conventionally-shaped warship, the hull may account for around 80% of an RCS that could be around 40,000 sq m, with the remainder coming from the weapons and equipment. Sloping the superstructure and bulwarks could reduce the hull's contribution to the total RCS to less than 10% of the total.

## Stealthy Layers

Measures should also be taken to prevent RF energy from entering within the superstructure, by making features such as bridge windows radar-reflective and by fitting RF screens to any large openings. In 2015 Thyssenkrupp Marine Systems filed a patent for a multi-layer material intended to mask deck equipment and access openings. This is made up of a camouflaging outer cover layer, a metal layer acting as a radar-reflective surface and a multi-layer laminate as a protective layer against gusts of wind and sea wash.

Photo: US Navy



**Built in 1984, but not declassified until 1993, Lockheed's SEA SHADOW explored the potential use of stealth technology on naval vessels.**

Photo: US Department of Defence



**The Swedish Navy ordered SMYGE as an experimental ship to test stealth technology. Unlike the Lockheed SEA SHADOW, SMYGE was armed.**

The use of composites can reduce a ship's RCS and IR signature and allows sensors to be integrated into the structure. Being of lower weight than traditional materials, composites can reduce structural weight by 50% or more, lowering a vessel's centre of gravity, while allowing the creation of a higher superstructure that will allow equipment such as sensors to be located further up. Composites are being used for the superstructure of smaller warships, but their potential usefulness for larger vessels involves factors such as fragility and possible vulnerability to fire. If steel is used, radar-absorbing coatings can reduce the levels of reflected energy – a technique that probably saw its first use on Germany's revolutionary Type XXI submarine. But these coatings can be expensive and make repair tasks more difficult. When the UK Ministry of Defence announced in 2016 that the former aircraft

carrier ILLUSTRIOUS was being offered for sale "for recycling only", it warned would-be purchasers that it intended to remove "material coatings" from the upper hull and superstructure before handing the vessel over. This statement raises the possibility that the coatings in question were some form of signature-reduction treatment.

The growing use of vertical launchers for missiles has removed the need for trainable missile launchers or fixed launch boxes and launch tubes, features that will have had a major impact on RCS, but minimising radar cross-section requires that many small features be eliminated, or relocated inside the superstructure. This gives a low-RCS ship a much cleaner appearance. Structures that cannot be eliminated or internally housed (such as ladders, brackets, and deck stanchions) should be made from radar-transparent material such as GRP.





Photo: Jean-Michel Roche

**COURBERT was the third vessel of the LAFAYETTE Class. It shows the sloped surfaces and clean exterior that would form the basis of later low-RCS warships.**

RCS can also be reduced by using an integrated mast, on which one sensor may be mounted at the masthead, with the other antennas being located either within an RF-transparent mast section or taking the form of non-rotating phased arrays located on the sides of the mast.

The principal components of a ship's IR signature in the critical 3-5 micron (medium IR) and 8-12 micron (far IR) bands are often hot exhaust gas plumes, and hot metal structural components, such as exhaust uptakes in the funnel stack. Internally-generated heat from the main machinery (engines),

electrical generators, heated internal spaces and even the waste air from ventilation systems can add to this internally generated IR output. Externally generated heat sources include surfaces of a ship that have absorbed or are reflecting radiation from the sun, sky and sea.

A ship can be made less of a thermal target by the use of IR signature suppression devices that use cool ambient air to reduce the IR output from hot exhaust gases from the main machinery and from hot uptake metal. Another method of cooling the exhaust plume is to inject water into the

plume. This has a rapid effect on 3-5 micron band emission, but the reduction of 8-12 micron band emission requires larger amounts of injected water.

Measures such as adequate ventilation and the application of insulation and/or special paint to exterior bulkheads can reduce outer skin temperatures. As its name suggests, Infrared Low Emissivity Paint (IRLEP) will reduce the thermal emission of a surface. However, it may have a high reflectivity that will increase the amount of reradiated energy. Active hull-cooling measures include spraying the structure with sea water to reduce its temperature to ambient or near-ambient temperatures. One method of accomplishing this is to use a ship's existing NBC (Nuclear Biological Chemical) water wash system.

The designers of India's SHIVALIK class (Project 17) frigates found that the engine exhaust signature in the 3-5 micron band could be reduced by around 95% by measures such as a plume-cooling device, while the cooling of hot metal components provided a good measure of protection from hostile look-down IR sensors. Measures such as good engine room ventilation helped to reduce hull contrast temperatures.

## A Sea-Going F-117

The first ship built with a configuration intended to have a minimal RCS was the IX-529 SEA SHADOW. A project by the US Defence Advanced Research Projects Agency (DARPA), US Navy and Lockheed, the vessel was completed in 1984, but its existence was not declassified until 1993.

Built to a small waterplane area twin hull (SWATH) configuration, it has two submerged twin hulls. Two steeply angled struts supported the above-water portion of the ship, creating a shape reminiscent of that of the fuselage of the Lockheed F-117 NIGHTHAWK stealth fighter. SEA SHADOW was 50 m long and had a displacement of 572 tons. Its diesel-electric powerplant gave a maximum speed of 14 knots. Operated for the USN until 2006, it was put up for sale, with the provision that that purchaser would break up the vessel and not attempt to use it. Sold in 2012, it has now been scrapped.

Sweden tested the concept of a stealth ship using the experimental vessel SMYGE. Built by the Karlskrona shipyard, it was taken into service in 1991. Although it was only 27 m long and had a displacement of 140 tons, SMYGE was armed with a Bofors 40mm gun, two Saab RBS-15 anti-ship missiles, and two Saab Type 45 torpedoes.



Photo: Brian Burnell

**The Royal Navy destroyer DARING was the lead ship of class. It was originally expected to be one of twelve vessels, but repeated defence cuts resulted in only six being built.**

## Ocean-Going Stealth Ships

The shape of the SEA SHADOW would be impractical for a warship, so naval architects had to make do with less radical hull forms when creating low-RCS designs. France's LA FAYETTE class frigate was designed by DCNS (now Naval Group). It combines a sloped hull and superstructure with a clean uncluttered configuration. Built from steel, it features a radar-absorbent material (RAM) coating. The first-of-class entered service in 1996, becoming the first ocean-going stealth ship.

Ocean-going stealth ships that entered service in the first decades of the 21st century followed the general configuration set by the LA FAYETTE class. These include The Netherlands' DE ZEVEN PROVINCIE class frigate (Royal Schelde, 2002), Germany's SACHSEN class frigate (Blohm + Voss, 2003), Singapore's FORMIDABLE class derivative of the LA FAYETTE class frigate (DCNS, 2007), the Franco-Italian HORIZON class frigate (Fincantieri, 2007 & DCNS, 2008), the UK's Type 45 destroyer (BAE Systems, 2009), the Franco-Italian FREMM multipurpose frigate (DCNS, 2012 & Fincantieri, 2013), Germany's F125-class BADEN-WÜRTTEMBERG class frigate (ThyssenKrupp, not yet in service), and South Korea's FFX-II-class frigate (Daewoo, 2018). All the shipyards cited in this paragraph are for the first of class, while the dates are for the entry into service of that vessel.

The only Russian surface ships to incorporate stealth features are the STEREGUSHCHIY I (Project 20380/20381) class corvettes. The first became operational in 2007. Like the follow-on STEREGUSHCHIY II (Project 20385) class – two of which were launched in 2017 – they combine a steel hull with a composite superstructure.

Russia's first stealthy surface warship could be the proposed Project 23560 LIDER (Leader) class missile destroyer. A model displayed at a Russian military exhibition in 2015 showed a sloped superstructure and masts are of pyramidal form. The new destroyer is expected to be 200 m long, displacing up to 17,500 tons, and to be nuclear powered. It is intended to replace the existing SLAVA class cruisers and SOVREMENNY class and UDALOY I class destroyers. The first of class was due to be laid down in 2018 or 2019. A total of was 12 was originally expected, six for the Northern Fleet and six for the Pacific fleet, but the programme is likely to be scaled back, or even cancelled.

Having developed the semi-stealthy Type 052C (LUYANG II) and Type 052D (LUYANG III) classes of destroyer, Chinese naval architects went on to create the more stealthy Type 055 (RENHAI class) destroyer, the first of which was launched in 2017. This features an integrated mast. Naval architects tasked with developing smaller vessels such as corvettes were able to take a bolder approach to stealth, creating warships of more novel shape. 1999 saw the entry into service of the first of Norway's SKJOLD class corvettes, the first coastal stealth ships. Built by UMOE MANDAL, these are only 47.50 m long, with a full-load displacement of 274 tonnes and a maximum speed of 60 kn. Based on two rigid catamaran-type hulls, they are built

of glass fibre and carbon composite materials, and extensive use was made of RAM. Sweden developed the 72.7-metre-long VISBY class corvette, which has a displacement of 640 tonnes. Five were commissioned between 2002 and 2015. The hull was carbon fibre reinforced plastic (CFRP) and used large flat, angled surfaces wherever possible, while potentially radar-reflective features were concealed or internally-mounted. The 57mm Bofors gun is in a mounting which has sloped sides and conceals the barrel. As a result of these measures, the RCS of the VISBY class is only about 1% of that of a traditional warship of similar size. Similar attention was paid to IR signature. The exhausts of the gas turbine part of the ship's combined diesel or gas (CODOG)

Photo: Jesper Olsson



**HELISINGBORG shows the novel shape of Sweden's VISBY class corvettes.**

Photo: US Navy



**The US Navy classifies INDEPENDENCE as a littoral combat ship (LCS). In practice, it is of the size that most navies would classify as a corvette. In theory, its trimaran configuration and sloped sides could be applicable to future frigates, but in practice the planned FFG(X) follow-on to the LCS is likely to use a more conventional layout.**





Photo: US Navy

***The US destroyer ZUMWALT looks more like something from science fiction than an operational warship, but its revolutionary configuration gives the vessel an RCS similar to that of a small fishing boat.***

powerplant are close to the water surface at the stern of the vessel.

The first INDEPENDENCE class littoral combat ship entered US Navy service in 2010. Built from aluminium, it used a trimaran hull form based on a fast commercial ferry design. The use of interchangeable mission modules should allow the vessel to be reconfigured for anti-surface

warfare, anti-submarine warfare, or mine-countermeasure roles.

2001 saw the start of the US Navy's DDG1000 programme, which would dramatically change the shape of the destroyer. Design contracts were awarded to Northrop Grumman Ship Systems and General Dynamics Bath Ironworks. Construction contracts were placed in 2008,

but by this time rising costs had reduced the programme to only three ships, all to be built by General Dynamics Bath Ironworks. Known as the ZUMWALT class, the design is optimised for low RCS and features a tumblehome hull with a wave-piercing inverted bow, while the integrated deckhouse and superstructure of the first two vessels of the class are made from composite materials and eliminate the traditional mast. On the third ship, the deckhouse and superstructure will be made from steel, a cost-saving measure made possible by weight-reducing modifications.

Previous low-RCS ships had featured gun turrets of recognisable form, but on the ZUMWALT class, the BAE 155mm Advanced Gun System retracts into containers. The RCS of the ZUMWALT class is not as low as it might have been, due to cost-saving measures, but it is still below the target value. Unofficial reports suggest that it is around 10 sq m – a level normally associated with small fishing boats.

ZUMWALT and its sister ships are intended for the littoral warfare role, where their two 155mm guns can be used against shore targets. So it remains to be seen whether such novel hull configurations become the norm for future destroyers and frigates intended for blue-water roles. ■

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# Tactical Communications – Increasing Use of Mobile Ad Hoc Networks

**Tim Guest**

As the modern battlefield becomes saturated with huge amounts of real-time, high-bandwidth tactical information – information, which needs to travel up the chain of command from soldiers and sensors on the front line – mobile ad hoc network solutions, or MANETs, are increasingly being used to make that happen.

**B**attlefields are fast becoming networked and connected like never before, helped by huge advances in mobile communications in the civil and public

tactical information network (MoTIV) procurement projects. This article, however, purely focuses on a single technological trend – the Mobile Ad Hoc Network, or

a sender. It is like civil hotspot technology, where one smartphone might act as a hotspot for others. The only difference is that every asset can be that hotspot and that there is no need for human input to become such a hotspot. So, any soldier or vehicle might be a sender. With MANETs the distances information has to pass decreases, making it very interesting for mountain or forest areas and any other places where antennas have difficulties to establish communication with forward troops. Also, the reliability of MANETs is higher, since every device is a kind of antenna. The third advantage is during communication on the move, where vehicles might carry satellite communication systems and soldiers simply connect with the vehicle, the data then hopping from one soldier to the other.

## Advantages of Deploying MANETs

Indeed, a key factor in the need for MANET development is the much more dynamic pattern of participation of individual nodes (devices) in a MANET. Operations today are often much more ad hoc in terms of the use of such resources as, for example, unmanned vehicles, or airborne assets. With this resource-flexibility factored in, MANETs automatically allow such additions and dynamically route data to new network members, thereby eliminating the need for operators and radio planners to manually configure and change networks during missions.

Older tactical networks use very low data rates with static association of information to its position in a data frame, whereas newer tactical networks use IP with a richer and more flexible association of information. Without MANET elements, radio networks are very cumbersome to plan, configure, integrate and deploy; the primary advantage of a MANET is that it extends the tactical network to the traditionally disadvantaged dismounted user.



Photo: Thales

***Awash with information from a wealth of high-bandwidth tactical data arriving from an arsenal of sensors, tomorrow's battlefields will need to be networked and connected like never before. One new approach is the Mobile Ad Hoc Network.***

safety sectors. With the wealth of high-bandwidth, tactical data arriving from an arsenal of sensors – helmet-mounted cameras, night vision devices, situational awareness sensors, satellites, drones and more – that's no bad thing.

The whole subject of tactical communications is extremely broad, encompassing systems such as the UK's Bowman and Germany's current mobile tactical communications (MoTaKo) and mobile tac-

MANET, also referred to as Mobile Ad hoc Networking – which is being deployed increasingly as part of the overall tactical communications solution.

## More Sensors, More Data, and the Need for More Technologies

A MANET is effectively a network with a large number of free or autonomous nodes, which typically comprise mobile devices, radios or other wireless sensors that can operate without strict top-down network administration and be arranged in a variety of ways. MANETs erase the typical divide between sender and receiver. Every platform, might it be handheld or radio, can become

## Author

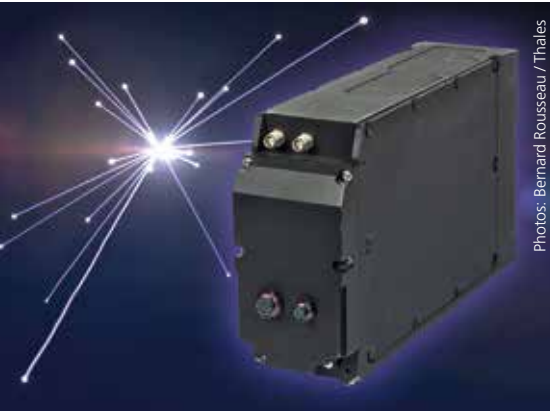
**Tim Guest** is a defence and aerospace journalist and former Royal Artillery officer.



With a MANET, a soldier at the 'tactical edge' remains connected to the network and all the services traditionally offered over wired IP networks; as such, text, file transfer, intelligence/reconnaissance info, data services and video feeds will all be

being part of a MANET, such as the Harris PRC-117G, RF-7800, RF-7850, have built-in routing capabilities that are used instead of, or in conjunction with, a vehicular router. One of the main uses for the latter is to provide a central IP connection and manage-

low the extension of the GIG to the tactical edge. Through radios such as those from the Thales SYNAPS and MBITR2 family of radios, which host a variety of waveforms, users can dynamically access network services and data over the wireless network,



Photos: Bernard Rousseau / Thales



**According to the company, Thales' SYNAPS and MBITR2 family of radios provide dynamic and resilient networking functions to support battlefield operations.**

available to him. The dynamic nature of a MANET, providing self-configuration and self-healing, means the network adapts to changing battlefield conditions and environments, and a MANET-based architecture, by its very nature, is decentralized. In early networking architectures, on the other hand, a centralized-controller concept was used, whereby a designated controller would manage the end-to-end network to include such things as authorising net entries, routing schemes, network timing and health. Once set, the network follows the rules within the MANET protocols and those configured at network initialisation, but it then manages itself autonomously. The other components of a MANET are user devices such as radios, which act as nodes in the network to provide connectivity and routing functions. The Thales SYNAPS family, for example, connects directly to the wired IP network creating the bridge from wired to wireless network routing and, together with the company's MBITR2 family of radios, provides dynamic and resilient networking functions to support modern military battlefield operations.

### Routers as Part of MANET Architecture

Individual soldier system multi-technology routers are currently in the pipeline; such routers can be deployed in vehicles to perform the IP routing between what are sometimes called the 'Stub Nets' at the edge of the network, and either the backbone or mobile backbone network used to interconnect the upper echelons of the services. Many radios suited to supporting/

ment device for all of the network devices in the vehicle, such as radios, intercoms, and computers. Modern dismounted soldier systems now include MANET-capable radio systems that connect the soldier directly into the network. With this capability, the dismounted soldier now becomes a connected node in the network.

### A US Perspective

It's worth looking at the US Military and how the US Army's Global Information Grid (GIG) and Network Operations (formerly Network Centric Warfare) doctrines have embraced MANETs to meet the needs of the networked battlefield. MANET technologies provide a critical capability and al-

seamlessly and securely. The US Army has been an early adopter of MANET technology through the handheld, manpack and small form fit (HMS) Joint Tactical Radio Systems (JTRS) programme. These radios incorporate the Soldier Radio Waveform (SRW). With nearly 25,000 radios fielded through capability sets and the migration to Full Rate Production (FRP), the US Army has fully adopted this technology and the benefits it provides. The HMS JTRS programme, for example, is the responsibility of the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T) out of Aberdeen Proving Ground in Maryland and the Thales AN/PRC-154 Rifleman Radio is one of two qualified radios under the HMS soldier radio requirement, which is currently entering FRP. (It is also understood

Photo: via Author



**A Canadian soldier with the Harris PRC-117G. The PRC-117G was selected for the first MANET capability sets for several brigades of the US Army.**



Photo: Bernard Rousseau/Thales

**A British soldier with a Harris RF-7850S. Many radios supporting MANET such as the Harris PRC-117G, RF-7800, RF-7850 and High Band Networking Radio products, have built-in routing capabilities that are used instead of, or in conjunction with, a vehicular router.**

that Thales' AN/PRC-148B MBITR2 will be a contender for the US Army's two-channel Leader Radio requirement.)

Harris is also playing a major role in the adoption of MANET technology by the US DoD across many of the mobile echelons, having started the evolution in 2009. PRC-117G radios were selected for the first MANET-capability sets for several brigades. At higher echelons, it is understood that Harris' High Band Networking Radio is used as part of the WIN-T solution to provide LAN-like rates using line-of-sight MANET and adaptive antenna technologies. The Mid-Tier Networking Vehicular Radio provided by the company provides the brigade-and-above, mobile-backbone component. The company now sees itself as the provider of the majority of MANET solutions and radios to the US DoD, having been at the forefront of developments using innovative technologies to maximise MANET performance while delivering excellent battery life. The company recently became an 'awardee' on both the HMS two-channel Manpack and Rifleman Radio IDIQ contracts that deliver MANET capabilities at the company level and below. With these awards, Harris is delivering a family of high performance MANET capabilities to the DoD to support the dismount squad leader all the way up to the brigade headquarters.

In addition to expanding its use and research into MANET waveforms, the US DoD is continuing to invest in new features and capabilities to allow for niche applications of MANETs in such scenarios as ECCM or Low Probability of Intercept or Detect (LPI/LPD) modes.

## MANET Future

MANETs have now been recognised as an important part of the tactical communications picture for current and future battlefield scenarios. Their flexibility, autonomous adaptability and applicability make them suited to a wide range of operational uses, which is why numerous key defence industry players, as well as the US DoD and NATO partners are investing in and developing MANET technologies, waveforms, procedures and protocols. ■

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# America Searching New Small Arms Solutions

David Saw

**The requirements of the US Army have shaped the small arms choices of the NATO nations since the 1950s and their imposition of the 7.62x51mm round as the standard calibre for NATO.**

Then, when virtually everybody had committed to the 7.62x51mm round, the US Army decided that it wanted an assault rifle rather than a battle rifle. This led to the adoption of the M16 in 5.56x45mm M193 as their standard rifle from the mid-1960s onwards. From 1977, the 5.56x45mm SS109 (M855) round would become the second NATO small arms calibre.

Military operations in Afghanistan from 2001 onwards and in Iraq from 2003 onwards featured sustained infantry combat and inevitably this led to interest in improving small arms performance. Criticism over the performance of the 5.56x45mm at extended ranges ignited a debate over whether it was time to opt for a new small arms calibre and a host of new calibres were considered. Then enhanced perfor-

(SCHV) rounds that led to 5.56x45mm. Then an effort was made to replace the M16 rifle through a programme known as the Advanced Combat Rifle (ACR) in the 1980s. Here, the aim was to double hit probability and submissions were received from AAI, Colt, Heckler & Koch (H&K) and Steyr, with weapons featuring flechette rounds, duplex rounds and caseless ammunition. The ACR could not deliver the desired performance and was cancelled in 1990, then came the Objective Individual Combat Weapon (OICW) programme that was cancelled in 2005.

## Future Technologies

While these efforts to forge a new path in small arms came to naught, they did not halt ongoing research efforts to develop future systems. One of these efforts was the Lightweight Small Arms Technologies (LSAT) programme and in particular the LSAT Light Machine Gun (LMG) work, which started in 2003. LSAT was seeking the "holy grail" in terms of small arms; the aim was to achieve lighter weight, more accuracy, more lethality and more reliability. One of the first issues to be considered in the LSAT LMG was ammunition, they looked at both caseless and cased telescoped (CT) ammunition. One immediate advantage of opting for a CT ammunition approach was the weight reduction, a CT 5.56mm round would be at least 30% lighter than a conventional 5.56mm round. However, going with CT would mean that existing weapons could not be used, and so it was decided to look for a new LMG solution rather than a new rifle because at that time the OICW programme was still in progress. There was a competition to select a contractor for the programme between AAI (later Teledyne) and General Dynamics, with Teledyne selected as the winner. Work on the LSAT LMG programme would deliver a system and new ammunition that appeared to offer a substantial improve-



Photo: US Army

**The US Army is looking to acquire a new small arms system to replace the M249 Squad Automatic Weapon (SAW), under a programme known as the Next Generation Squad Automatic Rifle (NGSAR). NGSAR will be a fully sound-suppressed, magazine-fed weapon, which could use a new calibre instead of 5.56x45mm.**

This resulted in a situation where the infantry squad would be equipped with assault rifles and a Squad Automatic Weapon (SAW) all in 5.56x45mm, with a Medium Machine Gun (MMG) or General-Purpose Machine Gun (GPMG) in 7.62x51mm at the company level. More recently, based on combat experience in Iraq and particularly in Afghanistan, the Designated Marksman Rifle (DMR), usually in 7.62x51mm, has become a part of the basic small arms mix.

mance 5.56x45mm rounds were fielded, as were enhanced performance 7.62x51mm, and the levels of dissatisfaction regarding performance were greatly reduced. In fact, the US Army, despite championing the 7.62x51mm and 5.56x45mm calibres, had been working on alternatives from the very beginning. These efforts included the Special Purpose Infantry Weapon (SPIW) programme at the end of the 1950s and research into Small Calibre High Velocity

# Masthead

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ment in performance over the in-service M249 SAW. The downside was that there was a new weapon and new ammunition technology involved, and at that point nobody was prepared to take the leap of faith or fight the budget battle to adopt a new machine gun. However, research would continue under a new programme known as the Cased Telescoped Small Arms Systems (CTSAS). Here, the aim was to develop an MMG and a new carbine. In terms of ammunition, the 5.45mm CT was considered inappropriate for an MMG application and this led to a 7.62mm CT round being developed and then a 6.5mm CT round emerged for the carbine.

Due to the LSAT and CTSAS programmes, there are prototype carbines from Teledyne in 6.5mm CT, an LMG in 5.56mm CT and an MMG in 7.62mm CT. The MMG can also be configured to use the 6.5mm CT round; as the rounds have similar dimensions, a barrel change is all that would be required. It is worth noting that a 7.62 CT round is 34% lighter than a conventional 7.62mm round, while a 6.5 mm CT round is 35% lighter than a conventional 7.62 mm. In comparison to belted conventional 7.62mm, a 200-round belt of 7.62mm CT would be 38% lighter.

All of this would appear to indicate that the potential exists to introduce a complete CT ammunition-based small arms family. The critical issue is whether the US Army is actually prepared to seriously consider a CT-based solution for its future small arms needs. Or is the institutional memory of the failure of the ACR and then the OICW still too vivid to risk pursuing a future advanced technology small arms programme?

## Changes Elsewhere

The work on CT ammunition and related small arms was only part of the story as far as US Army small arms research and development was concerned. There was also considerable research on larger intermediate rifle calibres, 6.5mm to 7mm. These rounds could be conventional, or to reduce weight they could be CT or even a polymer and brass hybrid case.

If the US Army is going to adopt a new calibre in the 2020s, it will inevitably become the de facto NATO standard. The problem is that, even when you standardise a calibre, that does not mean that everybody can use it. For example the US M4 carbine performs perfectly well with M855 5.56x45mm ammunition, this round is NATO qualified and meets the requirements of STANAG 4172. British L2A2 5.56x45mm rounds are also NATO qualified and meet the requirements of STANAG 4172. Yet, unfortunately, if you use them with an M4 you are asking for trouble. The L2A2 has a higher port pressure than the M855 and this causes failure to extract (FTX) in the M4. In contrast, the Canadian C8A3 carbine has an enlarged chamber and an improved extractor spring and buffer and can handle the L2A2 round. The lesson to be drawn from this is that a future standardised round must be fully standardised across the complete performance spectrum and therefore be truly interoperable across the full spectrum of NATO small arms in that calibre.

To summarise, there was plenty of small arms research and development work to draw upon, but very little in the way of actual programmes that could lead to new weapons being fielded. Then, all of a sudden in 2017, a pair of small arms programmes would emerge above the parapet, both of which looked highly promising, but only one of which would survive beyond the end of 2017 as a potentially viable programme. The first of these programmes was the Interim Combat Service Rifle (ICSR) and the second was the Next Generation Squad Automatic Rifle (NGSAR) programme.



## Face the Future

The ICSR programme was the result of the US Army seeing: "a potential gap in the capability of ground forces and infantry to penetrate body armour using existing ammunition." Dealing with this potential gap was the reasoning behind ICSR. This system was to be fielded with the M80A1 Enhanced Performance Round (EPR) to "engage and defeat protected and unprotected threats."

The ICSR programme emerged publicly in June 2017 and the US Army Contracting Command had issued a solicitation on 4 August 2017 for the ICSR. By September 2017, the ICSR programme was in trouble as the US Army rethought its small arms strategy, and by November 2017 the programme was cancelled. On 28 November 2017 US Army Contracting Command withdrew the ICSR solicitation, noting that: "This notice is to inform interested parties of the cancellation of the Commercial Opportunity Notice (CON) for the Interim Combat Service Rifle (ICSR), under CON W15QKN-17-Z-0ANP due to a reprioritisation of funding previously allocated for the ICSR. Resulting from a change in strategy, the Government is reallocating



Photo: US Army ARDEC

**Under the Lightweight Small Arms Technologies (LSAT) programme, the US Army Armament Research, Development and Engineering Center (ARDEC), working with Teledyne, developed the LSAT Light Machine Gun. This used 5.56mm Cased Telescoped (CT) ammunition that was at least 30% lighter than standard 5.56mm rounds.**

the ICSR funding to the Next Generation Squad Weapon (NGSW). The NGSW will be a long-term solution to meet the identified capability gap instead of the ICSR, which was an interim solution." Although called the Next Generation Squad Weapon

by US Army Contracting Command, what they are actually referring to is the NGSAR. Whereas the ICSR was a commercial off-the-shelf system, NGSAR is far more ambitious with the aim being to have a transformative system that will offer a "x10

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improvement over any existing current weapon system in the world.” According to US Army Contracting Command, the NGSAR requirement as of 31 May 2017 is as follows: “The Next Generation Squad Automatic Rifle (NGSAR) is a single incremental programme to meet future force warfighting needs. It is the planned replacement for the M249 Squad Automatic Weapon (SAW) in Brigade Combat Teams (BCT) and select support units during the

on is to be less than that of the M249. In addition, the level of toxic gases produced by the NGSAR must be less than that of the M249 firing M855A1 ball ammunition. In terms of performance, “the NGSAR will achieve overmatch by killing stationary, and suppressing moving, threats out to 600 metres, and suppressing all threats to a range of 1,200 metres.” The requirement calls for the new weapon to have both ball and tracer ammunition, as well

service since the 1980s. Ironically, the US Marine Corps has already started to replace the M249, which they took into service in 1985, with the M27 Infantry Automatic Rifle (IAR) based on the H&K HK417. The M27 is half the weight of the M249 and offers greater precision over similar ranges. The original idea was to take the M249 out of service completely once the M27 arrived, but later this was changed to each Marine infantry company retaining a total of six M249s. Now the US Marine Corps plans to adopt the M27 as their standard infantry rifle, replacing the M4, meaning that everybody in an infantry squad will have the same weapon.

While the US Marine Corps is committed to the M27 and the 5.56x45mm calibre as its small arms system, it is plain to see that the US Army wants to move in a different direction. Achieving the performance parameters desired for the NGSAR would seem to indicate that a solution using the current standard 5.56x45mm calibre is not possible. Fortunately, as we have seen, the US Army has spent considerable time and effort looking into different calibres and advanced ammunition technologies. This would seem to be the opportune moment for the US Army to seriously consider the NGSAR with CT rounds or even hybrid rounds with a polymer and brass case.

The problem in all of this is that the US Army does not really have a record of success in turning small arms requirements into real programmes that deliver a true operational capability, as confirmed by the failure of the ACR and OICW or even the ICSR. Furthermore, describing the NGSAR requirement as “transformative” indicates that there is a significant level of risk involved here.

On the other hand, if the US Army can make NGSAR a reality, then this could be one of the most significant moments in small arms since they adopted the M16. If the NGSAR can be fielded, it will create the basis for another new weapon that is often called the Next Generation Individual Weapon (NGIW) and this would be the replacement for the M4. It would also mean that NATO would inevitably have to standardise a new round in addition to 5.56x45mm and 7.62x51mm.

Over the next decade, the US Army could be on the road to transforming the infantry weapons picture, meaning that other countries that are in the market for a new assault rifle or SAW will have to decide whether to wait and see what the US does or risk opting for a 5.56x45mm or even 7.62x51mm small arms system that could well be rendered functionally obsolete by the US fielding a new technology small arms solution. ■

Photo: US Army ARDEC



**The US Army Armament Research, Development and Engineering Center (ARDEC) has spent a great deal of time researching cased telescoped (CT, back row) and caseless telescoped (front row) ammunition solutions. Cased telescoped rounds proved to be more effective, and now a rifle, LMG and MMG have been developed using CT rounds.**

next decade. It will combine the firepower and range of a machine gun with the precision and ergonomics of a carbine, yielding capability improvements in accuracy, range, and lethality.”

The NGSAR is to be lighter in weight than current systems and fire lightweight ammunition; this is a serious attempt to reduce the soldier weight burden. The system will operate with legacy optics and night vision devices, have back-up iron sights and be capable of utilising the future Small Arms Fire Control System. The requirement calls for the combat configured NGSAR, including sling, bipod and sound suppressor, to weigh no more than 5.443 kg, not including ammunition or magazine. The NGSAR is to have a maximum length of 96.52 cm and be no longer than 88.9 cm with the buttstock in the stowed configuration. There is great emphasis on reducing the signature of the new weapon in comparison to the existing M249. The requirement calls for the NGSAR to not be localised by sound at a range of more than 300 metres and not to be localised by flash out to 300 metres. The thermal signature of the weap-

as Live Fire Training Ammunition, Force-on-Force Training ammunition, blank and drill ammunition. The key issue as far as NGSAR ammunition is concerned, is that at a minimum it must weigh 20% less than current tactical brass ammunition, with a potential desired weight reduction of up to 50% compared to current rounds. Significantly, the NGSAR requirement noted that: “NGSAR ammunition could be a calibre not currently in use by the US Army.”

The requirement noted that the NGSAR should be “capable of a rate of fire of 60 rounds per minute for 16 minutes and 40 seconds without a barrel change or risk of cook off. Cyclic 200 rounds without cook off. It should also be capable of 108 rounds per minute sustained for 9 minutes and 16 seconds without barrel change or risk of cook off. Cyclic 300 rounds without cook off.”

### Final Destination

At this stage, the only certainty in the NGSAR effort is that the US Army wishes to replace the M249 SAW that has been in



# Japan's Wheeled Armoured Vehicle (Improved)

**Shinichi Kiyotani**

**The Japanese programme to introduce a new APC is encountering unexpected difficulties.**

The Acquisition, Technology & Logistics Agency (ATLA) of the Japanese Ministry of Defence (MoD) has been proceeding with development of the new 8x8 armoured vehicle called the Wheeled Armoured Vehicle (Improved) or WAV-Im for the Japan Ground Self-Defence Force (JGSDF). Despite the name, it is not an improved version of the currently used Type 96 8x8 Armoured Personnel Carrier (APC), but a new vehicle.

The competition was between Komatsu and Mitsubishi Heavy Industries (MHI), and the JPY1.97Bn contract for the prototype vehicle was awarded to Komatsu. Five prototypes were delivered to the MoD in February 2017: the process of assessing, testing and trialling was to continue until the end of fiscal year (FY) 2018 by the Test and Evaluation Command (TECOM) at Camp Fuji. However, the prototype vehicles had some serious problems, and were sent back to Komatsu's factory in the middle of 2017. ATLA and the Staff Office of the JGSDF are assessing alternative armoured vehicles, including foreign-sourced, although the ATLA and the Staff Office insist that they avoid foreign products because they do not meet the JGSDF's requirements in terms of cost and survivability.

WAV-Im was required to have better survivability than the Type 96 Armoured Personnel Carrier (APC), against snipers, IEDs, landmines etc., so it was required to have a mine-protected structure, modular armour, and the capability to mount a Remote Weapon Station (RWS). The development plan includes 3 variants – APC, Command & Control Vehicle and Combat Support Vehicle (Combat Engineer Vehicle) which will handle mine clearing, etc. The total number to be procured has not yet been determined. The development cost is estimated to be around JPY4.8Bn. Production of the prototypes started in FY2014 and finished in late FY2016, and the assessment tests and trials were planned for FY2016 to FY2018.

## Komatsu vs. Mitsubishi

Both MHI and Komatsu submitted proposals to ATLA. MHI proposed a vehicle based on the Mitsubishi Armoured Vehicle (MAV) which is developed as the company's own venture. MAV is based on the Type 16 8x8 Manoeuvrability Combat Vehicle (MCV) of the JGSDF. The MCV is equipped with a 105mm tank gun by Japan Iron Works, and it entered into service in FY2016. Its combat weight is up to 28 t, length 8 m, width 2.98 m and height 2.2 m. It has a crew of 11.

Komatsu's candidate was developed from the NBC Reconnaissance Vehicle which entered service in FY2010. Its combat weight is 20 tonnes, length 8.4 m, width 2.5 m and height 2.9 m, with a crew of 11. It has a mission module system similar to ARTEC's BOXER. The mission module allows the vehicle to be rapidly adapted to meet different operational requirements.

An industry source said in 2017, "The prototype has problems of armour and survivability, and, moreover, mobility. Komatsu used the components of construction ma-



Photo: Wikipedia CC

**The Japanese Army relies mostly on the Type 96 APC, here depicted at Camp Shimoshizu.**



Photo: JGSDF

**The Type 16 MCV is a wheeled tank destroyer, produced by Mitsubishi.**

Photo: Miki Yoshimoto



**A Komatsu LAV of the JGSDF's 11th Brigade**

chines to keep the cost down. The situation is serious; the authorities are considering foreign vehicles."

The JGSDF has not demanded off-road mobility for their wheeled armoured vehicles such as Type 96 and NBC Reconnaissance Vehicle, because of the Staff Office's operational concept. However, even by this standard the prototype's mobility was unacceptable for JGSDF use.

signer said, "If we had been allowed width up to 2.6 m, the Type 96's mobility would be greatly improved."

However, that regulation has another exception: If the MoD annually submits the necessary documentation to the Ministry of Land, Infrastructure, Transport and Tourism, the 2.5 m width limit may be waived. Thus the MCV, which started development after the NBC Reconnaissance Vehicle, ex-

Photo: Los688



**The NBC Reconnaissance Vehicle produced by Komatsu**

The NBC Reconnaissance Vehicle, as the basis for the prototype, is only 2.5 m wide, which is too narrow for a modern combat vehicle. The height is 3.2 m and the length is 8.4 m: it is too high and too long, too, although that is to obtain the required internal volume. The width of a wheeled vehicle is limited by the Road Traffic Law, which says the width must be below 2.5m. US military vehicles are an exception, but the JGSDF's vehicles are not exempted: even earlier-developed armoured vehicles such as the Type 96 were designed to comply with this regulation which, by the way, is not a suitable regulation for today's armoured vehicles. In fact, a Komatsu de-

ceeds the width regulation by being 2.95 m wide. Fundamentally, if a vehicle is less than 2.5 m wide it cannot absorb the recoil of a 105mm tank gun.

A tough negotiation between the Staff Office and MHI led to the Staff Office accepting MHI's claim.

## Development Problems

Komatsu decided to use the NBC Reconnaissance Vehicle as the base of their new vehicle to reduce development cost. In fact, the budget of JPY19.7M for the production of a prototype is too small to develop a new vehicle completely from scratch.

In a press release issued on 26 December 2017, ATLA announced that they recognised the problems with the prototype of WAV-Im; ATLA stated that until the end of FY2019 they will try to fix the problems and then re-start the tests until the end of FY2021, delaying the programme by 3 years. However, ATLA's press release mentions only the troubles with armour which is difficult to swallow: "The problems are the ballistic resistance of the armour plating, its unevenness and its thickness," the press release continued. "The main contractor Komatsu will fix the problems. At the same time, we will proceed with an analysis of alternatives in the best interests of the programme."

On 15 January 2018, ATLA asked the industry to submit information on 8x8 vehicles. The conditions are as follows:

- a) The companies must be experienced R&D and manufacturers of armoured vehicles
- b) The companies must have knowledge for R&D or production of armoured vehicles which can be explained clearly
- c) The companies must have the right to import and sell armoured vehicles, or be able to obtain rights for imports and sales of armoured vehicles

This would suggest that ATLA is considering importing or license-producing foreign armoured vehicles, instead of Komatsu's vehicle. However, a senior ATLA official told ESD, "The problems were almost solved, except for the armour. We are satisfied with mine and IED resistance capability. While Komatsu solves the armament problem, we have to make good use of the time. So we decided to study 8x8 armoured vehicles."

This explanation of ATLA is hard to believe. If armour were the only problem, ATLA would not consider vehicle alternatives from overseas. Another industrial source said that, "There are not only problems with armour and mobility, but also with defective modular systems. Moreover, when ATLA requested the application documents, they did not yet have the concept of a vehicle family."

The major defence companies have been promoting the APC project since mid-2017, but the strongest candidate would be MHI's MAV. Since the early days of the JGSDF, Japan has bought its armoured vehicles from the US but from the 1960s onwards, JGSDF preferred vehicles manufactured in Japan. Strictly speaking, the MAV is only a new version of the MCV. In this way, JGSDF is not only able to commercially market the products of the Japanese defence industry, but also training, maintenance and logistics, thereby reducing procurement and life cycle costs.





# Submerged Unmanned Platforms on the Rise

Luca Peruzzi

**Terror attacks in international waters or attacks on deep-sea communications cables require the development of long-range and deep-sea-compatible autonomous and remote-controlled platforms.**

The threat posed by the growing number of navies equipped with last-generation submarines and underwater weapons, the increasing complexity of mines and (submerged) improvised explosive devices (IEDs) and the rapid development of unmanned technologies have prompted the US and NATO, as well as the world's naval forces, to develop remote-controlled and autonomous vehicles and sensor technologies to support manned-platform operations and protect their crews by conducting dangerous mine countermeasures missions (MCM). At Euronaval 2016, Thales unveiled a recently developed autonomous vehicle capable of conducting prolonged missions: AUSS (Autonomous Underwater & Surface System), a new hybrid long-endurance maritime autonomous system. Developed in collaboration with French small- and medium-sized companies and allegedly the world's first hybrid unmanned system capable of operating both above and below the surface, AUSS has been designed for a wide range of civil and military roles, such as intelligence gathering, maritime counter-terrorism, and mine countermeasures.

AUSS is 5.5 m long and 533 mm in diameter and has a weight of 600 kg. The torpedo-shaped UUV (unmanned underwater vehicle) with a front end reminiscent of a shark's head and stern twin-tandem propellers features exceptional manoeuvrability and stability at low speeds. Capable of turning on the spot (360° in an 8x8-metre box) and adopting a vertical orientation and operating as a buoy, the AUSS can stop in 10 metres and then reverse

The vehicle reaches speeds of 0-17 knots and can go into "sleep" mode on the seabed for a defined period of time to extend battery life. AUSS can be launched and recovered from the surface, from underwater platforms and from the shore. In 2016, two prototypes underwent sea testing; market availability is expected for 2020.



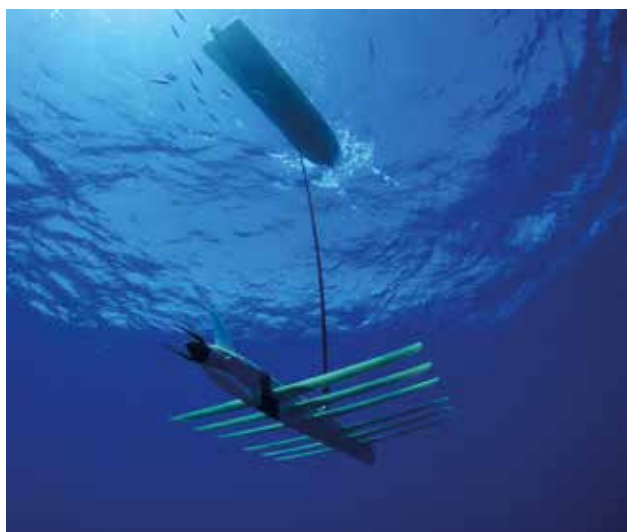
Photo: Thales

**During Euronaval 2016, Thales unveiled the hybrid long-endurance AUSS (Autonomous Underwater & Surface System) vehicle.**

## Powered by the Waves

Russia's increasing activities and the expansion of its underwater fleet underline the growing importance of NATO ASW research, development and intelligence. In addition to the increasing use of underwa-

direction, according to the French company. The new vehicle can take up a vertical position and extend a 3-metre high ISR mast over the water surface, which makes it unique among UUVs of comparable size. The vehicle body can be extended with additional rings (up to 8 metres) to accommodate larger loads.



Photos: Liquid Robotics

**Liquid Robotics developed the wave energy-propelled WAVE GLIDER.**



**The WAVE GLIDER can tow underwater sensors and sensor arrays in addition to platform-mounted surveillance systems.**



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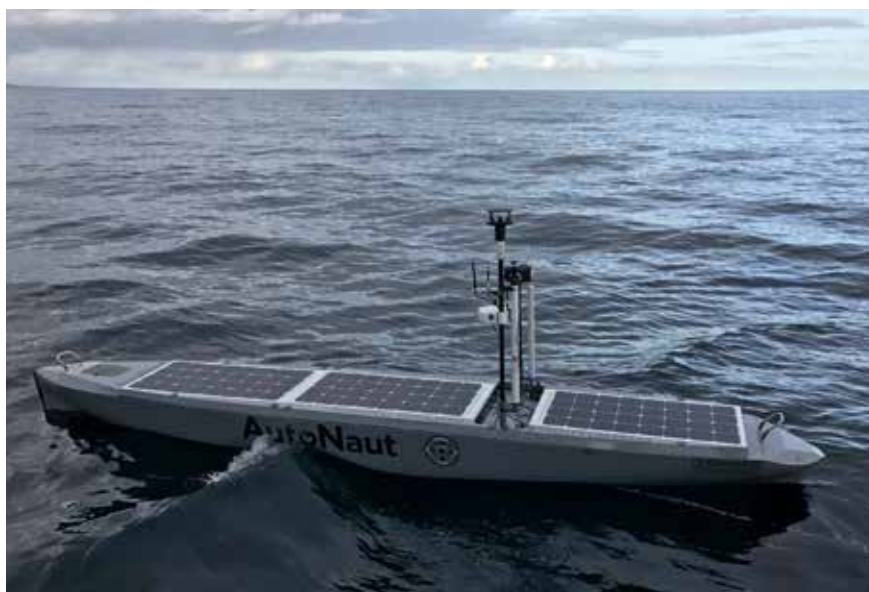


Photo: AutoNaut

**The UK-based company AutoNaut is working on a family of glass-fibre USVs which use wave propulsion technology.**



Photo: Saab

**During the Royal Navy's UW 2016, WAVE GLIDERS demonstrated their capabilities during ASW exercises, working with Saab's AUV62-AT (acoustic target) autonomous underwater ASW training platform.**

ter gliders and more conventional UUVs by US and European companies, such as Kongsberg (Hydroid) and their REMUS family, Teledyne's GAVIA AUV, Slocum's G3 glider, the L3 OceanServer IVER3 and ALSEAMAR's SE-AEXPLORER, vehicles powered by sea wave energy are drawing attention.

A pioneer of this technique is Boeing's subsidiary Liquid Robotics. The company developed the WAVE GLIDER, also known as SHARC (Sensor Hosting Autonomous Remote Craft), which consists of a surface float housing the solar cells, mission electronics and communication equipment. Below the float is a sub, which drives the vehicle with wave energy. The WAVE GLID-

ER can tow underwater sensors and sensor arrays as well as platform-mounted monitoring systems such as signal intelligence and electro-optical sensors.

With more than 1.4 million nautical miles under its belt, the latest version (with a 3-metre-long and 155-kilogram underwater thruster) can sail up to 3 knots and operate for longer periods of time (allegedly up to one year at sea, depending on the level of biofouling) in heavier sea states (sea state 6 and higher).

As part of the Royal Navy's Unmanned Warrior 2016 exercise (UW 16) sponsored by the UK MoD, four WAVE GLIDERS participated in ASW operations and success-

fully detected and tracked an advancing unmanned vehicle and a manned diesel-electric submarine, which demonstrates the effectiveness of the USV in conducting ASW missions autonomously. The WAVE GLIDER operates in the ASW role with the US Navy and has been sold to more than 400 customers worldwide; it is at the core of a US programme called Silvertip, which aims to deliver and test an unmanned, mobile, long-stand-off, submerged and surface target acquisition system to support initial concept validation. Launched in 2016, the programme is expected to be completed in the first half of 2018.

In Europe, the British company AutoNaut is working on a family of 3–10-metre-long glass-fibre USVs, which use energy from moving back and forth over waves to enable forward movement via sub-surface foils mounted fore and aft.

Wave propulsion via the patented wave foil technology generates top speeds of 4 knots for the 5-metre version. The on-board sensors are powered by solar energy and allow for several months of offshore data harvesting. The USV can accommodate a range of sensors as demonstrated in different exercises; research continues on extended-range operations. During UW 2016, a 5-metre AutoNaut USV demonstrated its ASW capabilities, working with a number of systems including Saab's AUV62-AT (acoustic target) autonomous underwater ASW training platform. The AutoNaut was equipped with a host of sensors, including Seiche's Digital Thin Line Array for passive acoustic monitoring, a Teledyne Defence PHOBOS radar threat warner for signal intelligence, the AutoNaut 360° video camera, a QinetiQ wifi communications system for real-time data transmission and Xylem Analytics' sonde for a range of oceanographic data, which were used for ISR collection. The AutoNaut USV also reached up to 5 nautical miles off the coast for short periods of operation.

## Relying on Unmanned Systems

The rapidly evolving capabilities of unmanned platforms, sensors and mission systems in long-range operations (including anti-access and area denial) and the declining number of combat vessels in naval forces is accelerating research and increasing the reliance of future manned platforms on unmanned systems.

The UUV programmes of the US Navy are facing a major challenge as more and more systems are being deployed and tested, while the service is pointing the way for larger underwater platforms in the future.



In September 2017, the US Navy established its first unmanned undersea squadron (UUVRON1) to operate a variety of UUVs, and it transitioned the first two innovative (large) naval prototypes from the Office of Naval Research (ONR) to the Naval Undersea Warfare Center (NUWC), where they are being used as training platforms to understand how to operate larger UUVs. The US Navy has stepped up both the Large Diameter UUV (LDUUV) and the Extra Large (diameter) UUV (XLUUV) programmes. Under the leadership of the US Navy's NUWC, the Snakehead LDUUV programme was split into two parallel programmes, one to continue the experiments and the other as an accelerated acquisition programme, to launch the Phase 1 prototype in the first quarter of 2020 (end of 2019) and the future LDUUV acquisition programme.

Phase 1 with two prototypes for testing and subsequent deployment will focus on intelligence and preparation of the environment (IPOE), while Phase 2 would try to add extended ranges to both missions, such as the use of an advanced permanent magnet propulsion system to be developed by General Atomics Electromagnetic Systems. In September 2017, the US Navy selected Boeing and Lockheed Martin to submit technical data packages for the Orca XLUUV programme as a next step in fielding an independently operating UUV. The Orca XLUUV will have a reconfigurable payload bay; it will be designed to be launched from a home base to an operational area, periodically communicating with the station, deploying payloads, transporting them home and being recovered from the water. The Orca XLUUV will be an industry effort with two design contracts to be awarded in the first quarter of FY 2019 for the production of up to five vehicles. According to FY 2019 budget proposals, the first Orca vehicle is to be delivered by the end of FY 2020. The unmanned vehicles are expected to significantly augment the capabilities of next-generation surface platforms currently under development.

The next increment of the US Navy's VIRGINIA class, the Block V, will ensure the compatibility of the submarine and the Snakehead UUV to pave the way for SSN(X)'s manned-unmanned teaming.

## Manned-Unmanned Teaming

US and European industries have developed systems to launch and retrieve UUVs, some of which have already been delivered to various navies, such as Saab's system to the Swedish Navy. Moreover, new underwater platforms, such as Saab Kockums' A 26 submarine, have a multi-mission por-

Photo: US Navy



**The Leidos-developed ACTUV demonstrator vessel SEA HUNTER**

tal or a compartment for the delivery of larger equipment.

In addition to the various European multi-role frigate programmes, the US Navy's Future Surface Combatant programme will include a large manned combat vessel, a small manned combat vessel and a family of unmanned surface vehicles.

In FY 2019, the US Navy will launch the Medium Displacement Unmanned Surface Vehicle (MDUSV), which is designed as a low-cost, highly resilient, reconfigurable, optionally manned ship capable of operating autonomously and accommodating various payloads, including ASW, while collaborating with other US Navy combatants. The US DARPA's ACTUV (ASW Continuous Trial Unmanned Vessel) programme has officially been completed, and the prototype

vessel SEA HUNTER produced by Leidos (with a second under contract) has been transferred to the ONR to conduct more research on autonomous technologies. Depending on the test results, the ACTUV/MDUSV could enter the service of the US Navy in 2018.

## Mine Countering

There is a widespread expectation that future anti-mine defence measures will be conducted by unmanned and increasingly autonomous systems operated by less complex parent ships at a safe distance from the minefield, rather than by the current, low-signature, high-value mine countermeasures vessel (MCMV). This is why European navies and the

Photo: Saab



**Saab's Multi-Shot Mine Neutralisation System**



Photo: ECA Group

**ECA Group's A9-M AUV was successfully deployed during the Belgian Navy's sea trials in June 2017.**

MCM community are pursuing a modular toolbox approach which embraces a range of technologies adaptable to different platforms or operational scenarios.

The use of unmanned vehicles has many benefits, but there are also challenges in terms of mission requirements and technological maturity, such as automatic tar-

get recognition, over-the-horizon concepts and the mother ship's signature.

communicate without barriers. Among the national and multinational R&D and prototyping efforts for the various MCM recapitalisation programmes currently underway in Europe, France and the UK are working together on the MMCM (Maritime Mine Countermeasures) demonstration project, but with separate follow-on acquisition programmes.

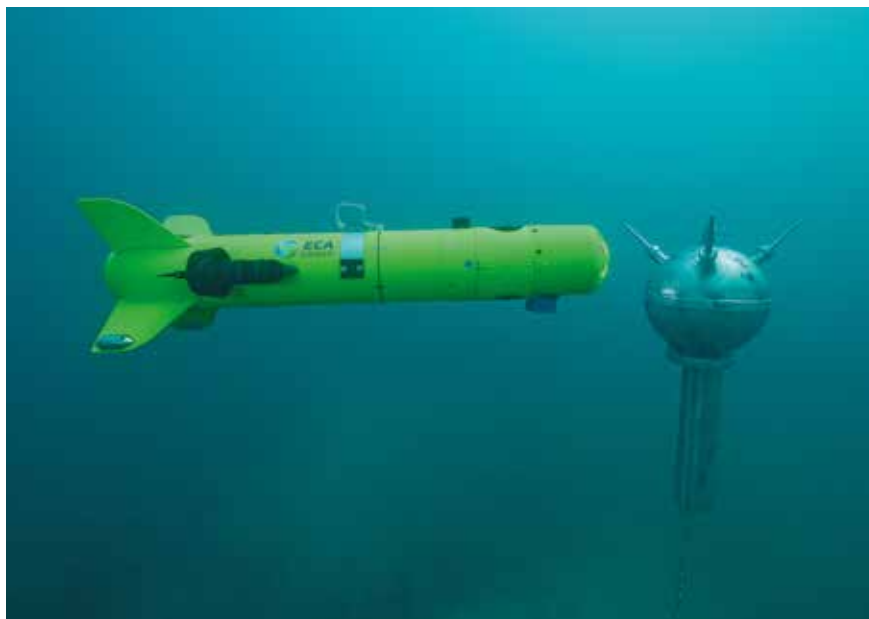


Photo: ECA Group

**ECA Group's SEASCAN Mk2 mine neutralisation system has been demonstrated to the Belgian Navy.**

get recognition, over-the-horizon concepts and the mother ship's signature.

To support R&D in the underwater domain, NATO's Centre for Maritime Research and Experimentation developed the JANUS standardised underwater communication protocol, allowing all compliant assets and their networks to

Based on a robust, non-USV-centric system with a modular structure to adapt to changing threats and allow for future upgrades, the contracted configuration includes an USV equipped with a towed synthetic aperture sonar T-SAS/Sonar and remotely operated underwater vehicle (ROV) and UAVs.

Rapidly deployable by road, sea, train, and air through containerised systems, the assets will operate autonomously and remote-controlled from a host ship or a shore-based station via high-data-rate communications and over-the-horizon links. Led by Thales Underwater Systems (TUS), the industry team is currently developing two identical MCM prototypes, one for the French Marine Nationale and the other one for the Royal Navy. The two prototypes are to be delivered in 2019 under a 30-month Stage 2/3 contract awarded in October 2016. The contract includes a follow-on (Stage 4) option for two years of support for the evaluation period of the systems.

Partnered with BAE Systems, Thales is supplying its high-resolution, multi-view SAMDIS T-SAS sonar for both the USV tow and the AUV and the associated PRACTIS data analysis tool, in addition to a mine-avoidance sonar and an integrated Portable Operations Centre solution for which BAE Systems will provide the Mission Management System (based on its existing NAUTIS MCM command system), and the virtual visualisation and experimentation suite.

## A Joint Industry Effort

Other industry members include ECA (responsible for the customised A27 AUV), ASV (Halcyon-based USV), Saab (Multi-Shot Mine Neutralisation System [MuMNS] remotely operated vehicle), and Wood & Douglas (communications).

Under a recently released French MoD LPM (Loi de Programmation Militaire) covering the 2019-2025 period, the next-generation Système de Lutte Anti-Mines – Futur (SLAM-F) programme will see the acquisition of eight MMCM packages (système de drones, MP) until 2030, in addition to four unspecified mother ships, with an option for a fifth depending on the selected platform, and five diver support vessels. At the end of the LPM period, the French Navy will have four MMCM packages, two mother ships and three diver support vessels.

The UK MoD is said to be looking at the MMCM package as a prototype for mature technology to inform the MCM and Hydrographic Capability (MHC) programme. Lessons learned from the Unmanned Warrior 2016 demonstration prompted the UK MoD to split its MHC acquisition programme into several projects to accelerate the deployment of mature unmanned capabilities. Assessment is to be concluded in 2019; a later phase will focus on de-risking unmanned technologies which include the MMCM package and the MHC sweep



programme delivered by Atlas Elektronik UK (AEUK). To bolster its minesweeping capability, in March 2015 the Royal Navy contracted AEUK to deliver a prototype of an unmanned surface vessel-based minesweeping system as the first phase of the MHC Sweep capability project.

Based on its ARCIMS (Atlas Remote Capability Integration Mission Suite) USV, AEUK has partnered with Babcock (launch and recovery and system integration) and BAE Systems. The latter will integrate the entire package with its Nautis MCM C2. Options could include up to four packages. Thus, the MHC programme is keeping momentum, as has been disclosed at DSEI 2017. The Royal Navy wants to speed up the MHC programme; it intends to deploy an unmanned vehicle for routine mine countermeasure tasks to UK waters within the next two years.

In November 2016, Belgium and The Netherlands agreed on a wider bilateral co-operation in MCM and frigates. Belgium will lead the future BE/NL MCM (TRIPARTITE class MCMVs plus Belgian Navy support ship) capability replacement acquisition programme, while The Netherlands will administrate the frigate acquisition programme for the two countries.

In January last year, the Belgian government gave the go-ahead to proceed with a public procurement procedure for the two countries (6+6 each), followed by approval by the Dutch Government and procurement by 2018.

The first platform delivery is planned for 2023, with IOC in 2025. The objective of the common programme is to procure a dedicated platform equipped with an MCM toolbox. The joint BE/NL requirement specification calls for a platform equipped with an MCM toolbox capable of conducting stand-off (defensive) MCM using primarily unmanned systems and support expeditionary operations in permissive and non-permissive operational scenarios. Each vessel operated from the coast or from a platform is to have an on-board MCM toolbox that can process all types of mines at depths of up to 300 metres, including two USVs with sensors and effectors, four light and three medium AUVs in addition to divers with RHIBs and one unmanned air system.

In order to better understand the systems and capabilities on the market, the Belgian Navy hosted the North Sea Unmanned MCM (BENSU) trials in June last year with a series of end-to-end or detect-to-engage (DTE) demonstrations conducted by a number of companies.

Among the latter, the Belgian patrol vessel POLLUX deployed ECA's Unmanned

MCM Integrated System (UMIS), which included an A9-M AUV and an INSPECTOR USV (itself deploying two SEASCAN Mk 2 remote-controlled vehicles), while the POLLUX simultaneously deployed ECA's long-range A27-M UAV. The two systems worked on a predefined MCM mission.

After just a few minutes in the search area, the first sonar contacts, which were automatically generated by the target recognition software of the A9-M AUV, were forwarded via the Inspector USV to the Belgian platform to begin the classification process while the AUV continued its activities. Aiming at the target, the INSPECTOR USV released the SEASCAN Mk2 inspection ROV to perform a final visual camera identification based on data transmitted to the C2 platform via the INSPECTOR USV. The British-French MMCM same-system

package is also equipped with a Thales SAMDIS Multi-View Synthetic Aperture Sonar; the A27-M proved to be an extremely stable, durable and reliable platform, and the SAMDIS and its data analysis tool PRAC-TIS demonstrated its performance.

During the same trials, Atlas Elektronik groups from the UK and Germany jointly demonstrated an MCM DTE capability using an AEUK ARCIMS vehicle equipped for the first time with both the Northrop Grumman AN/AQS-24B towed synthetic aperture sonar and a laser line-scan sensor already deployed during the UW 16 exercise and the SeaFox C mine destructor in two canistered rounds.

Following an unsupported transit to the exercise area, the USV executed a six-hour DTE mission using both autonomous and remote-controlled modes of operation

Photo: Saab



**Saab's proven DOUBLE EAGLE family of hybrid MCM ROVs/AUVs**

Photo: Saab



**The Saab A26 submarine is equipped with a portal to launch ROVs.**



Photo: Textron Systems

**Textron Systems' CUSV platform will be used for both minesweeping and mine hunting operations.**



Photo: Northrop Grumman

**Atlas Elektronik UK's ARCIMS equipped with Northrop Grumman AQS-24B towed sonar with laser line-scan sensor and SeaFox C mine destructor.**

from the Belgian Navy's command platform. During the demo, the USV conducted 12 sq km of continuous mine-hunting survey at 14 knots with two laser identifications and one SeaFox engagement. Saab is proposing a new MCM concept based on a new mother ship and Saab's family of unmanned autonomous and remote-controlled mine-hunting and neutralising systems. The new mother ship is 80 metres long and has a medium to high signature and medium shock resistance; it is capable of operating both surface and underwater

vehicles and will use mid-sized, 11-metre-long USVs to deploy MCM equipment. The latter is based on the proven and in-service DOUBLE EAGLE family with remote-controlled and autonomous (SA-ROV) vehicles, equipped with variable depth sonar and the multi-shot mine neutralisation system chosen for the UK/FR MCM programme and the AUV-62MR long-range AUV, which has been sold in both the surveillance and the ASW training version. The latter will be tested by the US Navy in summer 2018.

The growing need for long-range and deep-sea surveillance operations inspired the Italian Navy to combine the capabilities of Kongsberg's HUGIN 1000 AUV with Idrobotica's new MULTIPLUTO compact 60 kg ROV, which can dive to a depth of up to 4,000 metres. A mix of unmanned and manned systems deployed from the Littoral Combat Ship (LCS) is intended to fulfil the Navy's future MCM warfare requirements, which are today provided by the ageing and soon-to-be replaced MH-53E SEA DRAGON helicopters and AVENGER class MCM ships.

For the MHUs currently deployed in the Arabian Gulf, the Mine Hunting USV (MHU) programme provides an interim USV-based mine-hunting capability using an upgraded Northrop Grumman AN/AQS-24B towed synthetic aperture with the laser line-scan sensor. With its mix of submerged, surface and airborne capabilities, the new LCS's MCM MP will be phased in progressively due to development delays and the replacement of the Remote Minehunting System (RMS).

In addition to Northrop Grumman's Airborne Laser Mine Detection System (ALMDS), Raytheon's Airborne Mine Neutralisation System (AMNS) based on BAE Systems' ARCHERFISH neutraliser vehicles integrated on the MH-60S SEAHAWK helicopter and the COBRA (Coastal Battlefield Reconnaissance and Analysis) Block I system, the MCM MP also includes the KNIFEFISH UUV (produced by General Dynamics Mission Systems) and Textron's 12.7-metre-long Common Unmanned Surface Vessel (CUSV); the latter serves as a host platform for the UISS (Unmanned Influence Sweep System) and will soon integrate towed mine-hunting sonars to replace the RMS. The 7.2-metre-long UUV uses a low-frequency broadband (LFBB) sonar to detect and identify volume, proud (secured on the sea bed) and buried mines in a single sweep. After completing extensive trials, the system began operational testing last February, with a production and deployment (Milestone C) decision in the third quarter of FY 2018. The UISS is a mine-sweeping magnetic and acoustic system towed by the CUSV; it will see operational testing in spring 2018 with a Milestone C decision in the fourth quarter of the same year. According to a FY 2109 budget request, the CUSV is equipped with a 6-metre-long modular bay and will also integrate Raytheon's AN/AQS-20C. Tests will begin in late 2018 and operational user assessment in 2019. ■



# Global Mine Countermeasures: An Approach to Future Defence against the Naval Mine Threat

**Guy Toremans**

Today the MCM requirement is seeing resurgence in popularity as sea mines proliferate around the world, thereby necessitating a greater priority for mine countermeasures.

A survey of naval fleets with dedicated mine countermeasure vessels (MCMVs) shows that most of those in active service were built between 1980 and 1995 and are coming up for retirement. The roadmaps of several navies' future MCM programmes focus on the transition from a "traditional" platform-centric approach to the employment of multi-role platforms and unmanned autonomous vehicles. In order to leverage existing platforms and increase their capability, navies are modernising their MCMVs until the new assets are to join the fleet. On the **African continent**, only the navies of Algeria, Egypt, Libya and Nigeria and South Africa have MCM assets in their inventory.

The Algerian Navy ordered two new minehunters, based on the Finnish KATANPÄÄ class, from Intermarine. The first unit, EL KASSEH, was commissioned on 4 October 2017, the second, EL KASSAKH will join the fleet in 2018.

The Egyptian Navy operates two fairly recent ex-US Navy OSPREY class minehunters, AL SIDDIQ and AL FAROUK, transferred in 2007, as well as five SWIFT, three Chinese T-43 class and four Soviet-built YURKA class minesweepers.

With Europe to facilitate the rebuilding of Libya's military forces, it is likely that the Libyan Navy may replace its four NATYA class minesweepers, of which only two are operational, with second-hand European MCMVs.

The Nigerian Navy's two LERICI class minehunters, acquired in 1987/88, received a



*The Belgian FLOWER class minehunter BNS CROCUS received a Capability Upkeep Programme (CUP-CMT) in February 2009 in order to keep her in service until at least 2025.*



*The Estonian minehunter ENS UGANDI, the ex-HMS BRIDPORT handed over in January 2009, is to receive an upgrade in 2018.*

## Author

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Photos: Guy Toremans



**The German FRANKENTHAL Class minehunter FGS DATTELN is to be equipped with the Integrated Mine Countermeasures System (IMCMS) and the SEAFOX mine disposal system by 2020.**



**The Norwegian minehunter HNoMS KARMØY is one of the navy's six OKSOYIALTA Class vessels, which will be replaced in the 2025-2028 timeframe.**

mid-life upgrade in 2009/2010 but their operational effectiveness is doubtful.

The South African Navy (SAN) operates three German-designed RIVER class minesweepers, commissioned in 1981 and refitted in 2014/2015. Sources indicate that the SAN's future MCM capability will take the form of autonomous underwater vehicles (AUV).

In **North America**, the Royal Canadian Navy has embarked on an enhancement programme for its 12 KINGSTON class MCDVs. The ships, launched between 1994 and 1998, are upgraded with a modular Remote Minehunting and Disposal System (RMDS) system. Work is expected to be concluded by 2023.

The US Navy continues to rely on its ageing AVENGER class MCM vessels, commissioned between 1987 and 1994, and MH-53 SEA DRAGON airborne mine countermeasures (AMCM) helicopters while the organic system for the Littoral Combat Ships, known as BARRACUDA, is plagued by delays. However some upgrades are pursued. The Fifth Fleet is successfully employ-

ing an interim Mine Hunting Unmanned Surface Vessel (MHU), which pairs an AN/AQS-24A mine detecting system with an 11-metre RHIB.

In **Central and South America** only four navies are reported to operate mine countermeasure vessels.

The Cuban Navy is said to have two Soviet SONYA and three YEVGENYA class minesweepers,

The Brazilian Navy has four 1970s vintage ARATU class (German SCHÜLTZE type) minesweepers, which received a service life extension by 2007, and the Uruguayan Navy has two former East German KONDOR II class minesweepers, transferred in 1991. Only the Brazilian Navy is looking into a replacement programme. However, with the navy's submarine and frigate programmes top priorities, the new MCMV programme may slide to beyond 2024.

Mine countermeasures and the threat that naval mines pose towards maritime trade remains an area of concern for the

sea services on the **Asian continent**. Several navies are pushing ahead with their MCM programmes.

As of end-2017 the People's Liberation Army Navy (PLAN) operates some sixty platforms with the most recent MCMVs the five WOZAN and ten WOCHI class minehunters, which joined the fleet between 2005 and 2016. Other units include one WOLEI class minelayer.

The Indonesian Navy initiated the replacement of its two PULAU RENGAT (Tripartite) class minehunters and nine ex-East German KONDOR II class minesweepers for as many as eight new platforms. A FRONTRUNNER is a variant of the German FRANKENTHAL class minehunters. Other potential suppliers include the South Korean KANG-NAM, DAMEN, the French Naval Group (ex-DCNS), BAE Systems, Intermarine and Kockums.

The Japanese Maritime Self Defence Force (JMSDF) fields 26 MCMVs, all inducted into the fleet post-1990: 12 SUGUSHIMA class, three ENOSHIMA class, three HIRASHIMA class, one YAEYEMA class and two UWAJIMA class minehunters, two IESHIMA class drone control ships and six SAM drones. The newest units being introduced are the three-ship-strong AWAJI class minehunters to replace the YAEYAMAS. The lead ship, JDS AWAJI was inducted into the fleet on 16 May 2017. Since 2016, the JMSDF has also been taking delivery of MCH-101 airborne mine countermeasures helicopters, replacing the MH-53EJ SEA DRAGONS.

The Royal Malaysian Navy's four MAHAMIRU class minehunters, commissioned in 1985, remain capable vessels. The upgrade, carried out between 2007 and 2015, extended their service life past 2025, by which time new MCMVs should enter the fleet. Bidders for the new class include Abeking & Rasmussen, BAE Systems, Intermarine and the Naval Group.

A navy of which very little is known, particularly about its MCM capabilities, is the North Korea Navy. There are indications that the navy operates some 24 1980-vintage YUKTO class minesweepers.

The Republic of Singapore Navy's mine countermeasure fleet is made up of four BEDOK class (Swedish Landsort type) units acquired in 1985. All four completed a mid-life upgrade by 2014 but the navy is already looking into their replacement by 2025 with the Swedish M52 design a likely candidate.

The South Korean Navy operates six SWALLOW class minehunters, built between 1985 and 1994, and the three YANG YANG class minehunters, commissioned between 1996 and 2004. The Republic of Korea Navy already moved forward with





**HMAS DIAMANTINA is the fifth of six HUON Class minehunters in the Royal Australian Navy.**

the construction of six modified YANG-YANG class minehunters with the lead ship expected for delivery in 2019 and all ships to be in service by 2024.

The Taiwanese Navy is replacing its four 1950s ex-US Navy AGGRESSIVE and four ADJUTANT class minesweepers, transferred in 1994, with six new units based on Intermarine's KATANPÅÄ class. The lead ship, constructed in Italy, is to be delivered by end of 2019. The other five units, to be built at Taiwan's Ching Fu Shipyards, are scheduled to be operational by 2024. The navy also operates four YUNG FENG class minehunters, commissioned in the early 1990s, and two ex-US Navy OSPREY class MCMVs transferred in 2012.

The Royal Thailand Navy is also modernising its MCM capability. The navy's two LAT YA and two BANG RACHAN class minehunters, acquired in 1999 and 1987 respectively, are to be upgraded in 2018 in order to extend their service lives through 2032.

There are indications that the Vietnamese Navy is looking into the acquisition of both unmanned underwater vehicles (UUV) and newly built MCMVs to replace its 1970-vintage YURKA (two) and SONYA (four) class minesweepers, three 25-year-old YEVG-ENYA class minehunters.

There is a broad consensus across **European navies** on the means by which mine countermeasures should be executed. The growing desire "to take the man out of the minefield" is prompting them to head towards modular, "plug-and-play" MCM capabilities.

On 30 November 2016, the Belgian Naval Component and the Royal Netherlands Navy signed a Memorandum of Understanding (MoU) to procure 12 new platforms to

replace their TRIPARTITE class minehunters with each navy receiving six units. Having decided not to replace its MCM Command Ship BNS GODETIA, all Belgian units will be suited to embark staff personnel. It is anticipated that construction can start as early as 2022, with the first-of-class in service by 2025, and all operational by 2030. The new platforms will be able to conduct standoff MCM, support expeditionary operations worldwide and offer flexibility for future upgrades.

The Royal Navy and the French Navy retain a similar strategic perspective. In October 2016, the French Ministry of Defence and the UK MoD announced a joint programme, which is the Maritime Mine Counter Measures (MMCM). A contract has been awarded to Thales, in collaboration with BAE Systems.

Two prototypes of an autonomous system are being developed, one for each navy, for two years of testing. Each system will

comprise a USV, obstacle detection and avoidance sonar, a threat identification and neutralisation capability based on ROVs, a Towed Synthetic Aperture Sonar (T-SAS) and AUVs. The MMCM contract also includes manufacturing and testing the future mine countermeasures capabilities of both France (e.g. Système de Lutte Anti-mines Marines Future or SLAM-F) to replace its 11 ERIDAN class (TRIPARTITE type) minehunters and the United Kingdom's programme that will combine Mine Countermeasures, Hydrographic, and Patrol Capability into a single platform (the MHPC Project) to replace the Royal Navy's eight HUNT and seven SANDOWN class minehunters. In the meantime, the HUNT class is modified to operate a new unmanned vehicle and payload systems, thus allowing them to remain in service until around 2030.

The Germany Navy plans to replace its MCMVs with dedicated platforms as well as organic MCM modules suited to embark on its larger warships. Three minehunters will be upgraded with the Atlas Remote Capability Integrated Mission Suite (ARCIMS), from 2019. The entire fleet of MCMVs is to be renovated by the next decade, with the first new platforms planned to enter the fleet from 2027 onwards.

The navy is also looking at areas of multinational cooperation, for example in common platforms or toolboxes.

Mine warfare capabilities are a central part of the **Scandinavian navies**. The Royal Danish Navy already abandoned dedicated vessels in favour of its MCM DKN Concept – a containerised MCM system, suited to be put onboard the navy's ABSALON support ships, the IVER HUITFELDT frigates and the KNUD RASMUSSEN ARCTIC patrol vessels. The Finnish Navy's most prominent mine warfare assets are the three KATANPÅÄ class minehunters commissioned between 2012 and 2016, featuring state-of-the-art mine countermeasures equipment.



**HMAS HUON, lead ship of the Royal Australian Navy's six HUON Class minehunters commissioned between 1999 and 2003**



**HMCS EDMONTON** is one of the Royal Canadian Navy's 12 **KINGSTON Class Maritime Coastal Defence Vessels (MCDV)**.



**HMS PENZANCE** is one of the Royal Navy's eight remaining **SANDOWN Class vessels** in service.



**HSwMS ULVÖN** is one of the Royal Swedish Navy's upgraded **KOSTER Class minehunters** and is scheduled to remain in service until the early 2030s.

Key to the Royal Norwegian Navy's future MCM operations is the Future Naval Mine Countermeasures Project 6359 for the replacement of its six OKSOY/ALTA class MCMVs in the 2025–2028 timeframe. The scope of this project is to procure an MCM system based on both unmanned and autonomous systems.

The Royal Swedish Navy upgraded its five KOSTER class minehunters to keep them in service until the early 2030s, by which time new MCMVs, most likely Saab's MC-MV52 design (improved KOSTER class) joins the fleet. The navy's VISBY-class corvettes are also coming online with an MCM capability.

As far as the **Baltic navies** are concerned, the Polish Navy is the only sea service introducing three new indigenously designed KORMORAN II class (Project 258) MCMVs replacing the three 1960-vintage KROGULEC class minesweepers. The first-of-class OPR KORMORAN was commissioned on 28 November 2017. The other two units, ORP ALBATROS and ORP MEWA, are anticipated to follow in 2020 and 2022.

The Estonian Navy contracted Thales France for the modernisation of its three ex-RN SANDOWN class minehunters, transferred between 2007 and 2009. This modernisation, to be completed by the end of 2018, will allow the navy to keep the units in service until at least 2025, by which time new units are expected.

The Latvian Navy, operating four IMANTA (former Dutch ex-ALKMAAR class) minehunters transferred between 2007 and 2008, and the Lithuanian Navy, with one ex-German LINDAU and two ex-RN HUNT class minehunters, transferred in 1999 and 2011 respectively, seem to have no plans for any upgrade, nor new acquisitions in the near future.

In **Southern Europe** the Hellenic Navy's inventory includes two EVENIKI (ex-USN OSPREY class) and two EVROPI (ex-RN HUNT class) minehunters. The procurement of two additional OSPREYs was cancelled and there seem to be no plans to replace or modernise these platforms in the near future, due to the country's financial crisis. The Italian Navy's MCM renewal programme is aimed at the procurement of new MCMVs as well as integrating AUVs and USVs onboard its new ships, such as the Offshore Patrol Vessels (PPAs). In the meantime the 10 LERICI/GAETA class minehunters are being modified to carry the Kongsberg's HUGIN AUV and a CALZONI Mini Ranger USV.

The Spanish Navy also underlines the need to strike the right balance between manned and unmanned MCM requirements and lists the acquisition of a remote



MCM capability as a medium-term priority. However, the navy's off-board SIRAMICOR programme has been frozen. In the meantime, the six SEGURA class minehunters, which joined the fleet between 1999 and 2005, are to receive a SLEP.

The Turkish Navy operates 14 MCMVs, the most recent being the six AYDIN class minehunters which entered service between 2005 and 2009. The navy is considering a follow-on class to replace the ageing five ENGİN (ex-French CIRCE), four SEYDİ and two FELEK class units. A construction contract could be in place by 2019.

Several **Eastern European navies** are also exploring how they can recapitalise their MCM capabilities.

The Bulgarian Navy is planning the replacement of its four BRIZ (SONYA) and TSIBAR (ex-Belgian FLOWER class), with a contract expected to be in place by 2023.

The Croatian Navy announced the intention to procure four MCMVs to augment its single KORCULA class unit, commissioned in 2008. It could be that the navy may purchase second-hand (European) MCMVs.

There are indications that the Romanian Navy is to acquire up to four MCMVs to replace its 1980-vintage MUSEA class minesweepers. Second-hand European vessels, updated with modern minehunting systems may prove an attractive option. However, the Turkish Istanbul Shipyard's ALANYA class is also a possibility.

The Azerbaijan Navy expressed the intent to move away from its historical supplier Russia and look at Western MCMVs for the procurement of two, possibly four, MCMVs to replace its two YEVGENYA and two SONYA class minehunters by 2020.

The Kazakhstan Navy is replacing its two LIDA class minesweepers with two Russian Project 10750E platforms. The first unit, ALATAU, was commissioned in December 2016; the second unit will be delivered in due course.

The Russian Navy retains a significant, yet ageing, MCM capability, including some 50 various units. Around 30 new MCMVs are expected to join the Russian Navy in the coming decade. The Navy is already in the midst of replacing its 1960-vintage NATYA I class minesweepers with an initial batch of 10 new platforms, the 800-tonne ALEK-SANDRIT class.

The Ukrainian Navy confirmed to rejuvenate its mine countermeasure capability. The sole MCMV currently in service is a YEVGENYA class coastal minehunter. The annexation of Crimea by Russia in 2014 resulted in the loss of two NATYA and one SONYA class to Russia. The navy seems to be interested in the Polish KORMORAN II MCMV design but is also looking at West-



**HTMS THA DIN DAENG is one of the Royal Thailand Navy's two LAT YA Class minehunters, based on the Intermarine GAETA type MCMVs.**



**JDS UKUSHIMA is one of the Japanese Maritime Self-Defense Force's 12 SUGUSHIMA Class minehunters, commissioned into the fleet on 18 March 2003.**



**The Latvian minehunter LVNS TALIVALDIS is the former Dutch ALKMAAR Class ZrMs DORDRECHT, transferred to the Latvian Navy in January 2008.**

ern suppliers as potential candidates for used or lower-cost new constructions.

On the **Indian continent**, the Bangladesh Navy is looking into new assets for the replacement of its four 1980-vintage SHAPLA (ex-RN RIVER) class (transferred in 1994), and one SAGAR class (Chinese T43 type) minesweeper. A construction contract is anticipated to be in place by 2020. Of the Indian Navy's initial 12 PONDICHERRY class minesweepers, only six remain in service. In 2015, the Indian government approved the construction of a batch of 12 units, based on the South Korean Navy's YANG YANG class. The new ships will be built at Goa Shipyard Ltd. with assistance of the Kangnam Corporation. The first unit could enter service as early as 2021 with all 12 operational by 2027. The Pakistani Navy operates three fairly modern MUNSIF (TRIPARTITE) class minehunters. The first, PNS MUNSIF (ex-French SAGITTAIRE) was transferred in 1989 while the two other newly built units were acquired in 1998.

Several **Gulf navies** are considering the purchase of MCMVs, with some in favour of new constructions while others are taking the "used market" route.

The Kuwaiti Navy, planning to establish an MCM component, is looking for either new or used mine countermeasures vessels.

Back in 2013, Sultan Qaboos approved the procurement of one mine countermeasures vessel for the Royal Navy of Oman. However, until today (end of 2017) no request for proposal has been issued.

The Qatari Emiri Navy is to acquire up to four MCMVs. Possible candidates include Abeking & Rasmussen, BAE Systems, the Constructions Mécaniques de Normandie (CMN), Intermarine, Kockums, Lürssen-Werft and Navantia.



**KD KINABALU is one of the Royal Malaysian Navy's four MAHAMIRU Class minehunters. These units received an upgrade between 2007 and 2015 in order to extend their service life past 2025.**

The Royal Saudi Navy's three Al JAWF (SANDOWN type) class minehunters, delivered between 1991 and 1997, will be augmented with four additional units. These will replace the four 1970-vintage ADDRIYAH class vessels. Top contenders include, Abeking & Rasmussen, BAE Systems, Constructions Mécaniques de Normandie (CMN), Intermarine and Lürssen-Werft.

The United Arab Emirates Navy is considering the procurement of four MCMVs to supplement its two AL MURJAN class (ex-German FRANKENTHAL) minehunters, procured in 2006. Both MCMVs completed a modernisation programme in 2011, allowing them to remain in service for another 10 to 12 years.

In the **Middle East** the Syrian Navy operates one NATYA and five YEVGENYA class minesweepers and the Yemen Navy has a single NATYA class minesweeper in its inventory.

The only sea service in the Pacific with mine warfare assets is the Royal Australian Navy, with six HUON class minehunters, commissioned between 1999 and 2003. The RAN is planning their replacement with a variant of the Offshore Combat Vessels (SEA 1180) platform. In the meantime, the six HUON class units will be upgraded until their replacement.

## The Way Ahead

As aforementioned, a number of navies, mainly European, are to bring unmanned systems into their force structures. Not only does this offer strategic and operational benefits, but the technology which underpins it is also in demand among navies outside Europe, thus presenting quite some export opportunities. But unconventional hull forms are also gaining momentum, such as Abeking & Rasmussen's Small Waterplane Area Twin Hull (SWATH) platforms and the Ocean EAGLE 43 trimaran from the Constructions Mécaniques de Normandie (CMN), with the latter receiving interest from navies in the Middle East.

The next step may well be larger unmanned MCM platforms. But are navies ready to rely on over-the-horizon robotic systems to totally replace legacy MCM assets? It is clear that there are still many debates ahead on the merits of different operating concepts, system components, and mother ship platforms. ■



**The Turkish Navy's AYDIN Class (Type MHV 54-014) minehunter TCG ANAMUR was commissioned on 10 October 2008.**



# A New Beam from the Rising Sun?

**Georg Mader**

Although Japan loosened its ban on arms sales at the beginning of 2014, not much has happened since then. Japan's defence industry is reluctant to promote its products, as few people are as repugnant to armed conflict as the Japanese are.

In addition, a phlegmatic government and lacklustre marketing of the defence companies have contributed to Japan's new policy not receiving much attention. Against that background, Kawasaki Heavy Industries (KHI) and Japan's Department of Defence sent a C-2, Japan's newest and largest transport aircraft, to Dubai, where talks with the UAE Air Force about possible sales are currently underway. The visit to Dubai was accompanied by the Japanese Deputy Minister of Defence, Keitaro Ohno, and Georg Mader of ES&D.

When discussing the upcoming revision of the National Defence Programme Guidelines (NDPG), a defence policy document that guides the Mid-Term Defence Programme (MTDP) for military spending, Prime Minister Shinzo Abe said something unprecedented on 15 December 2017: "While continuing to uphold an exclusively defence-oriented posture and other fundamental principles, the upcoming NDPG revision will not be based on a linear projection of the past evolution of Japanese defence policy. Rather, the revision will be based on an honest assessment of the aggravated security situation that Japan finds itself in today. There is a sense of urgency regarding the deteriorating security environment in northeast Asia, due to the relentless pressure from China in the East China Sea and the tensions on the Korean peninsula caused by North Korea's provocative behaviour. There is a 'new normal' for Japan, which is why we must be on the alert in light of the security situation, which is unlikely to improve much over the course of 2018."

The Prime Minister further explained that his government would not fully revise these guiding documents but this is easier

Photo: JASDF



*Japan's latest hardware: the C-2*

said than done. In the current NDPG and MTDP, Japan has already committed itself to acquiring several expensive items, such as the F-35A, the HALE GLOBAL HAWK, Amphibious Assault Vehicles (AAVs), the Kawasaki C-2 transport aircraft and the Kawasaki P-1 maritime patrol aircraft. If Tokyo does not significantly reduce, postpone or cancel any of these armaments projects, new defence investments must be financially viable, which is why Japan is motivated to export some of its undoubtedly reliable but expensive products.

## The Budget Increases but Programmes Slip

There is a causal link between Japanese defence spending and procurement. Tokyo's defence budget has risen since Abe took office at the end of 2012, but the increase is not enough to allow the Japanese Self-Defense Force (JSDF) to recover from the depletion it experienced over the last decade, when Japan's defence budget had been continually shrinking. Japan will not only have to continue increasing its defence

Photos: Georg Mader



*The C-2 on a sales tour to the United Arab Emirates*

## Author

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**The C-2 has an unrefuelled range of up to 4,500 km.**

budget, but it may also have to be willing to considerably increase funds for the procurement programme. Needless to say, this is not an easy task in Japan's current fiscal environment. This is the context in which the draft budget for the fiscal year 2018, approved by the Prime Minister's government in December 2017, needs to be placed; it sets a record of JPY5.19Tn (US\$45.8Bn) for defence, an increase of 1.3% over the previous year.

items listed in Japan's current five-year defence programme, only 13 were fully funded as of the fiscal 2018 draft budget (two AEGIS-destroyers and 28 F-35A JSFs). Appropriations have fallen short when it comes to the other ten items. The problem is that all these items are only as strong on the market as they progress at home. International customers might hesitate when the 2014-18 procurement plan called for 10 C-2 transport aircraft, but the contractor KHI is

the latter two are mission sets constantly extolled by Japanese politicians. As a distant goal, the JASDF states that 40 or even up to 60 C-2s might be required in the end, once the predecessor C-1 and older C-130s have been phased out.

## A "Shining" Example

A classic case highlighting the weaknesses of Japan's defence industry to penetrate foreign markets was the failure to secure a deal with the Australian Navy to build the superb AIP-conventional SORYU submarines, despite vigorous backing of Shinzo Abe and the endorsement from his Aussie counterpart Tony Abbott. When Australian negotiators kept asking for certain classified information, the manufacturer was required by law to refer any request to the Japanese Ministry of Defense (JMOD), which often refused to disclose the information or took too long to respond. Unsurprisingly, the Australians selected a conventional derivative of a nuclear design by France's DCNS over the SORYU for the AU\$50Bn (US\$54Bn) contract.

Deputy Defence Minister Keitaro Ohno assured, in Dubai, that Japan had learned its lessons and this will not happen again. He also pointed to the progress – a debatable term when dealing with India's byzantine procurement procedures – made towards finalising the sale of 12 four-engine SHINMAYWA US-2i turboprop amphibians to the Indian Navy for US\$1.3Bn. Or to the interest by New Zealand, Thailand and Vietnam in the Kawasaki P-1, a Japanese-designed four-jet-powered MPA and successor to the P-3 ORION. The UK had invited the Kawasaki P-1 for



**Deputy Minister Keitaro Ohno and his C-2 flight crew**

Nevertheless, more than 40% of the most important defence items that Japan intends to introduce by the end of the 2018 financial year are not yet fully budgeted, and some items are behind schedule when it comes to acquisition and deployment, which leaves serious gaps in the country's defence capabilities and a bad impression on international customers interested in Japanese armaments. Of the 23 major procurement

five years behind schedule. Minister Ohno claims that the JASDF will soon have 11 aircraft (to follow the two XC-2 prototypes), however, thus far, only seven to nine of the twin-engine jets are contractually secured. A lack of C-2s to transport combat vehicles, midsize helicopters, and personnel, could undermine Japan's efforts to defend remote islands and to respond to natural disasters and humanitarian aid at home and abroad;



evaluation in 2015 but then selected the Boeing P-8 POSEIDON. And now another large aircraft is being showcased which is typical for an island nation with huge approaches and extended exclusive economic zones (EEZs).

### A Little C-17

And large it is, especially for a twin-engine transport. Dominated by two General Electric CF6-80C2K1F engines (also known from the Boeing-767) licence-built by Ishikawajima Heavy Industries, the C-2 has an unrefuelled range of up to 4,500 km, or twice that of a C-130. Or 7,600 km with a 20-tonne load or 5,700 km carrying 30 tonnes. With a maximum permissible weight of 36 tonnes, it almost doubles the payload of the venerable HERCULES and is just one tonne below the A400M. But, in contrast to these two turboprop designs, the C-2 can transport such a heavy load with speeds of up to Mach 0.82 and up to FL 430 (~13 km). The only other two twin-jet transports out there are the Brazilian EMBRAER KC-390 and the Ukrainian An-178, but these two transport aircraft remain below the C-2 in at least one key criterion, such as internal volume or payload/range. Basically, the C-2 with a MTOW of 141 tonnes is the next-best offer below a C-17 GLOBEMASTER III for users who want a jet-powered transport aircraft but have limitations in weight or runway length in their expected area of operations.

Inside, the C-2 offers a versatile cargo hold that can carry a variety of loads, many of which cannot be carried by other transport aircraft. The 4-metre (13.1-foot) width of the hold allows a large number of vehicles to be carried, while it is tall enough to permit the carriage of helicopters such as the UH-60 without disassembly. Eight 463L pallets can be accommodated, including two on the rear loading ramp, while 54 passengers can be taken in at the same time on tip-up paratroop seats along the side of the cabin. Up to 110 people can be carried with extra seats installed in the cabin centre. For the medevac role, up to 40 stretchers can be installed. In terms of airlift capabilities, the C-2 can fly tactical missions, including the air-drop delivery of up to 20 A-22 containers, heavy loads such as vehicles and paratroopers from both jet-stream protected/shielded side doors and the rear ramp. A loadmaster station is provided, from which a single person can control the cargo handling systems. Designed for two-pilot operation, the C-2's roomy flight deck is equipped with

multiple MFDs, FMS and a wide-angle head-up display. Behind the two pilots is an auxiliary station with navigation and communications systems that can be occupied by a third crewmember for long-distance flights. There are two bunk beds in a rest area behind the flight deck. An airline-style toilet is located next to the loadmaster station in the cargo bay.

### Slow Pace

The C-2 dates back to the Japanese MoD's C-X and P-X programmes. Originally, the JASDF wanted to procure the C-130J SU-

and in November 2001 KHI was selected as prime contractor for the programme after the model that met JASDF's C-X requirements was officially selected. During the subsequent – and slow – C-X development, XP-1 MPA started as part of the development. C-2 and P-1 are being built concurrently to save costs. Both aircraft share components and subassemblies and they have a similar wing structure, of course with different sweep angle and engines. The first flight as a red-and-white XC-2 did not take place until January 2010, and it took another seven years, until 28 March 2017, before



*The C-2 can carry a variety of loads.*



*Designed for two-pilot operation, the C-2 has a roomy flight deck.*

PER HERCULES, the C-17 or the European Airbus 400M for under approximately JPY340Bn (US\$3.8Bn). But after evaluations and comparisons, none of these aircraft met Japan's military requirements. The Ministry of Defence therefore decided to build a local transport aircraft,

the first three aircraft were handed over to an operational unit, Dai 403 Hiko-tai at Miho in Japan's western Tottori prefecture. A total of 10 C-2s are scheduled to be deployed to the base by the end of March 2021. The unit is currently receiving flight training on the C-2. ■

## A Further Insight:

**“This is an aircraft suitable for many nations and many missions.”**

**The aircraft sent to Dubai was the fourth production aircraft. ESD's Georg Mader was given an exclusive tour and the opportunity to talk to both accompanying leading figures: Deputy Minister Keitaro Ohno and Col. Tokukazu Omine, the C-2 Programme Manager in the Aircraft Project Management Division of ATLA (Acquisition, Technology & Logistics Agency):**

**ES&D:** It is a welcome sight, but still quite a surprise, to see the Japanese rising-sun roundel on an international stage and so far away from Japan. As this is obviously a sales tour, on what route did you and the C-2 get to the UAE?

**Ohno:** Following our government's easing of regulations, we hope to be around more often. With this first operational C-2 we came here via Thailand, India and Djibouti. On our way home, we will present it in New Zealand. Here in the UAE and the GCC, we are also having discussions concerning the C-2 which are boosted by the domestic JASDF order for now 11 aircraft.

**Omine:** Thus far, our potential overseas customers knew the C-2 from the internet or the catalogue. This is their very first time seeing the actual aircraft. The best way to understand the plane is to actually see it. We hope that everyone can learn more about the C-2 through the event. This plane has a long range; it can fly to Alaska from here. It can be used in tactical situations to fulfil different roles, such as supporting international missions and emergency response operations.

**ES&D:** When we were sitting in the spacious C-2 two-man glass cockpit, everything looked state-of-the-art. What about capabilities such as in-flight refuelling, night vision devices or EW/self-defence? And what makes the C-2 special?

**Omine:** It's basically all there. The upper side of the fuselage is fitted with a fuelling nipple, which enables long-distance flights. The cockpit is compatible with night-vision goggles and equipped with wide-angle HUDs that help the pilot perform missions by showing not only a guided flight path, but also threats along the way. The aircraft performs a variety of missions – transporting troops, dropping relief supplies and day and night medevac, even in hostile environments. We believe that the aircraft is superior in performance, load capacity and range to other aircraft of the same type. It can transport up to 110 passengers using fixed sidewall seats and can carry large or outsized cargo or a medium-sized helicopter in the S-70 class. However, while heavier transports often require the reinforcement of existing runways, this is not the case with the C-2, which has also been tested on unpaved surfaces such as snow or sand.

**ES&D:** It is often claimed that Japanese defence equipment is too expensive for widespread export, due to the high labour and energy costs in Japan. Can you describe the financial volume of the C-2 programme?



**Col. Tokukazu Omine in interview with Georg Mader (ESD).**

**Omine:** Since 2001, the entire programme has had a volume of about JPY260Bn [US\$2.3Bn] while the JASDF is paying about JPY20Bn [about US\$176M] per aircraft. However, the unit costs for international customers would or could vary greatly depending on the aircraft configuration and procurement volume.



**Keitaro Ohno, the Japanese Deputy Minister of Defence**

**ES&D:** Minister Ohno, Can Japan now offer or export its defence equipment to everyone under the new rules? How is that handled?

**Ohno:** No, not to everyone. No general catalogue has yet to be prepared, regarding which countries we can or cannot deliver to. But we now have the freedom to be present and learn about RFIs or RFPs and their criteria. If a country inquires about our products, the government can decide freely whether or not to offer our products.

**ES&D:** What are these principles or values?

**Ohno:** Approvals for a particular Japanese OEM to offer or to supply are considered according to the principle of "proactive pacifism". While we are also cooperating in anti-piracy operations, we are a peace-loving country. This means that exports must support peace or stability in the region – for which, by the way, I think the C-2 fits perfectly. But, of course, we don't export arms to conflict regions which are a danger to international security.

**The interview was conducted by Georg Mader.**



## New SP Artillery Systems for Norway

(ck) The Norwegian Defence Materiel Agency has signed a contract for the procurement of 24 K9 THUNDER 155 mm self-propelled artillery systems with the South Korean company Hanwha Land Systems. The K9 THUNDER 155 mm is in service in large numbers in South Korea and Turkey and has recently been acquired by Finland. The Norwegian Defence Materiel Agency also signed a contract for the logistic sup-



Photo: Norwegian Defence Materiel Agency

port in the scope of the life cycle management of the gun together with a contract for the establishment of a Centre of Excellence at Bjerkvik Technical Workshop. The Centre of Excellence contract stipulates that Hanwha Land Systems provide test equipment and training material to the Bjerkvik Technical Workshop in order to provide available systems and technical training. Delivery of the K9 THUNDER is expected during 2020, with the artillery battalion combat ready with the new system in 2021. The total value for this acquisition is approximately €190M.

## WB Electronics – a New Manufacturer of Loitering Munitions

(sb) Loitering munitions is a weapon system category in which the munition loiters above the target area for some time, searches for targets, and attacks once a target is located. Loitering munitions en-



Photo: WB Electronics

able faster reaction times against concealed or hidden targets that emerge for short periods without placing high-value platforms close to the target area, and also allow more selective targeting as the actual attack mission can be aborted. Loitering munitions fit in the niche between cruise missiles and unmanned combat aerial vehicles and are also known as kamikaze or suicide drones. Systems as such are manufactured in only a few countries around the world. The US and Israel both remain in possession of technologies required to create loitering munitions, but they have recently been joined by the Polish company WB Electronics and its new development, the WARMATE. The WARMATE weapon system uses UAVs fitted with warheads. The warheads may vary, depending on the mission of the given UAV. The available selection includes anti-tank (for engagement against light armour), fragmentation (against enemy soldiers) or thermobaric (against fortifications) warheads. The manufacturer claims that WARMATE may be used at distances exceeding 10 kilometres, offering flight endurance of more than 30 minutes. The operational ceiling for the system has been defined as 30-200 metres, while maximum altitude at which the system may fly is 500 metres. The Polish solution has already been proven in actual combat, as the UAV in question has been acquired by Poland and several foreign customers. The first WARMATE loitering munition systems were delivered to the Polish Army in 2017. The equipment received by the Polish Army constitutes the first batch of 1,000 WARMATE UAVs ordered by the Polish Ministry of Defence, led by Antoni Macierewicz: more deliveries are planned during the next year. The total value of the order is €24M.

## New Leadership for NIAG

(ck) The NATO Industrial Advisory Group (NIAG) celebrates its 50th anniversary in 2018. The NIAG is a consultative body of senior industrialists from NATO nations. It advises NATO and the Conference of National Armaments Directors on key issues regarding armaments cooperation matters. Since its inception NIAG has delivered more than 200 studies on a wide spectrum of topics. Since early 2018, the NIAG has had a new Chairman: John Jansen (The Netherlands) succeeding Martin Hill (United Kingdom). Jansen is a Senior Advisor to The Netherlands Foundation for Defence and Security Industries (NIDV). NIAG also elected Rudy Priem (Belgium) as its new

Vice-Chairman. Priem is Director, European Government Relations for Security, Defence and Space at United Technologies Corporation (UTC). Both were elected to serve a two-year term.

## Bruno Even CEO of Airbus Helicopters

(ck) Effective 1 April 2018 Bruno Even (49) will be the new Chief Executive Officer (CEO) of Airbus Helicopters. He will report to Airbus CEO Tom Enders. A graduate of Ecole Polytechnique, Bruno Even joined the French Ministry of Defence in 1992 where he was in charge of the space component's development for the HELIOS II satellite. In 1999, he joined Safran Helicopters and later was appointed CEO of Safran Electronics & Defense. He succeeds Guillaume Faury who will become President of Airbus Commercial Aircraft.

Photo: Safran / Remy Bertrand



## Programme Adjustments for A400M

(ck) Airbus SE has signed a Declaration of Intent (DoI) with the A400M launch customer nations (Germany, France, United Kingdom, Spain, Turkey, Belgium, Luxembourg) and the European defence agency OCCAR. OCCAR is managing the A400M programme on behalf of the seven launch customer nations. According to the DoI, all parties have agreed to adjust the contracts and the delivery plan as well as a roadmap for the development of military capabilities for the A400M programme. "Since its inception in 2003, this programme has suffered not only from a number of operational issues but, more importantly, under a flawed contractual set-up and insufficient budget which resulted in significant losses for Airbus as prime contractor. We have a good chance to stop or at least reduce the bleeding now and deliver the capabilities our customers need," said Tom Enders, Chief Executive Officer of Airbus. The A400M is Europe's largest joint defence programme ever. In February 2017, Airbus called upon the launch customer nations to readjust the contracts. Since then, Airbus and OCCAR have set up working groups assessing adjustments such as delivery planning as well as the military capabilities development roadmap.

## New CEO at Frequentis

(ck) Norbert Haslacher has been appointed as the new CEO at Frequentis. He will succeed the CEO and company owner Hannes Bardach who will move to the Supervisory Board in April 2018. Hannes Bardach has been a member of



Photo: Frequentis

the Frequentis management for 35 years and will hand over his responsibilities to his colleagues in the Executive Board - Sylvia Bardach, Hermann Mattanovich, and Norbert Haslacher. Hermann Mattanovich and Sylvia Bardach remain in their current responsibility as CTO and CFO respectively. Norbert Haslacher has been the executive board member for Sales & Marketing. He can refer to an impressive track record: Frequentis order intake reached a new high of €288M in 2017. Frequentis is a globally active group of companies with more than 1,700 employees in over 50 countries.

## HENSOLDT to Open Field Office in Singapore

(ck) HENSOLDT will establish one of its five global sales hubs in Singapore. The sensor company will share its new premises in downtown Singapore with British radar specialist Kelvin Hughes which was acquired by HENSOLDT in 2017, and the



Photo: Frequentis

company will expand its workforce. HENSOLDT and Kelvin Hughes have delivered naval and land-based radars, self-protection systems, air traffic control equipment and optronic devices to countries such as India, Australia, Singapore, South Korea and the Philippines. "We are considering the APAC region as one of the most promising growth regions for our business", explains Nathan Manzi, HENSOLDT APAC General Manager.

## Liquid Decontamination Systems for Britain

(ck) Following a tender for the capture, transfer and containment of liquid waste units, the UK MoD has selected Avon Protection as the supplier for liquid decontamination containment systems. The liquid capture

system has been developed by Avon Engineered Fabrications (AEF) to decontaminate the MoD's in-service vehicle fleet. AEF is one of Avon Protection's engineering business units and a supplier of industrial coated fabrics for a wide variety of applications including bulk liquid storage, distribution systems and hovercraft skirts. "We are delighted to be supplying this new bespoke decontamination liquid capture system solution for the UK Ministry Of Defence, which highlights how Avon's innovation and engineering focus are leading the way for future Avon Products", says Oliver Morton, Avon's EMEA & Asia Pacific Military Business Director.

## Record Earnings for MTU Aero Engines

(ck) MTU Aero Engines AG once again posts new record earnings in 2017. Revenues increased by 6% to a new high of €58bn. Operating profit reached a new record level of €606M, beating the previous year's result by 21%. Earnings after tax surpassed the previous record of €345M set in 2016, growing by 24% to €429M. "We took advantage of the favourable market environment in 2017 to drive profitable growth in both of our operating segments - OEM and MRO," said Reiner Winkler, CEO of MTU Aero Engines. In 2018, commercial series production business looks set to become the fastest growing segment with an increase in revenues of around 30% - a trend driven by the geared turbofan programmes. Continued growth is also projected for the commercial MRO and spare parts business.

## Nammo to Buy MAC LLC

(ck) Nammo, a provider of ammunition for military and commercial customers, has bought the company MAC LLC. The weight of ammunition is a major chal-



Photo: Nammo

lenge for armed forces, causing fatigue for soldiers while reducing range and endurance for vehicles and aircraft. In response to this, MAC LLC has developed lightweight polymer cartridges for small and medium calibre ammunition which significantly reduce the weight of mili-

tary ammunition. Nammo believes that the merger "will strengthen our group's strategic position in the US and international ammunition markets," says Morten Brandtzaeg, CEO of Nammo.

## Brazilian Submarines

(ck) In February, the first section of the Brazilian Navy's SCORPENE type submarine RI-ACHUELO was transferred to the assembly line located in Itaguaí in the Sepetiba Bay where the submarine's three sections will be welded. The sections of the SCORPENE were built by a Brazilian subsidiary of Naval



Photo: Naval Group

Group and Odebrecht. The transfer allows the final assembly of the submarine. Commissioning is scheduled for 2020. The three remaining submarines will be produced at a rate of one per year. Naval Group provided the submarine's blueprint, the internal equipment as well as technical assistance. "Naval Group is pleased to work alongside the Brazilian Navy and is proud of the successful transfer of technology achieved, which provides the country with state-of-the-art equipment made in Brazil. The capacity building of the Brazilian Navy will contribute to the crossing of a new stage in the regional and global influence of Brazil," says Naval Group's CEO Hervé Guillou.

## New Rheinmetall Office in Brussels

(ck) The EU Commission plans to consolidate the EU's spending on defence; EU member states are to establish a common defence fund to promote defence cooperation in Europe. This is why Rheinmetall has opened a new office in Brussels, led by Dr. Thomas Weise as "Head of EU and NATO Affairs." The Rheinmetall office will put forward the Rheinmetall Group positions in the city that plays host to the European Parliament, the EU Commission and NATO headquarters. It supports all of Rheinmetall's operational business units and sees itself as an interface to the EU and NATO, focusing on defence, public security and mobility. The Brussels office reports directly to the executive board of Rheinmetall.



### Susanne Wiegand Appointed to Rheinmetall Executive Board

(ck) Effective 1 March 2018, Susanne Wiegand (45) was appointed to the Ex-

Photo: ESD archives



ecutive Board of Rheinmetall Defence with responsibility for the Electronics Solutions Division. She succeeds Gordon Hargreave who is now tasked with expanding the company's international operations in Asia. From 2007 to 2017, Susanne Wiegand served as director of the German Naval Yards (GNY) group. In this capacity, she successfully welded three longstanding shipyards – German Naval Yards Kiel (the former HDW-Gaarden), Nobiskrug and Lindenau – into a single shipbuilding group.

At Rheinmetall, she will be responsible for the Electronic Solutions Division, which encompasses Rheinmetall Defence's electronic components and systems solutions as well as its air defence operations. Among other things, the division supplies the German Bundeswehr with the Future Soldier System as well as electronic components for vehicles and simulation systems.

### BOXER Drives UK Jobs

(ck) BAE Systems, Pearson Engineering and Thales UK have signed agreements with the ARTEC consortium as partners for the production of BOXER. Should the armoured wheeled vehicle be selected as the British Army's next generation Mechanised Infantry Vehicle (MIV), at least 60% of BOXER's value creation and 100% of final assembly will take place in Britain. ARTEC's investment in the UK is estimated to secure or create at least 1,000 jobs in the country to ensure best value for the British tax payer. The UK partnership approach will ensure that British companies are fully embedded in the MIV supply chain. Rheinmetall intends to establish a modern production

Photo: Rheinmetall



centre for armoured vehicles in the UK as part of the programme. This step constitutes a significant commitment from Rheinmetall with regard to a long-lasting armoured vehicle capability in the UK. The UK played a major role in the design, development and testing of BOXER from 1999 to 2004. Upon acquisition, the UK would reassume the rights which it had as an original project partner. This would



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allow BOXER to be exported from the UK. BOXER is proven against all key requirements of the British Army. Its high mobility, wide range of capabilities and maximum protection for the soldiers make it an ideal solution for UK operations.

### Helicopter Simulators for the US

(ck) Helisim, the European helicopter simulation centre and a joint venture of Thales and Airbus, will open a new facility in Grand Prairie near Dallas, Texas. The Helisim Training Centre will host two Thales Reality H Level D full flight simulators to train pilots on H145 and H175 type aircraft. There are plans for adding an H160 simulator once the helicopter model is certified and production is under way. "When we first embarked on this partnership with Airbus, our primary goal was to ensure the



Photo: Thales

next generation of helicopter pilots worked in an industry with the same safety record as those in the fixed wing market," says Benoit Plantier, Thales Vice President, Training and Simulation. The new facility will offer the full spectrum of helicopter training needs, from classroom and hands-on instruction to simulator training. The company claims that Reality H is the most advanced helicopter simulator on the market suited for flight and mission training for these two helicopter types and that the H145 and H175 were the most high-tech civil helicopter models on the market, just entering into wide use over the Americas. The investment for the Airbus Helicopters Training Academy is estimated to be about US\$40M. Once the centre is in operation it is expected to train several thousand pilots per year.

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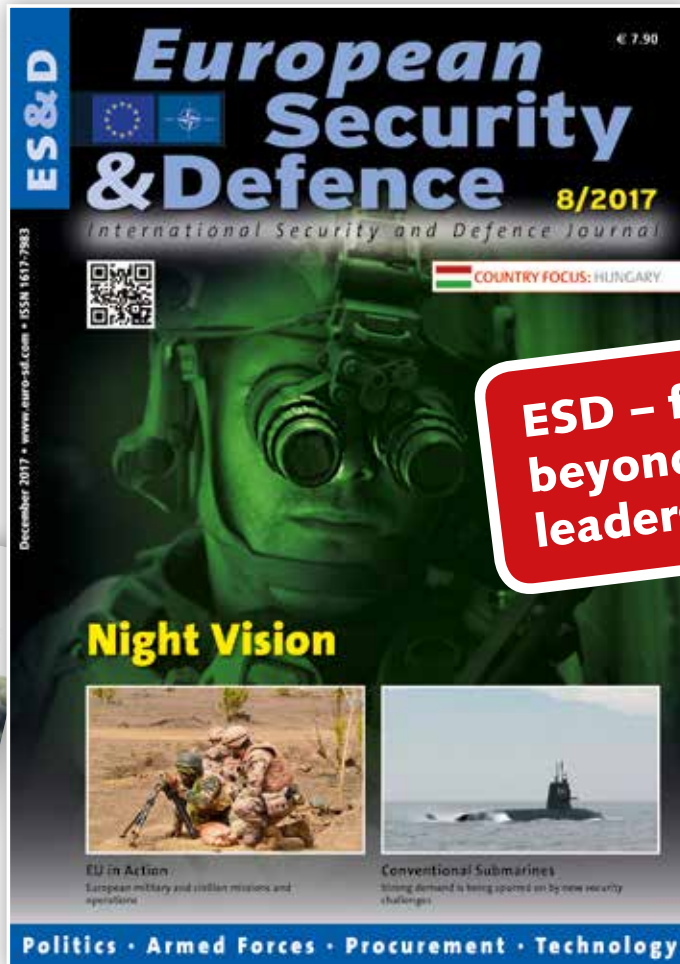
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