COUNTRY FOCUS: SWITZERLAND

European Security & Defence

3-4/2015

Unmanned Aerial Systems

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More than a Glimmer of Hope?

It is a historic agreement. After years of dispute between the West and Iran on the nuclear issue, an agreement has been reached following tough negotiations in Lausanne. In Lausanne, Federica Mogherini, the EU's High Representative for Foreign Affairs, said that the UN members with powers of veto, plus Iran and Germany, would now begin to write the text for the final treaty, which is due to be finished by 30 June.

Iran is committing to submitting its nuclear enrichment programme to a multi-tiered system of restrictions and controls for a period of up to 25 years. All the country's nuclear activities will therefore be subject to strict monitoring by the International Atomic Energy Agency. In addition, the country will have to shut down over two-thirds of its existing capacity for the enrichment of uranium for the first ten years. It will be required to dilute or export over 95 percent of its stockpile of enriched uranium. After that time, Iran will only be permitted to carry out enrichment, research and development within narrow limits and under strict controls. In return, the West will lift its economic sanctions. Should Iran violate the terms of the agreement, the sanctions will be reimposed immediately.

There is legitimate doubt as to whether the agreement will actually be concluded, because now the detail of the contract has to be worked out. The result achieved on the shores of Lake Geneva is a hard-won and complex interim diplomatic success, which was only possible because all sides made concessions. It is immaterial who has conceded the most. It is the outcome that matters. There was immediate criticism from Israel. Israel claims that the agreement legitimises Iran's nuclear programme, despite the fact that it it has the sole aim of building atomic bombs. Critics said that none of Iran's nuclear facilities will close. The Republicans in U.S. Congress also reacted with scepticism. The Speaker of the House of Representatives, John Boehner, noted an "alarming deviation" from US President Barack Obama's original goals. Congress will make a detailed examination of the final agreement before any easing of the sanctions on Iran.

Even the Iranian President, Hassan Rouhani, cautioned against allowing expectations to get too high: he will be making certain demands ahead of finalising a definitive agreement in late June. Ayatollah Ali Khamenei also warned against premature celebration. Iran will only agree, if "on the first day of the implementation of the agreement, all economic sanctions are completely lifted", said Rouhani in a speech broadcast on Iranian television. Iran's spiritual leader, Ayatollah Ali Khamenei, does not consider the framework agreement to guarantee a final treaty. He said that what has been agreed "thus far", does not guarantee either a final treaty "or its contents", or even that negotiations will continue "to the end". Khamenei, who has the final say on foreign policy, had repeatedly made sceptical comments about the negotiations' chances of succeeding, but basically supports the efforts of Rouhani and his Foreign Minister, Mohammed Javad Zarif, to solve the long-standing conflict over the nuclear issue in order to get sanctions lifted.

Both sides hope, of course, to improve their positions during the detailed negotiations. Warnings ahead of this stage are therefore fully understandable. Yet the critics in Israel, Saudi Arabia, and in Congress in Washington, now find themselves in a difficult position. Iran is allowing its full nuclear capabilities to be put under international monitoring, is exporting the fuel that could potentially be used to construct a bomb, and is modifying or dismantling some of its facilities. And has agreed to all of this for a period of 25 years. Of course, this could be considered insufficient – but what would the alternative have been? Military escalation? For example, bombing Iranian nuclear facilities, with an uncertain outcome and adding to the many existing trouble spots in the Middle East. Or a tightening of economic sanctions against Iran? Such action would have been irresponsible. Of course, it is still possible that the negotiations will collapse before the end of June. Both sides must and should now prove that it is still possible to resolve conflicts through diplomacy. It is worth the effort.

Henning Bartels

Content

Powerful Instrument

To ensure consistent combat capability, the French Air Force is working to integrate new weapon systems while adapting its operational doctrines and the training of personnel responsible for their implementation. Page 31

Russia's "Wonder Tanks"

At this year's "Victory Parade", held on Moscow's Red Square on 9 May 2015, in addition to vehicles already in use by the Russian armed forces, twelve each of a range of new battle tank systems were on display. Page 52

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COLUMNS

VIEWPOINTS FROM ...

Turkey's First Indigenous UAS

(df) Turkey is quite ahead in the European unmanned flight sector with ANKA, an advanced Medium Altitude Long Endurance (MALE) Unmanned Aerial System (UAS). This first indigenous UAS has been developed with the contribution of the affiliates of TSSK – Teknokent Defence Industry Cluster – and was shown during IDEF'15. ANKA passed the acceptance test campaign in 2013. That 18+ hour long test flight concluded with automatic landing, after successful demonstration of full endurance and 200 km data link range performances at winds reaching 45 kts.

(Photo: TAI)

During the flight, Air Traffic Control (ATC) coordination was achieved through onboard radio, which was relayed to the GCS (Ground Control Station) over the data link, demonstrating ANKA's capability to operate safely in an airspace managed by ATC.

ANKA has a wing span of 17.3 metres, a length 8 metres and a payload capacity of 200 kg. The performance is 24 hours endurance, service ceiling 30,000 foot and a data range of 200 km.

Poland Preselects CARACAL Multipurpose-Helicopter

(gwh) The bid of Airbus Helicopters and its partner Heli Invest Services was the only one meeting the formal requirements and technical requirements for multipurpose helicopters for the armed forces, the Polish Ministry of Defence announced.

After preselection of the H225M CARACAL by the Polish MoD a detailed evaluation and verification of operational needs by the armed forces will start to define details.

(Photo: Anthony Pecchi)

Poland is looking for 50 helicopters (16 transport, 13 CSAR, 8 anti-submarine warfare, 8 special forces, 5 MedEvac) to be delivered from 2017. Final assembly of the helicopters will be performed by Heli Invest Services in Poland.

With a net weight of 5.3 tons CARACAL can carry 5.9 tons of payload. Powered by two Turbomeca engines with 1.566 kW the helicopters reach a maximum speed of 324 km/h and a range of 740 km. The service ceiling extends above 6.000 m. 29 Soldiers and a crew of five can be transported in the 1.45 m high cabin.

CRAYLER Field Loader

Several applications deriving from user experience are now available for the CRAYLER, a remote controlled, four-wheel-driven and air-transportable field loader with a lifting capacity of 1,300 kg at 600 mm load distance and a lifting height of 2.8 metres.

The CRAYLER, produced by Palfinger, was developed in close cooperation with the German Armed Forces for the erection and operation of air-transportable field camps and medical rescue centres.

Due to its compact transport dimensions and service weight, air transport of the CRAYLER is possible with helicopters like CH53, CH47, SUPER PUMA, BLACKHAWK inside or underslung or with fixed wing aircraft like TRANSALL, HERCULES, C235 or A400. Several certifications for air transport already exist for the above mentioned aircraft.

(Photo: Palfinger)

After the first operational experiences the fields of application increased by implementing a variety of add-on equipment like a grap system, camera system, dozer blade, towing device or a crane arm.

Among others, current users include medical corps, field camp troops, logistic support units of airborne troops, special forces, artillery forces, engineering corps and maintenance corps.

The main advantages of the CRAYLER are: easy transport by road, air, rail or sea due to its compact dimensions, easy operation by means of a radio remote control, also from protected vehicles, off-road capability by means of four-wheel drive, low fuel consumption of only 3-4l per hour (diesel/F63) and available add-on equipment to increase the field of operations.

Mast Systems by Geroh

(df) Geroh showed their mast systems KVR and SPM together with the Stiletto at IDEF'15. KVR masts are suitable meet-

Renewal of the Italian Fleet

(df) Fincantieri and Finmeccanica will build and equip the units set out in the renewal plan of the Italian Navy's fleet.

In general, this multi-year programme for the renewal of the Navy's fleet (known as the "Defence Act") will employ a total funding of €5.4 billion and includes the construction, in addition to the aforementioned units, of one transport and landing unit (LHD) through a public contract with the Italian Ministry of Defence currently being finalised. In particular, one logistic support unit (LSS or Logistic Support Ship), six patrol vessels (PPA, or Multipurpose Offshore Patrol Ship) and four more in option, one transport and landing unit (LHD or Landing Helicopter Dock).

(Photo: Finmeccanica)

In the framework of this plan, OCCAR (Organisation Conjointe de Cooperation sur l'Armement = international organisation for cooperation on arms) has signed the order of the contractual performance for the construction of six patrol vessels (PPA, or Multipurpose Offshore Patrol Ship), with four more as an option, and for one logistic support unit (LSS or Logistic Support Ship) with the consortium (Raggruppamento Temporaneo di Impresa = RTI) consisting of Fincantieri, agent, and Finmeccanica, through its subsidiary Selex ES, principal.

The value of the contracts for the seven units is approx. €3.5 billion, of which Fincantieri's share amounts to approx. €2.3 billion and the one of Finmeccanica to about €1.2 billion.

ing the demands on communication or surveillance operations with a payload capacity of 70 kg. They are in use in military and commercial such as communications testing, surveillance and lighting and are designed for vehicle, trailer, shelter or field deployment.


(Photo: Geroh)

SPM ist a highly precise spindle mast in use with the German Army and other international forces to enhance capabilities like communication, security, surveillance, reconnaissance and detection of targets throughout the battlefield. It is designed for heavy payloads (600 kg) with large windsail areas while the precision tolerances maintain azimuth and minimise deflection.

Unmanned Hovercraft

(df) Hov Pod Hovercraft is working with suppliers of UAV technology to configure and supply hovercraft for unmanned hovercraft operations.

Unmanned hovercraft will either work under the direction of remote operatives, particularly for border patrol, to deter smugglers and drug or human traffickers, and may deploy night vision cameras or weapons. Hov Pod already supply hovercraft configured with GPS mapping software and ground survey equipment to detect and map unexploded ordnance in areas that need re-development.

The new Hov Pod Carbon Infinity 120HP Turbo is the world's first production carbon

(Photo: Hov Pod)

fibre/hybrid hovercraft which due to the lightweight properties of carbon fibre can carry half a ton in weight.

The Hov Pod was also chosen for use by The United Nations World Food Programme for its ease of use, ease of maintenance, durability, reliability and operational characteristics, particularly on water and over rough terrain. It will be used to cross swollen rivers to bring food, aid and essential medical supplies.

Progress for MIDCAS

(wb) The MIDCAS (Mid Air Collision Avoidance System) consortium together with the European Defence Agency (EDA) announced the completion of successful flight test and simulation campaigns conducted as part of the MIDCAS project. Major milestones included fully automatic avoidance manoeuvres of a Remotely Piloted Aircraft System (RPAS).


(Photo: EDA)

Flights with a demonstrator Detect & Avoid (D&A) system integrated in the Sky-Y RPAS test bed have been conducted since December 2014 at Grazzanise Air Force Base, Italy. First fully automatic coupled avoidance manoeuvres were performed by the RPAS based on combined cooperative and non-cooperative detection as well as non-cooperative detection only and put on collision course with a manned aircraft. The MIDCAS system had full authority over the RPAS flight control system.

The formal flight test permit to perform the automatic manoeuvre was obtained using results from earlier flight tests demonstrating the readiness to safely perform such critical manoeuvres. Flight tests have covered numerous scenarios and sensor combinations bringing RPAS traffic integration a significant step closer to reality. The Detect and Avoid system tested, performs collision avoidance and traffic avoidance using data fusion for various combinations of the included detection technologies, i.e. the cooperative IFF and ADS-B equipment and the non-cooperative electro-optical, infrared and radar sensors.

Advanced Launcher for UAS

(df) The Finnish company Robonic (Sagem/Safran) and U.S. company Lockheed Martin have signed an agreement to develop a smaller, more efficient and transportable fourth-generation pneumatic launcher for drones, called OHTO.

OHTO will provide advanced launch capabilities for Group II and III unmanned aerial systems and target drones. It is based on the Kontio launcher, but with significant changes including a higher power-to-weight ratio, reduced footprint and improved mobility, lower operating costs and enhanced reliability.

Under the terms of this agreement, OHTO will be part of the ground support equipment (GSE) suite for the Lockheed Martin Fury, a Group III unmanned aerial system (UAS). In addition, the agreement facilitates


(Photo: Lockheed Martin)

licenced production of OHTO in the U.S. by Lockheed Martin.

The Lockheed Martin Fury already uses a Robonic Kontio third-generation launcher to support flight testing and initial operations in its development programme.

Israel Procures Four MEKO Corvettes

(gwh) During the visit of the German Defence Minister Ursula von der Leyen to Israel, her Israeli counterpart, Moshe Yaalon,


(Photo: Thorsten Bädge)

annouced the procurement of four MEKO corvettes from Germany. The German shipbuilder ThyssenKrupp Marine Systems (TKMS) has signed a €430 billion contract to build four patrol corvettes for the Israeli Navy, based on the MEKO 80 design. Almost one third (€113 million) will be subsidised by the German Government. Israel plans to use the new boats to protect the expanded Exclusive Economic Zone (EEZ) in the Eastern Mediterranean, where recent

explorations discovered major oil and gas resources. The first boat will be delivered in 2019, with the other three to follow over the next three years.
The new Israeli boat to be designated Saar 6, will be a version of the K-130, a 2,000 ton class corvette in service with the German Navy.
All four vessels will be built in Germany by TKMS while systems outfitting (combat management system, sensors and weapons) will most likely be conducted in Israel. The weapons fit may include the new Barak 8 medium-range surface-to-air missile system and an MF-STAR multifunction AESA radar, both systems developed by Israel Aerospace Industries (IAI).
As part of the agreement, the German ThyssenKrupp group, the owner of TKMS, will expand its procurement efforts in Israel, thus covering an offset volume of more than €150 million.

New OPVs by Damen

(df) Damen gave a sneak preview of their newly designed 2nd generation Offshore Patrol Vessels (OPVs) during the annual OPVs & Corvettes Asia Pacific conference. This new generation of re-configurable Damen OPVs uses the Sea Axe hull shape which leads to good seakeeping including exceptional low heave accelerations. Since the hull is designed to reduce water resistance, the new OPV is also fuel efficient and capable of speeds up to 25/26 knots.
Other improvements include the multi-mission locations – namely bridge, hangar and bay. The Multi-Mission Bay (MM Bay) can be equipped with dedicated mission modules (e.g. mission containers) for missions such as counter piracy or anti-mining warfare (AMW). The MM Bay is also equipped with a nine metre RHIB (rigid-hulled inflatable boat), which can be launched over a dedicated slipway through the rear of


(Photo: Damen)

the vessel while the OPV is sailing. In the Damen-built HOLLAND Class ocean patrol vessels for the Royal Netherlands Navy this system has already proven to be safe in operations up to SS 5 conditions.
Unlike other OPVs, the command and control centre (C2 Centre) is located directly behind the bridge. Damen calls this development their Multi-Mission Bridge (MM Bridge). Both spaces can be separated by means of a blinded sliding wall. OPVs are less likely to take part in combat situations such as those faced by a frigate. During a mission, when lowering the sliding wall, situation awareness in the C2 Centre is improved, allowing C2 Centre officers to observe the situation immediately with their own eyes.

Precision Missiles by Diehl Defence

(df) At IDEF'15 Diehl Defence showcased missile expertise for advanced submarines as well as combat aircraft with its IDAS and Laser-Guided SIDEWINDER guided missiles. Moreover, the company presented high-quality packaging for defence equipment.
The Interactive Defence and Attack System for Submarines (IDAS) was developed by Diehl Defence (Germany) in cooperation with HDW (Germany) and Kongsberg (Norway). IDAS is a guided missile, launched from submerged submarines and effectice against targets like helicopters. It enables submerged submarines to defend themselves against threats from the air and to precisely engage vessels as well as land targets near the coast.
The submarine can launch the multi-role missile from a torpedo canister under water. An autopilot and image-processing infrared seeker provides autonomous guid-


(Photo: Diehl Defence)

ance and navigation. Due to the fiber-optic data link the operator in the submarine is also capable of controlling the missile during the entire flight, providing the opportunity of target change, correction of target impact or mission abort.

PUMA Enters Service

(df) The PUMA armoured infantry fighting vehicle has entered service in the Bundeswehr. With this new weapon system the German Army is taking advantage of several capability enhancements. Seven PUMAs are used by the armoured infantry for instructor training at Munster. In close cooperation with the German user and procurement organisation PSM GmbH developed an initial technical design concept which defined the framework for the brand-new armoured infantry fighting vehicle. The focal point of the initial and any subsequent design concept has always been the optimised system; in other words, to find the best possible compromise between numerous and


(Photo: PSM)

partly conflicting technical requirements. One key design criteria dominated throughout the development process: to maintain the optimal integration of the entire crew during mounted and dismounted operations. Therefore, the requirements for information and communication exchange between dismounted and mounted crews and the vessel, user
friendliness, ergonomics, and training have been integrated into the design from the beginning. The entire crew – commander, gunner, driver and a squad of six – are accommodated in a chassis with an unmanned remote controlled turret. This concept allowed for minimising the protected volume which in turn assisted in compliance with the weight limits and achieving a high protection level.

Two New Designs by FNSS

(jh) At IDEF FNSS for the first time publicly introduced the prototypes of two new armoured vehicle types: PARS 4x4 and KAPLAN 20.
As the latest member of the PARS family the PARS 4x4 has been designed for surveillance, anti-tank-, and command & control missions. The vehicle has a power-to-weight ratio of 25-30 hp/ton, a height of 1.9 metres and amphibious capabilities. It has a crew of 5 and can operate in deep and fast-flowing water without any preparation. In the water, the vehicle can perform pivot turns and even move backwards when re-


(Photo: FNSS)

quired. The increased manoeuvring capability in water is due to the two water jets at the rear of the vehicle.
The KAPLAN-20 NG-AFV is the latest member of FNSS' new generation armoured fighting vehicles family, designed to meet the tactical and technical requirements of the armed forces of Turkey well as those of friendly and allied countries. The vehicle provides protection against mines, rocket propelled grenades and kinetic energy threats. It's high performance power pack features automatic transmission, heavy duty suspension and rubber tracks which

enable the vehicle to carry heavy loads such as 105 mm gun systems.

■ RAIDER Helicopter Maiden Flight

(df) Sikorsky Aircraft announced the successful first flight of the S-97 RAIDER helicopter, a rigid coaxial rotor prototype designed to demonstrate a very good combination of manoeuvreability, hover ability, range, speed, endurance and survivability. This first flight was conducted at Sikorsky's Development Flight Center (DFC) where the two-prototype RAIDER helicopter test programme is based.

(Photo: Sikorsky)

During the first test flight, which lasted approximately one hour, RAIDER Pilot Bill Fell and Co-Pilot Kevin Bredenbeck took the aircraft through a series of manoeuvres designed to test the aircraft's hover and low-speed capability. With first flight achieved, the RAIDER helicopter now moves into more progressive flight testing to demonstrate key performance parameters critical to future combat operations including armed reconnaissance, light assault, light attack and special operations.

The RAIDER helicopter programme is part of the portfolio of Sikorsky Innovations, the technology development organisation within Sikorsky Aircraft's Research & Engineering division.

■ 200th RAM Guided Missile Launching System

(df) RAM-System, the prime contractor for the Rolling Airframe Missile programme (RAM) for the F125 class of frigate (four units) of the German Navy, hosted the roll-out ceremony for the 200th RAM guided missile launching system (GMLS) at the end of April. "With respect to new conflicts and growing threats, the extremely reliable RAM weapon system with an exceptional hit probability of greater than 95 % today is of greater importance for navies than ever," stated Michael Wehner, General Manager of RAM-System GmbH.

(Photo: RAM-System GmbH)

RAM is a supersonic, quick reaction, fire-and-forget missile providing defence against anti-ship cruise missiles, helicopter and airborne threats, and hostile surface craft. The RAM weapon system is developed, produced and marketed by RAM-System GmbH in close cooperation with its German parent companies Diehl BGT Defence and MBDA Deutschland, together with its U.S. partner Raytheon Missile Systems.

■ Norway Procures WISENT 2

(df) The Norwegian Defence and Logistics Organisation (NDLO) has ordered six WISENT 2 Armoured Recovery Vehicles (ARV). Comprehensive logistics such as documentation, training and spares complement the scope of the contract.

(Photo: FFG)

WISENT 2 ARVs are based on the LEOPARD 2 main battle tank. The conversion from an ARV into an AEV and vice versa is possible within a few hours. The main winch has a pulling force of 40 tons – regardless of the required cable length.

Key features of the WISENT 2 are the intelligent hydraulic system and the electronic architecture. The platform can support a Full Width Mineplough (FWMP) in both configurations. Besides Canada, Qatar and teh UAE, Norway is the fourth customer for the WISENT 2 in the last four years. The WISENT 2 has been contracted both as newly build vehicles (Qatar and UAE) and as a conversion of used refurbished LEOPARD 2 MBT chassis (Canada and Norway).

TTIP/CETA and Security Policy

Johannes Varwick and Aylin Matlé

The partners on both sides of the Atlantic share close tangible links through their common interests (politics, business and culture) and also share basic values such as their commitment to democracy, the rule of law and a market economy. Nevertheless, there is an increasing number of sources of friction in the relationship, which in turn increase the likelihood of disagreements.

In recent years, the EU (if it can be referred to as a single protagonist) and the USA have increasingly developed competing views on important issues relating to the future of international politics. Whilst the tone and style of President Obama's two terms in office differ significantly from those of his predecessors' administrations, views on how to deal with global problems, and where they should rank on the trans-atlantic agenda, are in part shaped by fundamental differences on each side of the Atlantic. This article therefore seeks to shed some light on the potential impact of the proposed transatlantic free trade agreement on European and American security and defence policies. The conclusions will be incorporated into a broader strategic discussion around future transatlantic ties.

Photo: Port of Rotterdam

The port of Rotterdam: Transatlantic commerce represents around 50 percent of global gross domestic product and about a third of world trade.

Authors

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One Third of World Trade

Economic relations are an important element of transatlantic relationships, and also form the basis for common interests and disputes. There is a particularly high degree of economic integration among the partners: the EU and US economic regions are the most strongly linked in the world. Each year, more than €1,500 billion in direct investments flow into the EU from the USA, and a similarly high sum flows from the EU to the US. Transatlantic commerce represents around 50 percent of global gross domestic product and about a third of world trade. These figures attest to an impressive level of business, which benefits both sides. Yet, at the same time, transatlantic trade disputes are increasingly putting a strain on mutual relations. In particular, conflict centres around the agricultural sector and consumer protection issues (including the import of bananas, animals treated with hormones, genetically modified food and subsidies for European agriculture). When it comes to economics, the Europeans rarely share American ideas, and their views have come to counter those of the Americans on many issues. The introduction of the single European currency (Euro) is itself a potential source of conflict. The US fears a competitor to the leading global currency – the US dollar – while the EU hopes precisely that the euro will give it a stronger influence on global monetary and financial systems and will mitigate US dominance in this area.

In order to counteract any possible centrifugal forces in the transatlantic relationship, a number of policy initiatives have been launched in the past 25 years. As early as 1990, the US and the EU – then the EC – agreed to a regular exchange of information within the framework of the Transatlantic Declaration, the political highlight of which is the annual EU-US Summit. Even when the USA and the EU member states have slightly different agendas, these meetings help both sides to understand one another's standpoints. With the adoption of the New Transatlantic Agenda in 1995, relations were put on a much broader footing. The transatlantic dialogue began to address a much wider range of issues and involved social stakeholders to a greater extent. A Transatlantic Economic Partnership was established in 1998, promoting the opening up of markets and trade liberalisation between the transatlantic partners.

Since 2013, the EU and the USA have been negotiating the path towards the ambitious goal of a transatlantic free trade area, the Transatlantic Trade and Investment Partnership (TTIP). There are plans to cut tariffs in order to reduce trade barriers, which would benefit the economies of both sides. Firstly, the TTIP would eliminate both tariff barriers

and non-tariff barriers, such as import quotas and technical standards. There are some contentious issues. For example, opponents fear that the agreement would, above all, reduce consumer and environmental protection mechanisms in Europe. Critics also argue that there is a lack of transparency in the negotiations and that it is unclear what the role of national parliaments is in the process. Negotiators on both sides have nevertheless stated their commitment to reaching a successful conclusion of the agreement. However, it is currently impossible to predict when this might be achieved. In addition to the TTIP negotiations, since 2009, the European Commission has been in talks with Canada, on behalf of the EU member states, to conclude a Comprehensive Economic and Trade Agreement (CETA). It was agreed in September 2014, but has not yet been ratified. The CETA and TTIP address similar trade policy issues. In the past, the transatlantic free trade agreement has been viewed mainly from an economic policy perspective, and not from a security policy perspective. Given that the CETA and TTIP agreements have a very similar structure, it is reasonable to assume that these free trade zones will have a similar impact on security policy issues. In addition to economic issues, the negotiations surrounding a transatlantic free trade agreement could also include defence procurement and, in the longer term, a common security policy. It is still undecided whether this area will be covered by the negotiations, let alone any future agreement. It is therefore all the more important to consider the extent to which the European and the American defence sectors could be affected by a free trade zone.

European Status

The defence sectors on both sides of the Atlantic are currently characterised by protectionist measures, which aim to protect the various countries' own industries from competition. However, this does not mean that there are no examples of European and American companies establishing themselves in markets on the opposite side of the Atlantic. Nevertheless, with 28 member states in the EU, the political framework conditions for this kind of cooperation are much more complicated than in the USA. Washington uses national legislation to try to ensure that competition does not lead to a loss of jobs in the defence sector. In the EU, on the other hand, there is no unified defence industry – despite the logic of the internal market and numerous relevant memoranda of understanding. Instead, the EU has 28 national defence industries. They compete with one another and have historically been far from cooperative in nature, let alone likely to form a single European defence industry. To date, no attempt to change this – such as establishing the European Defence Agency (EDA) in 2004 – has led to any substantial change. In real terms, that means: The policies of the EU States are predominantly shaped by national industrial interests rather than by security policy considerations and strategic needs.

Photo: White House

Press conference at the EU-US summit 2014 in Brussels

Masthead

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At the same time, steadily declining defence budgets within the EU mean that, for economic reasons, it is becoming inevitable that there will be closer cooperation in the field of arms development and procurement in the long-term. From a strategic political viewpoint, such a development would in fact be necessary if the Europeans wish to retain and develop military capabilities. In this way, if the TTIP negotiations were to expand to include the defence industry, it might serve as a catalyst to further open up national markets to other European and American companies. This would reduce not only trade tariffs, but also more restrictive non-tariff barriers, such as technical standards, which could even be abolished in the long-term. The removal of such barriers could also take into account fiscal constraints – which also exist in the USA – by using resources more efficiently, to create a more effective common defence policy. The key to this lies in standardising military equipment within the EU, a move that could be extended to include at least some parts of the USA in a next phase.

Photo: Norwegian Air Force

A Norwegian F-16 returns to its base at Souda Bay, Crete after completing the first combat mission over Libya: The 2011 NATO mission to Libya dramatically demonstrated just how limited is coordination amongst the European armed forces.

Common standards for the development and procurement of armaments projects follow both economic and operational logic, which eventually converge at a strategic level. In economic terms, harmonisation in the area of procurement not only reduces costs, it also means that the burden of expense involved in maintaining military equipment can be shared. Operationally, coordinated development and procurement processes can lead to a greater degree of interoperability on joint operations. Last, but not least, the 2011 NATO mission to Libya dramatically demonstrated just how limited coordination amongst the European armed forces is. For example, the lack of compatibility, which negatively impacted air-to-air refuelling, created challenges affecting the effectiveness of the operation.

Capability Gaps v. Standardisation

The Americans often complain about capability gaps between the US and its European partners. The joint development of military equipment could help to close these gaps – or at least reduce them – making joint military operations easier. In addition, the Europeans would then also be in a position to share responsibilities with the Americans, by themselves having the capabilities to shoulder military operations without having to rely on US support – for example, in operations in the EU and its immediate vicinity. This idea is in line with the importance of standardisation with regard to NATO and, to a certain extent, the common security and defence policy (CSDP) – which, as yet, has far fewer defence policy capabilities: The harmonisation of capabilities is crucial, both in the context of NATO and within the framework of the CSDP. Whether under the heading of "Smart Defence" or "pooling and sharing", a closely interlinked European-American defence industry would provide new impetus for defence policy projects. In future, Europeans and Americans will only be able to work together if both sides ensure the interoperability of their military forces, particularly in an age of military strategy that is increasingly characterised by networked defence systems and advanced technologies.

So far, these thoughts are purely speculative, and will probably never be implemented as long as the negotiations for a transatlantic free trade agreement are not extended to include the defence sector. Given the difficulties within Europe regarding harmonising national defence industries, it is unlikely that it will be possible to establish a common transatlantic defence sector in the near future. Nevertheless, the possible impact of the TTIP on transatlantic security policy should serve as the driver for a long-overdue discussion – a discussion that will force the focus on to issues surrounding the fragmentation of the European defence industry and how this might be countered. Furthermore – and this seems to be more important at the transatlantic level – American and European decision-makers need to ask themselves whether and what strategic goals should be pursued with common assets.

Transatlantic relations will, undoubtedly, continue to be subject to stress at times. One particular flashpoint is the fact that, in extremis, the USA would often be in a position to act without its European partners. The USA will also have to get used to the idea that, when it comes to other issues, it will increasingly (but certainly not always) find itself facing a single, unified European stance.

In this respect, TTIP would be a strategic element in consolidating the common transatlantic relationship. Back in 1957, the great American political scientist, Karl Deutsch, differentiated between two types of security community in his famous study Political Community and the North Atlantic Area: pluralistic and amalgamated communities. In both types of community, a community ethos prevails – albeit to differing degrees – which is supported by formal and informal institutions and practises. This makes it highly likely that there will be peaceful relations and change between the members over a long period of time. Security communities are therefore like "transnational cognitive peace regions", which form on the basis of common discourse and trade, trust and reliability and eventually develop a common identity.

This goal of a transatlantic security community is to be renewed in a multipolar world and in view of the changing importance of security policy cooperation between Europe and the US. For despite all the current and structural differences of opinion, we must not lose sight of the bigger picture. North America and Europe share common values and interests, and it is unlikely that any problem would ever be solved if Europe and the US were to work against each other, instead of working together. In reality, the transatlantic partnership is a key prerequisite for global stability and security. In this sense, TTIP and CETA are instruments of economic policy which also serve a political purpose, and which ought to be harnessed more fully than previously planned when viewed from a security policy perspective. ■

Sidney E. Dean

US Expectations Regarding TTIP

Concluding the Transatlantic Trade and Investment Partnership (TTIP) with the EU, and a similar free-trade agreement known as the Trans-Pacific Partnership (TPP) with 11 Pacific rim nations, is a top priority for the Obama administration's second term.

According to the Office of the US Trade Representative, every $1 billion in exports of US goods and services supports more than 5,000 US jobs, and those export-supported jobs pay 13 to 18 percent higher than the national average wage. Specifically regarding TTIP, the Obama administration, the Congressional Research Service, and private research organizations have presented some detailed expectations:

- according to some forecasts, a $150 billion annual increase in transatlantic trade (split roughly halfway between the US and Europe);
- up to three percent annual GDP growth in the US;
- creation of hundreds of thousands – by some estimates millions – of new jobs;
- enhanced US competitiveness globally, not just directly vis-a-vis Europe.

These benefits would be obtained by:

- eliminating remaining tariffs and, more importantly, administrative and regulatory barriers which add an estimated 20-26 percent to the cost of transatlantic trade;
- improved market access for goods (including agricultural goods) and services;
- developing rules, principles, and new modes of cooperation on issues of global concern, including intellectual property, market-based disciplines addressing state-owned enterprises, and discriminatory localization barriers to trade.

Congress, the Public, and TTIP

Not everyone in Washington agrees. Many Americans believe that previous free trade agreements resulted in US manufacturers relocating production to foreign locations with lower wages and standards. In some ways, TTIP suffers under the administration's simultaneous attempt to achieve the Trans-Pacific Partnership. Many points raised by US opponents to trade pact approval – concerns over labour conditions, environmental standards, and outsourcing of manufacturing on the left, increased immigration among the right – are objectively relevant only with regard to Pacific-rim trade partners, but the political backlash hampers the effort to achieve both treaties.

A Pew poll conducted in Spring of 2014 showed that 53 percent of US citizens questioned at the time actually supported TTIP. By party affiliation, 44 percent of Republicans and 60 percent of Democrats approved of TTIP. However, the same poll found that only 20 percent of Americans believe trade creates jobs, and only 17 percent believe trade boosts wages; here, Republicans had a more positive outlook than Democrats.

This may explain why free-trade accords are, in general, more popular among Republican politicians (and business federations) than among Democrats (and organized labour). "We can look at these trade bills over the years – every one of them without exception [caused] millions of job losses," Senate Minority Leader Harry Reid (Democrat) said on 20 May. "But yet they're going to try the same thing again and hope for a different result. That's insanity."

Senator Elizabeth Warren, philosophical leader of the Democratic party's left wing, has been leading the effort to block both new trade pacts. While many members of Congress specifically direct their criticism at TPP, Warren is outspoken against TTIP as well. She fears that the agreement might undermine the legal framework regulating the practises of the US banking and finance industry.

"We are already deep into negotiations with the European Union on a trade agreement and big banks on both sides of the Atlantic are gearing up to use that agreement to water down financial regulations", Senator Warren said during a speech on 5 May.

Another concern is that US banks might re-incorporate in Europe to evade liquidity requirements and other regulations. In broader terms, Warren and other trade pact critics fear that the need to harmonize US and foreign regulations could, in the future, undermine US consumer protection or regulatory legislation.

The ironic result is that President Obama must now rely largely on his conservative rivals to support his trade policy. And even then, ratification of any TPP or TTIP accord is not guaranteed.

US-European Relations

Some of the most powerful arguments in favour of TTIP actually go beyond trade. Much has been made of the United States' "pivot to Asia", but with the exception of defence agreements, ties to Asia are primarily economic in nature. With few exceptions, US ties to Asia lack the "Community of Values" aspect which distinguishes Transatlantic relations.

Vice President Biden addressed this directly at the 2013 Munich Security Conference, emphasizing that US engagement in Asia does not come at the expense of Europe, "America's indispensable partner of first resort." This sentiment is largely shared across Washington's partisan spectrum. Some in Europe may perceive US global commitments as a distraction from Europe. Ironically, many in Washington have long perceived the EU's efforts at forging a common foreign and security identity separate from NATO as evidence that Europe is distancing itself from America.

For that reason some US advocates of TTIP specifically praise it as an instrument to reinvigorate the US-European relationship and bind the partners more closely together.

NATO and the Challenge of Hybrid Warfare

Andreas Jacobs and Guillaume Lasconjarias

Since the beginning of the Ukraine crisis, "hybrid warfare" has become the buzzword in the security debate within NATO. Not only Russia, but also different state and non-state actors on NATO's southern flank are increasingly using hybrid methods of warfare, making this the most relevant concept in NATO's security planning and strategic thinking.

The Alliance has already recognised the new challenge, but is still struggling to find appropriate answers. There is neither a common understanding among NATO member states on the concept of hybrid warfare, nor a common strategy to counter the threats it involves. Based on a comprehensive definition and several case studies, this article analyses NATO's attempts to understand and counter hybrid threats and develops policy recommendations for a better adaptation of NATO's strategy and structures to the new security environment.

Understanding Hybrid Warfare

Until now, there has been no comprehensive and widely accepted definition of hybrid warfare. The term itself was popularised by Frank Hoffman in the early 2000s. Hoffman understood hybrid warfare as the simultaneous and adaptive use of a "… fused mix of conventional weapons, irregular tactics, terrorism, and criminal behaviours in a battle space…".[1] While Hoffman insists on the means of warfare, other commentators focus on the actors: thus, hybrid wars are described as being fought by a "… combination of special operations and conventional military forces; intelligence agents; political provocateurs; media representatives […] proxies and surrogates, paramilitaries, terrorist, and criminal elements."[2] In addition, hybrid wars are not limited to a particular battlefield between militaries or groups alike, but are waged on markets and stock exchanges, in cyberspace and in the media: any means to destabilise one's opponent can be – and is – used. Given this variety of perspectives, a very generic definition seems plausible: the term "hybrid war" describes a form of violent conflict that simultaneously involves state and non-state actors, with the use of conventional and unconventional means of warfare that are not limited to a precise and physical battle space.

One of the most prominent examples of hybrid warfare as defined above is the 2006 Israel-Hezbollah war. In the 34-day military conflict during the summer of 2006, Hezbollah used "a conventional arsenal, irregular forces and guerrilla tactics, psychological warfare, terrorism and even criminal activities, with support from a multi-dimensional organisation and capable of integrating very different sub-units, groups or cells into one united, large force."[3] Additionally, Hezbollah had the direct support of Iran, particularly the Iranian Revolutionary Guard, which allowed them to wage a guerrilla war with an impressive conventional arsenal (artillery, anti-tank and anti-ship guided missiles and drones). Despite the limited military effect of Hezbollah's conventional strikes, the consequences for Israel were substantial. Hezbollah's attacks "terrorised the north of Israel, paralysed the country's economy and forced over a million civilians to temporarily evacuate".[4] But Hezbollah did not fight only on the physical battlefield. It also challenged Israel with a broad propaganda campaign. With its TV and radio stations, it temporarily managed to depict Hezbollah and its leader, Hassan Nasrallah, in many Arab and Muslim societies as the new spearhead of resistance against Israel. This led to an overwhelming (and incorrect) perception within the Arab world, and in parts of the international community, that Israel – the strongest military power in the region – had been defeated at the hands of Hezbollah, a non-state militia: "The psychological effect […] was enormous and became the impulse for Israel to build its […] Iron Dome counter-rocket and missile-defence systems".[5]

For Europe and NATO it was not the Israel-Hezbollah war, but the series of actions first undertaken by Russia in the Crimea and Ukraine in 2014 that triggered the debate about hybrid warfare. Russia, on the other hand, had learned its lessons much earlier. In the Chechnya wars in the late 1990s and the war in Georgia in 2008, Russia discovered the potential of blending together all means and tactics to defeat its adversary, using a variety of military and non-military tools to reach its goals. From 2010, Russia's understanding of hybrid warfare was conceptualised and then incorporated into a document referred to as the "Gerasimov Doctrine" (named after the Chief of the General Staff of the Armed Forces of Russia). Recognising that the very rules of war have changed, Gerasimov concludes that "…the role of non-military means of achieving political and strategic goals has grown, and in many cases, they have exceeded the power of force of weapons in their effective-

Photo: dpa

Israeli security personnel operate at the site where a Hezbollah-fired rocket hit a building in the coastal town of Nahariya, northern Israel, near the border with Lebanon, Thursday, 13 July 2006: One of the most prominent examples of hybrid warfare is the 2006 Israel-Hezbollah war.

Authors

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ness […]. The focus of applied methods of conflict has altered in the direction of the broad use of political, economic, informational, humanitarian, and other non-military measures — applied in coordination with the protest potential of the population."[6] In this new doctrine, military means (both regular and special operations) support this broad panel of possible actions, targeting the enemy's centre of gravity, that is the population and policy makers.

What defines Russia's hybrid warfare is a multifaceted approach: while striking at its opponent's vulnerabilities (exerting economic pressure on natural resources or threatening to do so, or hacking Ukrainian government websites), a massive disinformation campaign was carried out, in order to discredit the Kyiv government, claiming that it was led by "fascists".[7] In the meantime, armed forces were massed at the border with Ukraine in a show of force, while special forces – the "polite green men" in unmarked uniforms – took over the main buildings and facilities, preventing effective countermeasures from the overstrained Ukrainian forces.[8] Nonetheless, this operation faced more difficulties when moving deeper into Ukraine. The narrative of rebels backed by Russian "volunteers" could not hide the fact that separatists received equipment – including heavy gear – under the auspices of Russian forces intervening directly. However, Russia always tries to maintain a clause of plausible denial, carrying out operations under a critical threshold so as to minimise the risk of retribution and retaliation and limit the risk of a reaction.

NATO's Responses to Hybrid Threats

The two abovementioned examples indicate why the concept of hybrid warfare matters. The very aim of hybrid warfare is to keep war below the threshold of conventional warfare. Consequently, NATO has difficulty in reacting to hybrid warfare with the traditional instruments of collective defence (Article 5 of the Washington Treaty of 1949), which are not designed for dealing with insidious and ambiguous threats. Because of this, a new concept of defence against hybrid threats, able to react flexibly to hybrid challenges, is needed. NATO and its member states have already taken some first steps in order to develop and implement such a concept. However, this has to be made more effective and to be fully amalgamated into Alliance doctrine and military thinking.

In 2009/2010 Allied Command Transformation (ACT) already started developing an overarching concept for the NATO military contribution to counter hybrid threats, highlighting not only the challenges posed by current or future threats, but also the need to adapt the Alliance's strategy, structure and capabilities.[9] But it was the crisis in Ukraine that deeply changed the perception of the security environment in Europe and demanded a unified response: the Allies, gathered at the NATO Summit in Wales in September 2014, recognised the need for a response that would not just be a mere adaptation to, but would encompass every dimension of, the ongoing crisis. Based on what NATO Secretary General Jens Stoltenberg defined as the Alliance's greatest strength, its ability to adapt to ever-changing threats and environments, the Allies came up with a "Readiness Action Plan", a political measure providing a renewed "Reassurance Policy" in the form of help and assistance to any member state that came under attack.[10]

This adaptation of NATO's strategy focuses on three keywords: comprehensive, responsive and rapid. The Readiness Action Plan showed that the development of NATO's strategy against hybrid threats did not start from scratch. First, if hybrid threats are a blend of means used by different actors in a variety of fields (such as those defined earlier in this paper), they can be seen as "the dark reflection" of NATO's Comprehensive Approach.[11] This is not to imply that NATO had the solution before even examining the problem. But NATO can build on extensive lessons learnt from the implementation of the Comprehensive Approach, while modifying the context and increasing interaction

Photo: NATO

In 2009/2010 Allied Command Transformation (ACT) started developing an overarching concept for the NATO military contribution to counter hybrid threats.

with other actors.[12] With this in mind, SHAPE established the Comprehensive Crisis and Operations Management Centre (CCOMC), inaugurated in 2012.

Second, NATO also has a set of forces at its disposal. The NATO Response Force (NRF) was introduced in 2002, initially designed to be the "iron fist" of the Alliance, capable of carrying out any type of mission. Unfortunately, the NRF almost fell into disarray.[13] However, after years of debate on its size and true responsiveness, a breakthrough is now expected. At the Wales Summit, the Allies established a spearhead element able to move within 48 hours to show political will and true resolve. This spearhead element, the "Very High Readiness Joint Task Force" (VJTF), is a brigade-size land component with enablers (air, maritime and special forces) capable of being deployed anywhere – South and East – to both reassure Allies and deter potential adversaries. But the adaptation measures go beyond the mere implementation of a "bright and shiny object" like the VJTF: the Allies are also changing the way they consider the current force structure. To be effective, six "NATO flags" in the form of small and modest command and control elements are going to be permanently deployed among the Eastern Allies bordering Russia. In addition, a new joint force headquarters is going to be established – the previous Multinational Corps Northeast based in Szczecin (Poland) will be "NATO-ised" and given responsibility for controlling these subordinates.

Eventually, to be effective and rapid, NATO forces have to be fully exercised and ready: since last spring, the Alliance has been working on shaping, designing and testing its forces – and will continue to do so in the time leading up to the Warsaw Summit of 2016. Non-stop exercises take place amongst allies, acting as a test for identifying shortfalls, adjusting doctrine, and potentially reorganising the structure. These exercises will probably show that comprehensive and rapid NATO action on its eastern and southern flank requires an increase of deployable forces, modern equipment, and the availability of ships, aircraft and troops. They might also serve as a reminder that high readiness comes at a cost.

Recommendations

NATO has started to adapt to the hybrid challenge – particularly in reaction to Russia's hybrid war in Ukraine. But the Alliance is still far away from a comprehensive strategy against hybrid threats, with particular regard to those emerging in the South. In order to develop such a comprehensive strategy, NATO needs to balance the course it is following to the East and South, as well as further develop its instruments, resources and approaches.

With regard to instruments, NATO forces need to be ready to shift operations suddenly and unexpectedly along the spectrum. Regarding the Eastern flank, Article 5 and collective defence will remain the cornerstone of NATO's policy and raison d'être. However, this does not spell the end for crisis management operations, where responsiveness is also key. If one considers that threats emerging from the South are a daunting challenge, more has to be done with partners and, in this case, the setting of deployment hubs in the South could be a fruitful idea. Of course, the NRF or the planned VJTF will be well suited to the kind of intervention required, because of their flexibility and adaptation capacity.

However, these resources could be better structured and organised to really cope with hybrid threats and truly encompass every dimension of a counter-hybrid force. For instance, NATO's response forces would first complement the nations' own resources, by fielding additional enablers and deploying "counter-hybrid forces", while nations would remain responsible for ensuring their preparation and resilience. To be fully effective, this "counter-hybrid force" could be organised around a core of special forces, assuming that these would better understand and better address the adversary's deployment. In addition, military police and law enforcement units could train and monitor friendly forces and deal with criminal elements and armed militias. Cyber defence teams could protect and secure NATO communication networks and deter cyber attacks. 'Psyops' (Psychological Operations) teams could counter the adversary's propaganda. Civil-military capabilities could provide support to the local population. All of these elements should be backed by accurate intelligence and situational awareness. Finally, NATO should become better prepared to counter (untrue) narratives and challenge propaganda and disinformation. With the Communication Centre of Excellence in Riga, Latvia, NATO has already established such a counter-narrative tool.

This approach requires more diversified scenarios, more complex exercises and a better integration of NATO's partnership infrastructure into its different strategic planning and crisis management efforts. From this perspective, complementing and adapting NATO's documents seems to be inevitable.[14] The security situation in the East and in the South is very different in nature, and might even require separate NATO strategies at a certain point. However, some concepts, tools and tactics that work in the East might also work in the South and vice versa. Therefore, it is necessary to better cross-connect NATO's own internal discussions and planning processes. What is needed is a comprehensive approach to break the artificial "strategic stovepipes" that separate areas of operations and prevent a real strategic understanding of a new way of warfare. ■

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1 Frank G. Hoffman, "Hybrid vs. compound war. The Janus choice: Defining today's multifaceted conflict," Armed Forces Journal, October 2009, p. 15.

2 Captain Robert A. Newson, "Why the US Needs a Strategy To Counter 'Hybrid Warfare', Defense One, 23 October 2014, www.defenseone.com/ideas/2014/10/why-us-needs-strategy-counter-hybrid-warfare/97259/ (accessed 13 May 2015).

3 Marcin Andrzej Piotrowski, "Hezbollah: The Model of a Hybrid Threat," PISM Bulletin, no. 24, March 2015.

4/5 Ibidem.

6 According to the Voenno-promyshlennyi kur'er, 27 February 2013. See also Heidi Reisinger and Aleksandr Golts, Russia's Hybrid Warfare. Waging War below the Radar of Traditional Collective Defence, Rome, NDC Research Paper no.105, November 2014, p. 2.

7 Simon Shuster, "Russians Rewrite History to Slur Ukraine Over War", Time Online, 29 October 2014 time.com/3545855/russia-ukraine-war-history/, (accessed 5 March 2015).

8 F. Stephen Larrabee, Peter A. Wilson and John Gordon IV, The Ukrainian Crisis and European Security. Implications for the United States and U.S. Army, RAND Report, 2015, p. 6.

9 Michael Miklaucic, "NATO Countering the Hybrid Threat," 23 September 2011, www.act.nato.int/nato-countering-the-hybrid-threat (accessed 12 April 2015).

10 NATO, Wales Summit Declaration, 5 September 2014, paragraph 5.

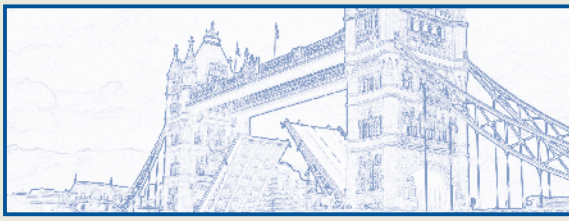
11 NATO Secretary General, Remarks at the ACT Transformation Seminar, Washington DC, 25 March 2015 www.nato.int/cps/en/natohq/news_118430.htm (accessed 1 April 2015).

12 Michael Aaronson, Sverre Diessen, Yves de Kermabon, Mary Beth Long, and Michael Miklaucic, "NATO Countering the Hybrid Threat," PRISM, no. 4, 2011, pp. 111-124.

13 Guillaume Lasconjarias, "The NRF: from a Key Driver of Transformation to a Laboratory of the Connected Forces Initiative", Research Paper no. 88, NATO Defense College, November 2012.

14 US Special Operations Command, "Counter-Unconventional Warfare, White Paper," 26 September 2014, https://info.publicintelligence.net/USASOC-CounterUnconventionalWarfare.pdf (accessed 1 April 2015).

Viewpoint from London



Tim Guest

The UK as an Ally in Dangerous Times

We live in dangerous times. As any former soldier knows, there is a certain kind of buddy they would prefer watching their back when the going gets rough. Picture this: A big marine, battle hardened in fight after fight, supported a long time by a smaller guy, professional and polite, well equipped and reliable. As the battle wears on, however, the little guy starts to talk a lot about still being the big guy's best friend but the marine notices that the little fellow is tired, not as alert and discarding bits of kit to lighten his load. The big guy is a bit uncomfortable about this. He needs someone he can rely on when the going gets tough. Seems the little guy just cannot cut it anymore. He used to walk the walk, but now only talks the talk and as the battle ahead shows no sign of getting easier, the big marine knows he needs – absolutely needs – a buddy beside him who will be ready, prepared, well-equipped and reliable when the 'proverbial' hits the fan.

Well, NATO and the US are feeling a little bit concerned, just like the big marine, about the UK. For several years, the UK has allowed its defence capabilities to weaken despite growing threats and conflicts around the world. Worryingly, that situation does not look like improving in these times of austerity, particularly now that the country's Conservative Party has taken power in the recent general election, moving from its coalition-government position of the past five years – a period in which it oversaw major defence cuts – to one of governing all on its own. And no matter how much fork-tongued hyperbole the politicians utter, the facts speak for themselves: the total number of 'regular' personnel in the UK armed forces has been cut dramatically in that period and on 1 April 2015 totalled just 153,720, with the army accounting for 87,060 individuals. That army figure is down almost 20,000 from its pre-2010 levels and on track to reach the government's 2020 target of 82,000 [the UK Armed Forces Quarterly Personnel Report, published on 1 April, makes fascinating, if somewhat depressing reading]. Brains at the UK's Royal United Services Institute have actually deduced that if this current downward trend continues, the army will have as few as 50,000 regular personnel before too long, which, as one commentator has noted, is almost the same level at which the Kingdom of Great Britain, (1770s nomenclature), fought the American War of Independence … and lost!

Well, in common with 2010, (not 1776), when the last strategic defence and security review (SDSR) laid out this fateful path of decline, 2015 will see another SDSR before the year is out. What the new government in Westminster needs to wake up to before another round of defence spending cuts is approved, is that in 2015 the world is a far more dangerous place than five years ago. NATO is aware of it, the US is aware of it but the new UK Government appears to be oblivious.

Britain's defence spending sits just above the 2% GDP target that NATO wants member states to achieve to ensure Alliance capabilities and effectiveness. However, neither Prime Minister David Cameron, nor 'newly-reappointed-relatively-newly-appointed' Secretary of State for Defence, Michael Fallon, has committed to that target. Indeed, both men have already sidestepped any firm undertaking that they will keep to the two-percent-of-GDP defence-spend commitment that NATO and the Obama regime have urged them to confirm. It seems, therefore, that the UK is on track to hit its meagre, Future Force 2020 targets and no amount of NATO pressure or barracking by Obama will convince them to maintain 2%. Someone in UK political power needs to wake up and smell the coffee being brewed by ISIS, Russia in Ukraine and Europe, the chumminess between Russia and China, and Tehran's 'harmless' domestic nuclear intentions, and be brave on defence spending.

NATO and the US need a strong UK, Mr Cameron; now is certainly not the time to turn this year's SDSR into a 'TDSR' – a review that is tactical, short term and downright dangerous for the UK and its allies, in this increasingly dangerous world.

Swiss Security Policy after 2014

Christian Nünlist

Switzerland, like many other Western states, is currently debating how to respond to current security challenges in Europe's neighbourhood posed by President Putin's Russia and the Islamic State. Yet, Swiss security policy remains a special case in Europe, since Switzerland is neither a member of the EU nor NATO. In 2014, however, Switzerland played a valuable role during its OSCE Presidency.

In 2014, Russia's land grab of the Crimea and the sudden rise of the Islamic State triggered debates about how to respond to these new challenges close to Europe. 25 years after the end of the Cold War, as a neutral state Switzerland still pursues an independent foreign and security policy. It is neither an EU nor a NATO member. However, solidarity is an important principle of Swiss security policy – and "security through cooperation" is its leitmotif.

On these grounds, Switzerland assumed the responsibility throughout 2014 of actively leading the efforts of the Organization for Security and Cooperation in Europe (OSCE) in managing the Ukraine Crisis as well as in dealing with the phenomenon of foreign Jihadi fighters returning to Europe. Owing to the OSCE presidency, the Swiss government had an effect upon global diplomacy that far exceeded its traditional small-state clout.

Domestically, Switzerland's active engagement within the OSCE framework caused little controversy. It might have even drawn attention away from the worsening bilateral relations with the EU. Yet, difficult discussions lay ahead about the future course of Swiss security policy and about the crucial question of how Switzerland intends to position itself in a damaged European security system post-2014.

This article first describes the evolution of modern Swiss security policy up to the most recent Security White Paper of 2010. Putin's Russia and returning Jihadi fighters, the currently two most pressing security challenges are then discussed from a Swiss perspective. Looking ahead, it is argued that there exist opportunities to rethink Swiss security policy after 2014. The OSCE presidency has been widely perceived as a success among the Swiss public. Accordingly, more active international involvement of Switzerland now finds a more positive echo among the Swiss public than during the last decade.

Photo: OSCE

The Swiss OSCE presidency was widely perceived as a success among the public.

A New Strategy: Security through Cooperation

The birth of Swiss security policy is precisely recorded. The term "security policy" first appeared in Switzerland in 1973, relatively late compared with other countries. The "Report on the Security Policy of Switzerland" from June 1973 outlined a two-part strategy: The defence policy maintained a preserving and defensive character. Operational cooperation with other countries was not permitted in peacetime for neutral Switzerland. But at least Swiss foreign policy should be more flexible. This "active foreign policy", however, encountered clear limits beyond a surprisingly ambitious performance during the Conference on Security and Cooperation in Europe (CSCE). In 1986, Swiss voters rejected Swiss UN membership.

A paradigm shift took place in 1990, partly in response to a referendum aimed at abolishing the Army that rallied an astonishing 36 percent of the Swiss electorate in November 1989. As a consequence, instead of the previous strategy of autonomy and self-sufficiency, international cooperation was stressed in the 1990 Security White Paper ("Bericht 90"). To contribute to international stability in Europe was declared to be an aim of Swiss security policy. The report also prominently advocated expanding multilateral peace policies in Europe. Since then, Swiss security policy stands for more than just military policy. This time, noble words were followed by concrete action, including Swiss accession to the NATO-linked Partnership of Peace (PfP) and Swiss chairmanship of the OSCE in 1996. In addition, Switzerland joined UN sanctions against Iraq, former Yugoslavia, and Libya, and it actively contributed to military peacekeeping operations in the Western Balkans.

The conceptually most stringent White Paper ("SIPOL B 2000") was published in 1999 under the slogan "Security through

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Cooperation". Peace-building, crisis management, and participation at the international level became more and more prominent. The guiding principle of "Security through Cooperation" was already mentioned in a Swiss foreign policy report in 1993, albeit rather casually and hidden in an annex on neutrality.

The 2010 White Paper: Plenty of Politics, but Little Strategy

In retrospect, the 2000 White Paper, the green light from Swiss voters for arming Swiss soldiers in peacekeeping missions in 2001 as well as the narrowly-endorsed Swiss membership of the United Nations in 2002, already marked the beginning of the end of a brief post-Cold War interlude when Swiss security policy was marked by a high degree of internationalism. As a result of the 9/11 terrorist attacks in the US and the resulting global fight against al Qaeda, right-wing conservatives increasingly criticised both the cooperative security approach with its emphasis on foreign military missions, as well as the planned transformation of the Swiss armed forces. The prevailing 2010 Security White Paper ("SIPOL B 2010") was criticised by experts because it focussed more on domestic feasibility than on strategic necessity. In the drafting phase, deep trenches between the foreign and defence ministries became public. In the final compromise version, however, the government confirmed international cooperation as the best approach to deal with modern security challenges, even if this path has become much more controversial domestically since 1999.

At the same time, the 2010 White Paper expanded the notion of security policy to include the field of everyday violence and integrated cantonal police work into national strategy. Because there is a lack of border guards and police personnel – police density in Switzerland is very low compared with European norms – the Army increasingly assumed internal security tasks to support civilian authorities. Finally launched as "Swiss Security Network" (SSN) in 2013, this domestic cooperation was much more strongly emphasised in the 2010 White Paper than international security cooperation. Yet the exact division of competencies, particularly during a crisis situation, remains contested between the national government and the cantons.

Despite heated debates on the future course of Swiss security policy, there was a great deal of continuity from 1990 to 2010 and beyond. However, 2014 marked a clear caesura in European Security that also impacted Switzerland.

Photo: dpa

Russian soldiers in Crimea: The Ukraine Crisis marked a clearly negative turning point for European Security.

Hybrid Warfare: Switzerland and Putin's Russia

As OSCE chair, Switzerland played a prominent role in 2014 within international efforts to de-escalate the Ukraine Crisis. Swiss diplomats achieved some notable successes. On the one hand, all 57 OSCE member states agreed on deploying a civilian field mission to Ukraine in March 2014. Swiss President Didier Burkhalter personally succeeded in convincing Vladimir Putin over the phone that such an observer mission would also protect Russian minorities in Ukraine. Previously, Moscow had been strictly opposed to a role of the OSCE in the Ukraine conflict. Moscow's consent to the independent "eyes and ears" of the international community in Ukraine was thus a decisive success for Swiss diplomacy. On the other hand, the Geneva Agreement of April 2014 as well as the "Swiss Road Map", entailing a cleverly constructed sequence of desired steps up to the Ukrainian presidential elections, were additional constructive Swiss contributions to international crisis management efforts. Starting in June 2014, Swiss diplomat Heidi Tagliavini also maintained dialogue with Moscow, Kyiv, and the pro-Russian separatists leading to the Minsk ceasefire agreements of September 2014 and February 2015.

Thus, Switzerland played a useful role in the Ukraine crisis. Because Switzerland is neither a member of the EU nor NATO, it is more trusted by all the conflicting parties. Switzerland put the previously- forgotten and often neglected OSCE back on the map, even if the Ukraine Crisis simultaneously marked a clearly negative turning point for European Security. Putin enforced Russian interests with military means and bid farewell for the foreseeable future to the vision of common security in Europe. For Switzerland, this was bad news. As a small and neutral country, Switzerland is particularly dependent on the respect of international principles and rules.

The Ukraine Crisis also put in question Switzerland's fledgling concept of non-European strategic partnerships. Since 2007 Switzerland cultivated a strategic partnership with Russia, which was largely suspended after March 2014. Switzerland condemned Russia's annexation of the Crimea and united behind Western sanctions against Russia – while at the same time carving out a position independent

Photo: MoD Switzerland

Press Conference on the occasion of the presentation of the 2010 Security White Paper

from the US and the EU. Yet, for the future direction of Switzerland's security policy, the thorny question needs to be answered sooner or later whether the country should continue to mediate between Russia and the West – or whether it should come out more strongly in its support for Western values. The difficulty of Switzerland's peculiar role was illustrated by the controversy over CHF 90 million worth of arms exports granted to Russia in the autumn of 2014 –just when the war in East Ukraine reached its critical stage.

Photo: UN

The envisaged Swiss candidacy for a seat on the UN Security Council in 2022-23 is currently supported by an overwhelming majority of the Swiss citizens.

Switzerland's military threat level was largely unaffected by the Ukraine Crisis since a direct military attack by any State against Switzerland is not to be expected in the next 10 to 15 years. Yet, recent evolutions in NATO and also in like-minded European NATO partner countries such as Sweden and Finland need to be attentively followed from a Swiss perspective. Interestingly, the Ukraine Crisis led to a further rapprochement of Sweden and Finland with NATO. NATO itself, after the long Afghanistan decade, refocussed again on collective defence and Article 5. The Alliance is intensively discussing how to respond to Russia's hybrid warfare and how to avoid a Crimean scenario from unfolding in the Baltics.

Global Terrorism: Switzerland and Jihadism

The rapid rise of Islamic State (IS) in 2014 marks an even more important milestone for Swiss security policy. Previously, the Federal Council identified the phenomenon of Jihadism as a ubiquitous threat for Switzerland, but at the same time always stressed that Switzerland was not a direct target of al Qaeda. The 2010 White Paper even emphasised that the present world was not fundamentally different from ten years ago (i.e. before 9/11) and "not necessarily more dangerous".

Indeed, Switzerland was significantly less affected by Islamic fundamentalism than other Western countries. The degree of radicalisation of young Muslims in Switzerland was identified in a 2013 ETH study by Lorenzo Vidino as being rather low for four reasons. First, there was no hotbed of radical Islam in the country. There never was a mosque in Switzerland that advocated Jihad, nor was there a geographically closely limited area from which Jihadists operated. Second, most Muslims in Switzerland are well integrated. Third, 90 percent of Swiss Muslims have their roots in the Balkans or in Turkey where Islam is traditionally interpreted in a more tolerant and apolitical way than elsewhere. Fourth, Switzerland's neutral foreign policy also helps since the country is less exposed to the world stage than other Western countries.

In May 2014, the Swiss Intelligence Service (FIS) still characterized the terrorist threat level as hardly changed. A few months later, however, the issue of "foreign terrorist fighters" rapidly climbed up the agenda of European security policy. Jihad-motivated travel movements from Western Europe to conflict areas significantly increased, including from Switzerland. By the end of 2014, the FIS was aware of 62 people who had traveled to Syria, Iraq, Afghanistan, Pakistan, Yemen, or Somalia since 2001. In May 2013, there had been merely 20 foreign fighters.

When it became public in September 2014 that a Swiss Islamic State cell had planned a terror act, the topic of foreign fighters dominated the headlines for weeks and parliamentarians fell into a hectic pace. Subsequently, the Federal Council set up a task force to implement measures to prevent potential foreign fighters from departing from Switzerland and committing crimes after their return. In its first report, the task force concluded in early 2015 that even domestically radicalised individuals could become terrorists, even without having travelled to a conflict zone. To deal with Jihadi travellers, Switzerland has accelerated the exchange of information between concerned domestic services. In addition, the FIS intensified preventive interrogations with potential Swiss foreign fighters. Further, a specific questionnaire was created for asylum hearings. Other potential measures still under consideration include the establishment of a hotline for concerned families or a possible travel ban.

The most recent FIS situation report of May 2015 emphasises that foreign fighters represent a concrete, serious security challenge for Switzerland. Due to the borderless Schengen area, the downside of the free movement of persons is that terrorists, too, can move freely in Europe.

Internationally, before the hype surrounding the issue, in 2013 Switzerland had already chosen the topic of foreign fighters as a priority of its OSCE presidency – and organised an international anti-terror conference in Interlaken in April 2014 to harmonise appropriate countermeasures within the OSCE framework.

Reflections on the "2016 White Paper": What Strategy for Switzerland?

Both Putin's revisionist foreign policy and the increase in Western Jihadi fighters have made it clear that Switzerland's strategic environment has dramatically changed since the release of the 2010 White Paper – and that, accordingly, a discussion on a potential update of Swiss security policy is needed. The Federal Council announced the drafting of a new Security White Paper in May 2013 and already organised expert

hearings in the autumn of 2013. Preparation of the fifth security policy report since 1973 was, however, postponed in the wake of the Ukraine Crisis and because of the rejection of the procurement of GRIPEN fighter jets by Swiss voters in May 2014.

Political struggles over the size and orientation of the Swiss armed forces have been ongoing since 1989. Also, the newest Army reform project ("Weiterentwicklung der Armee", WEA) is rather controversial, even among officers. Since 2008, the Swiss armed forces focus on probable missions – mainly subsidiary operations in support of civilian authorities. The transition between support for civilian authorities and conventional defence is becoming more fluid. The Crimea scenario thus ultimately confirmed the Army leadership in their accentuation of current Army reform. The traditional defence task needs to be adapted to modern warfighting. Switzerland should no longer prepare for fictitious tank battles, but concentrate on protecting critical infrastructure – if necessary, also through combat by mechanised brigades.

Annual opinion polls on security trends published by ETH Zurich in recent years consistently showed that the Swiss remain bound to tradition. Some 95 percent of Swiss still wish to maintain neutrality. In addition, the urge for autonomy has always been ultra-strong. The most recent issue of the publication series ("Sicherheit 2015", May 2015) indicates that Switzerland's successful tenure as OSCE chairman has led to a renewed public support for an internationalisation of Swiss security policy. Public acceptance of EU (21%) or NATO membership (22%) significantly increased in 2014, though still clearly below majority. 78 percent think that Switzerland should act more as a broker in international conflicts. The envisaged Swiss candidacy for a seat on the UN Security Council in 2022-23 is currently clearly supported by 70 percent.

These are encouraging signs for the nascent 2016 White Paper. "Security through cooperation" is still considered to be the best, unrivalled security policy strategy for Switzerland – both in dealing with Putin's Russia as well as in fighting Jihadi terror in Europe. ■

Photo: dpa

The rapid rise of "Islamic State" in 2014 marked an important milestone for Swiss security policy.

The Swiss Armed Forces Today and Tomorrow – Mission and Future Development

Lieutenant General André Blattmann

Photo: Schweizer Armee

Switzerland's security environment is to a large extent similar to that of its neighbouring states and therefore characterised by a comparable set of menaces and threats. Nonetheless, generally speaking, Switzerland is a secure country. This is mainly the case because it is surrounded by friends and has a low crime rate.

The linguistic and cultural diversity of its society may play a role in this, as well as the fact that its citizens can participate in the political decision-making process through direct democracy. However, if Switzerland benefits from high-level security, it is also due to the presence and excellent work of the police corps and the Armed Forces. The Swiss Armed Forces are constituted on the principle of universal conscription and can be employed within the country at the request of and subordinate to the civilian authorities.

The Mission

A substantial crisis is likely to change this situation significantly. An insecure environment can have an instant effect on Europe. The Ukraine crisis, for instance, showed that so-called "conventional" military threats – characterised through the engagement of fighter aircraft, tanks and artillery –remain and are actually gaining importance in Europe. It further showed how modern warfare has developed. This includes operations such as cyber-attacks, (dis-)information campaigns, and the deployment of irregular groups and special operations forces.

These so-called "hybrid" threats are in the main not directed against the territorial integrity of a specific state, as was the case with conventional military attacks in the past. They would affect the functionality of a state – its political structure, its economy, its society – and not necessarily its territorial integrity. The result is a mixture of different forms of violence and activities involving unfamiliar, unconventional and covert terrorist activities in addition to the spectrum of thus far well-known military aggression. If violence against parts of the population and critical infrastructure becomes disproportionate the consequences could well be compared to those of a classic military attack. Indeed, it might have even stronger repercussions on a state's population and its cohesion than a conventional attack. Furthermore, the use of conventional materiel in response to such actions might no longer even be possible, as events in the Crimea have clearly shown.

This understanding of the threat is further explained in the "Security Policy Report 2010", Switzerland's current White Paper which serves as a basis for the future development of the Swiss Armed Forces.

There are four areas of particular importance, especially with regard to the current understanding of modern conflict:

- **Be informed.** This includes intelligence services capable of collecting the necessary information in time, as well as military reconnaissance and troops which can supply data independent of threats and situations. The State must be capable of retaining information supremacy even during attacks that are especially directed at communication equipment.
- **Maintain high preparedness.** During the Cold War the Swiss Armed Forces had a system allowing large numbers of conscripts to mobilise directly from their civilian lives in a very short time. This sys-

Images: Schweizer Armee

The threefold mission of the Swiss Armed Forces entails defence, support of civilian authorities and peace support.

Author

LtGen André Blattmann has been the Chief of the Swiss Armed Forces since 1 March 2009.

Planned Performance Profile

PERMANENT

- Retention and further development of capabilities to avert military attack
- Retention of air supremacy with sensors and conventional air-policing
- Basic performance missions (support to civilian authorities, communications networks, logistics, first aid, etc.)

FORESEEABLE

- Protection of conferences and significant objects with 8,000 service members
- Retention of air supremacy with increased air policing with 2,500 service members
- Within days: overseas assistance / contributions to humanitarian aid
- Within weeks to months: peace support with up to 500 service members

UNFORESEEABLE

- Complete spectrum of missions (disasters, terror threats, etc.)
- Graded preparedness:
  - Within hours first intervention forces in theatre (long-term service members and professional units)
  - Within 24hrs-96hrs with approx. 8,000 service members
  - Mission fulfilment with up to 35,000 service members within 10 days

Performance profile: "With the Future Development of the Armed Forces we are specifically defining the exact performance requirements as well as the lead time for each of them."

tem had largely been abandoned, after it was thought that conventional threats had subsided. In order to meet the increasing requirement for rapid deployment, the Armed Forces will reintroduce a higher preparedness by supplying the necessary training as well as defining units which are to be fully equipped at all times.

- **Protect Command Networks.** In order to maintain command and control capabilities at all times, including during power cuts or cyber-attacks, an independent command network must be established. Constant efforts to modernise this equipment must be undertaken.
- **Ensure robust materiel.** The hybrid battlefield does not replace the conventional threat but only widens the spectrum. Therefore, troops must still be capable of holding and regaining ground or strategic objects with robust combat materiel.

The "Future Development of the Armed Forces" in Switzerland is based on these elementary concepts. Military reform is currently under political debate and is supposed to be implemented from 1 January 2017.

The reform encompasses the following benchmark figures:

- Retaining the system of universal conscription and mandatory service;
- Strength of the Armed Forces: 100,000 service members;
- Budget is planned with CHF5 billion per annum;
- Missions remain identical i.e. defence, support of civilian authorities, peace support.

Future Development

The Future Development itself contains four focal points:

- **Increasing preparedness**
  - Re-introduction of a mobilisation system for the entire Armed Forces;
  - New preparedness system in order to enable the Armed Forces– even in unexpected events – to immediately call up and rapidly deploy fully equipped troops;
  - Newly designated high readiness conscript units to supplement and support already-deployed forces.
- **Improvement of cadre training**
  - All future leaders are to attend full-length recruit training (duration 18 weeks);
  - Important and practical leadership experience will be obtained by going through the ranks;
  - Extension of pre-exercise briefing to promote leadership skills and improve practical refresher course preparation;
  - Additional and regular cadre training in technical/tactical courses.
- **Fully equipped operational units**
  - Reduction of the size of the armed forces and re-allocation of equipment will permit fully equipped units, in particular pertaining to operations in support of civilian authorities;
  - High readiness conscript units will be rapidly equipped with dedicated materiel.
- **Regionalisation within the country**
  - Flexible, rapid and operation-tailored support of civilian authorities by the territorial divisions. They will plan and conduct disaster relief, security and support operations and – in a defence scenario

– also carry out protective and security tasks in their area of responsibility;
- Reinforcement of the territorial divisions through organically subordinate battalions.

To sum up, the Swiss Armed Forces will attain a higher degree of preparedness and become an inventory of modern materiel and higher training standards in the coming years.

The process of the future development of the Armed Forces is accompanied by an updated and partly accelerated system of arms procurement. A more detailed account of the Swiss procurement process is supplied in the articles published by the Swiss procurement agency armasuisse. From the Armed Forces' perspective three points are especially important:

The increased budget of approximately. CHF 5 Bn per annum allows us to increase the procurement ratio up to 40%. If we succeed in retaining the proportion at that level the military's technological standards can be progressively increased. The procurement process must allow a more swift acquisition of materiel in the future.

A credit frame of four years allows the Armed Forces to handle procurement planning more flexibly and to use their resources more efficiently and effectively.

The armament procurement programmes lay an emphasis on the required capabilities of the future Armed Forces structure as follows:

- **Command and control capability:** with the procurement of a new generation of communications equipment suitable for handling large amounts of data, we will be able to retain secure and mobile command and control capability. The modernisation and extension of our protected command network will ensure command and control capability including in crisis situations.
- **Air defence:** the procurement of new fighter aircraft to replace the F-5 fleet was rejected by the Swiss population in 2014. In a first phase we are now placing emphasis on the modernisation and procurement of a ground-based air defence system (including a missile defence system). We are further upgrading the existing fleet of F/A-18 aircraft. The procurement process for new fighter aircraft will be resumed in the next few years.
- **Selective modernisation of ground materiel:** we plan the acquisition of vehicle-based mortar systems for precise fire support of combat units, as well as to procure replacements for the fleet of armoured combat vehicles and of mobile anti-tank defence systems (including ammunition capable of destroying hardened structures). Regionally-deployed infantry battalions will be equipped with modern materiel in order to enhance their combat capability.

In order to take part in ensuring security in Europe we will continue to implement our concept of armed neutrality. In fact, with the 200-year anniversary of the Congress of Vienna in 1815, we are celebrating this year the founding of this concept as well as its recognition within international law. Today, armed neutrality in essence means that Switzerland is committed to ensuring security as a full member of the international community. The Swiss Armed Forces are proud of their tradition of peace support missions. Swiss service members are deployed at the Korean demarcation line, and in Kosovo and in Bosnia-Herzegovina. They support UN military observer efforts and humanitarian demining programmes in different regions of the world. Moreover, Switzerland strives to fulfil its role as a state in Europe and ensures that no danger for others comes from within its boundaries. Critical infrastructure will be protected and Swiss territory will not be used as a starting-point for aggression of any kind. Due to its central geographical location in Europe several vital transportation axes lead through Switzerland. This is of high significance for modern and mobile societies. Switzerland will continue to perform its duties and to make its contribution to peace and stability in Europe as well as for security and freedom. ■

Data Fusion with iVeNet

With the increasing challenge of symmetric threat scenarios the protection of personnel and material requires early reconnaissance to identify hazards. The recent years have seen a continual rise in the number of new reconnaissance and peripheral weapon systems, a trend that has both improved the capabilities of military systems and provided better protection for the soldiers. However, new reconnaissance and sensor systems integrated into military vehicles and upgrades to those already installed present crews with the challenge of switching back and forth between a range of different display systems and interfaces – potentially resulting in a failure to identify key information and incorporating it timely as part of the decision-making process. Besides, the frequent lack of interoperability between existing and/or newly integrated subsystems often results in information to be communicated through the operator and, in a crew situation, often via shouted orders. If a vehicle crew only consists of a driver and a commander, it is almost impossible to register the vast amount of information provided by the subsystems, hampering rather than improving dedicated system operation.

Additional challenges associated with the subsystems can be expected in the future. These may involve ergonomic aspects of vehicle operation being compromised, given the increased number of individual operator units that need to be used at the operator's station. There is also the potential for regulatory problems because of difficulties in adhering to mandatory safety clearances – as well as integration issues due to limited installation space in vehicles. Another consequence is an increase in training times because of the autonomous operating concepts of the subsystems.

iVeNet (Intelligent Vehicle Network) from Krauss-Maffei Wegmann (KMW) is a system solution that addresses these weaknesses. It links any sensor data that is available using the CENTURION i7 computer unit from ATM ComputerSysteme GmbH (ATM), and displays information in an ideal format via the cross-functional software interface. iVeNet enables the system operator to display and operate a range of vehicle systems and sensors using a single, intuitive interface.

With this solution, crew reaction times can be improved significantly. The sensor data of the heterogeneous subsystems are centrally processed in an interface, and additional information from other workstations in the vehicle is also provided – ensuring that the vehicle commander is continually able to retrieve reconnaissance information at his or her workstation from an adapted weapon station, and then records it and passes it on based on an assessment of the situation.

The aggregated overview created by iVeNet enhances the crew's situational awareness.

The CENTURION i7 computer unit collects and combines the signals provided by the subsystems, processes these into information that can be used immediately, and makes them available for the cross-functional display and for operation on the ATM VistaMaster display. The computer features an integrated digital video converter and a gigabit switch for this purpose. In addition to the standardised software interface, the standardised operating keys for the VistaMaster display ensure that soldiers always work under the same operating conditions, regardless of the vehicle or workstation.

The fact that iVeNet is a modular upgrade solution means that all subsystems can be combined to form what can genuinely be regarded as a complete system, with no changes to or impact on the systems that have already been integrated. The result is a user-oriented, standardised operating concept across several classes and types of vehicles. The system architecture remains open to allow the use of additional workstations and the future integration of new subsystems.

In the German Army, iVeNet has been introduced as a QBA ("Querschnittliche Anzeige und Bedienung", meaning "cross-functional display and operation") system by the German Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw), and installed in vehicles like the DINGO 2, EAGALE IV and IVECO TRAKKER ZLK 15t.

(Photo: KMW)

VistaMaster 15'' with iVeNet user interface

ATM's CENTURION i7 computer unit

(Photo: ATM)

armasuisse – the Swiss Armed Forces' Procurement Organisation

Martin Sonderegger

armasuisse is the central procurement organisation for the Swiss Armed Forces. As a civilian administrative unit, the Federal Office for Defence Procurement (armasuisse) is one of seven groups or offices within the Federal Department of Defence, Civil Protection and Sports (DDPS). It covers a wide range of activities, from the procurement of complex systems and goods and the provision of technical and scientific services to the construction, management and sale of military real estate.

The DDPS, or Federal Department of Defence, Civil Protection and Sports, is more than just the Swiss defence ministry: In addition to the administrative units already mentioned, the DDPS – the largest of the Confederation's seven departments – also includes the Federal Intelligence Service (FIS), the Federal Office of Topography (swisstopo), and the Federal Office for Defence Procurement (armasuisse).

Martin Sonderegger

What is armasuisse?

Although personal items of military equipment, procured by armasuisse on behalf of the Swiss Armed Forces, can be found in every Swiss household which includes either a militia soldier liable for active duty or one assigned to the reserve, the procurement organisation itself is probably the DDPS area least well-known to the public. And this is true even though the organisation covers a wide range of activities.

armasuisse is the federal government's centre of excellence for the procurement of defence and security technology, for public tendering procedures, for technical and scientific services, for the procurement of goods in accordance with the federal government ordinance on public procurement procedures, and for managing the DDPS' real estate.

Behind this fairly dry and technical description is an organisation with extraordinary know-how and a broad remit.

A workforce of some 700 civilians based at 14 different sites within Switzerland and at two branch offices in Brussels in Belgium and Washington in the USA are employed producing tailor-made solutions for their very demanding main military customer, the Swiss Armed Forces, as well as for other federal administrative units, national security cooperation partners, and external non-government customers.

The organisation is divided into different units, each responsible for a particular subject area.

Procurement

Procurement consists of four Competence Sectors, one for each of the following capabilities:

- Command & Control and Reconnaissance Systems,
- Land Systems,

Photos: armasuisse

The Pilatus PC-21 serves as a trainer aircraft for F/A-18 HORNET pilots.

Author

As the Head of armasuisse **Martin Sonderegger** is the Swiss National Armament Director

- Aeronautical Systems and
- Purchasing & Cooperations.

In addition to carrying out unbiased evaluations, procuring equipment in good time and at reasonable cost, commissioning repair and maintenance work, and selling or disposing of technologically complex systems and materiel, armasuisse also encompasses the centre of excellence for the WTO tendering procedure. These areas of armasuisse procurement expertise are complemented by 'Science and Technology' and 'armasuisse Real Estate', two further areas with specific expertise and know-how.

Science and Technology

As the technology centre for the DDPS, Science + Technology (S+T) is responsible for technology management and for advising on matters relating to the minimisation of technological and financial risk. S+T, together with a network of experts drawn from universities and industry, engages in specific applied research to identify and evaluate technological development with the aim of ensuring that the Swiss Armed Forces are in possession of the appropriate technologies at the right time.
S+T also tests and assesses the operational and functional effectiveness plus the safety requirements for current and future systems for the Swiss Armed Forces and our other customers.

armasuisse Real Estate

The real estate division within the DDPS is one of the largest real estate management organisations in Switzerland, responsible for some 13,500 facilities or installations and 24,000 hectares of land. In its role as the property owner's representative, armasuisse Real Estate manages a broad and diverse infrastructure portfolio on behalf of the Swiss Armed Forces and offers both our internal and external customers a comprehensive range of real estate services from a single source.

Armaments Procurement – the Backbone of our Work

The core activity undertaken by the four procurement areas is the actual procurement of systems, goods and services. The armaments procurement process can be illustrated by describing each of its six clearly defined phases. These phases are, of course, further sub-divided and have precisely defined project milestones. De-

The procurement of the GRIPEN E as a successor of the dated F-5 TIGER was cancelled following a national referendum about funding of the programme. The Swiss Air Force continues to have a requirement for new combat aircraft.

pending on the phase, different input will be required from the relevant Swiss Armed Forces decision-makers, from politicians, and from procurement specialists.
The armaments procurement process consists of the following phases:

1. Project planning
2. Evaluation
3. Advising Parliament
4. Procurement and service introduction
5. In-service use
6. Decommissioning.

Project planning
Capital expenditure planning for the Swiss Armed Forces is geared to maximising capability. This means that longer-term projects – generally over two legislative periods – are implemented through medium to short-term implementation plans. The master plan produced by the Armed Forces Staff is the authoritative document as regards the main focus for capital expenditure. This master plan forms the basis for the Swiss Armed Forces' needs, and it is from these documents that the military requirements for the systems which are to be procured are ultimately derived. This phase concludes with a written project brief to armasuisse.

Evaluation
The Swiss Armed Forces and armasuisse work closely together during the evaluation phase. If a new system is to be procured, integrated project teams start

As a standard radar-guided weapon the AMRAAM AIM-120C-7 medium-rang air-to-air missile is subject to procurement to replace the Swiss F/A-18C/D's dated weaponry.

armasuisse – the Organisation's Structure

armasuisse covers a wide range of activities with the following Competence Sectors:

- Resources & Support – a classical cross-departmental area encompassing corporate development, finance, communications, external relations, personnel and infrastructure, legal affairs/transport and customs, and information technology;
- Land Systems;
- Command & Control and Reconnaissance Systems;
- Aeronautical Systems;
- Purchasing & Cooperations;
- Science & Technology;
- armasuisse Real Estate.

Each Competence Sector has a structure tailored to meet its particular tasks and is sub-divided into specialist areas. These include, for example, specific specialist areas such as 'Heavy Land Systems' (tracked vehicles), 'Flight Testing' (incl. evaluation or aviation certification), 'Communication Systems' and CC WTO (public tendering procedures). In addition to these capability-related specialist areas, the corresponding commercial, quality management and resource management specialist areas, as well as some separate project-related specialist areas such as 'BODLUV' (the ground-based air defence 2020 project), also contribute to the successful execution of the armasuisse mission.

armasuisse Real Estate and Science and Technology occupy a special position. As so-called 'FLAG' offices (this German acronym stands for 'Independent management model including performance mandate and global budget'), they have greater freedom of action.

armasuisse has a workforce of roughly 700 and also acts as a training establishment for young people employed in commercial and technical professions.

from the project brief, drawing up a market analysis and inviting various manufacturers to take part. The input from the manufacturers is then examined and analysed against the technical, commercial and military requirements. From a long list, the project term will arrive at a short list. This will usually include three or four suppliers, various aspects of whose products will then be tested in greater detail. Their life-cycle costs and subsequent upgrade potential will be important factors. If the Armed Forces confirm that one or more systems are suitable for use by units, armasuisse will then – in consultation with the Swiss Armed Forces – decide which system to choose. During the important evaluation phase, politicians are kept informed at first hand by the relevant committees.

Advising Parliament

Major armaments procurement projects are aggregated in a Federal Council bill. This bill, known as the Armaments Programme, is presented to the Swiss Parliament for deliberation and ratification. Smaller arms procurement projects are financed by other credits which are also submitted to Parliament annually. Once the credits are authorised, contracts can be signed with the manufacturers and the systems or the equipment items procured.

Procurement and introduction into service

Once procurement is complete and the system has been handed over to the user ('Fit for Mission') and its introduction into service has begun, responsibility for the project passes from the procurement organisation to the Armed Forces.

In-service use

After handover, the systems are in operational use with responsibility for their maintenance and repair resting either with the user or with commercial firms under long-term contracts. Depending on a system's useful life, combat effectiveness enhancements (further evolution) or service life extensions may be necessary during the in-service phase. Such considerations are initiated by the Swiss Armed Forces and, once a decision is taken and finance assured, set in motion by armasuisse.

Decommissioning

When a system's service life approaches its technological, operational and/or economic end, it will be designated as obsolete by the Chief of the Armed Forces. armasuisse then takes on the task of decommissioning it on behalf of the Armed Forces.

This means that the system will be sold, re-used or recycled.

Once a system has been decommissioned, it is no longer in operational use by the Swiss Armed Forces. For this entire length of time, the project has followed

Twelve bridgelayers were procured to improve land mobility.

a clearly laid down process; and toward the end of its useful life, the Swiss Armed Forces staff will put forward a proposal for a system to succeed it. The process starts anew.

Working with Conflicting Interests

As it performs its mission in an area where the interests of the public, politicians and industry may conflict, armasuisse – like every other procurement organisation – is in the spotlight in many ways.

At the end of any procurement process there is one 'winner' and a number of 'losers'. Against this background, it is important that every phase of the procurement process is conducted with transparency and that decisions are traceable: Both the national and international armaments procurement and security industries are under pressure to succeed.

It is important, therefore, that armasuisse undertakes a comprehensive and serious evaluation because any procurement organisation must assume that one day a different procurement contract will be concluded with the 'runner-up'. This calls for a relationship based on mutual commercial trust.

Networking as the Key Success Factor

armasuisse works closely with Swiss and foreign industries. As a consequence, armasuisse enjoys an extensive, well-established network of relationships with manufacturers throughout the world and is in close contact with internationally active procurement organisations. In its role as the country's central procurement agency, armasuisse actively provides the link to the Swiss security industry. A strong domestic and international network is a central success factor for armasuisse and its customers.

Since the federal government's armaments procurement policy considers any home-grown developments financed by the Swiss state to be the exception, most major military systems can only be procured from abroad. In such instances, armasuisse ensures through its policy of industrial participation that Swiss industry benefits from an appropriate degree of direct and indirect involvement.

Employees as the Decisive Factor

Complex and challenging tasks demand highly-qualified and experienced staff.

Important Ongoing Procurements

A selection of some currently ongoing procurements from the armaments programmes of recent years:

- Light all-terrain motor vehicle – Mercedes G 300 CDI 4x4
- Bridgelaying system on the LEOPARD main battle tank chassis
- 45-meter support bridging system
- AMRAAM AIM 120C-7 air-to-air guided missile
- PC-21 jet pilot training system
- New vehicle generation (more than 2,000 trucks and other vehicles)
- Armoured personnel carrier (GMTF)

Many of our employees possess extensive and unique technical expertise and market knowledge, some of which can be found nowhere else in Switzerland except at armasuisse.

A depth of knowledge about currently available and future technologies and materials plus long-term relationships with domestic and international industry are characteristics which define our employees and experts.

This know-how makes it possible for us to offer our customers advice, based on sound economic principles, on the choice of technologies, systems and materials as early as the requirement definition stage. Because of the demanding technical and project-related requirements, the proportion of armasuisse employees who are graduates from applied science universities or senior professional training institutes or who have a university or college degree is comparatively high (over 75%).

Main Focus for the Immediate Future

On 18 May 2014, the Swiss electorate voted against the so-called GRIPEN Fund Law. This halted the planned procurement of the Swedish GRIPEN fighter, which had been evaluated in the previous years as a replacement for the Swiss Air Force's approximately 35 year old F-5 TIGERs. Therefore, our efforts in the next few years will be concentrated on current procurement projects. Cancelling the procurement of a new combat aircraft means that other procurements which had previously been postponed can now be brought forward. Our main focus is now on ongoing projects enabling these technologically extremely demanding systems to be procured and handed over to the armed forces on time and in a professional manner.

A further change to the procurement process relates to our collaboration with industry. Not least due to lack of capacity in the procurement area, industry is to be involved in the process earlier than was the case in the past. Industry will not adopt the role of decision-maker but will act as a resource. Specifically, this means that it will be involved as early as the development phase. The intention is to accelerate procurement. However, significant decisions will still be taken by armasuisse, which will continue to bear procurement responsibility. ■

With the procurement of more than 2,000 tactical vehicles between 2011 and 2015 the Swiss Army is in the process of modernising its vehicle fleet. Thanks to multifunctional designs the number of different vehicle types can be reduced.

"The military and civilian sides of the business complement each other superbly."

Interview with Urs Breitmeier, CEO RUAG Group

ESD: What are the core competences of your company, and how are they portrayed in the company's structure?
Breitmeier: RUAG develops and markets internationally sought-after technology applications in the fields of aerospace and defence for use on land, in the air and in space. This applies to the group with its five divisions (Space, Aerostructures, Aviation, Ammotec and Defence).
The corporate strategy comprises three strategic thrusts: combining civilian and military technologies, focusing on the core business (aerospace and defence), and international growth.

ESD: What are your current turnover figures and employment numbers? Who are the shareholders of your company?
Breitmeier: RUAG can look back on a strong financial 2014. Net profit grew 7.5% to CHF102 million. All five divisions operated profitably and contributed to the positive group result. Around 8,100 employees – of whom 410 are trainees – generated sales of some CHF1.8 billion. 57% of RUAG's products and services are destined for the civil market and 43% for the military market. Outlays for research and development rose to a total of CHF140 million.
RUAG is a joint stock company wholly owned by the Swiss Confederation. The Swiss Federal Department of Defence, Civil Protection and Sport (DDPS) exercises the Confederation's shareholder interests.

ESD: What is the ratio/percentage of domestic vs. export business?
Breitmeier: The percentage of international business increased again, reaching a new high in 2014 of 63% (61%).

ESD: Which export markets are currently of particular relevance?
Breitmeier: The primary growth region in 2014 was Europe (except Switzerland), with orders in business aircraft MRO, aerostructures for Airbus and sales of simulation systems. The French company GAVAP, acquired at the end of 2013, contributed a substantial portion of the latter. RUAG saw significant gains in North America as well in the space business, aerostructure orders for Bombardier and the growing sport shooting market.
The growth markets are in the USA and especially the Asia / Pacific region. In order to preserve and enhance our technological expertise, we will need to expand our market position outside as well as inside of Europe.

ESD: For the first time RUAG has made an appearance at the CeBIT exhibition this year. What was your motivation to present yourself in this business segment? Which solutions can you offer? Which division is responsible for this area?
Breitmeier: RUAG Defence was part of the Swiss Pavilion and presented for the first time its cyber security solutions to the civil market. Cyber attacks over networks, manipulation, espionage and cyber terrorism are issues that are increasingly making headlines. Secure information and communication systems are one of the biggest challenges for companies and organisations. Our cyber security portfolio offers greater protection for our clients' data through inspection, event analysis and decision-making support. Our product portfolio is mainly addressed to telecommunication, energy, finance and transport organisations.

ESD: What are currently your most important defence programmes? Are any of these executed in international partnerships?
Breitmeier: RUAG Defence is currently integrating and maintaining over 100 C4ISTAR systems in Switzerland. It has an impressive reputation as a reliable supplier of complex systems for use by armed forces, police forces and rescue organisations. This expertise won RUAG Defence the contract to create a solution for mobile broadband communications for the command and control system of the Swiss Armed Forces ("FIS Heer") and to test it via a proof-of-principle trial.
A major success was also achieved by the new French subsidiary GAVAP. It was awarded a contract to act as a tier 2 supplier for a virtual simulator in a project for the French Navy. In addition, RUAG Defence acquired a number of live simulation projects and orders in the Middle East, Germany and France.
Furthermore a significant area of international activity is ballistic protection. Here, the division was able to secure orders for roof protection systems for the German PUMA infantry fighting vehicle and for complete protection for the PANDUR wheeled armoured personnel carrier in several countries in Northern and Western Europe.

ESD: Are you happy with the current capabilities and operations of the company? What are your objectives for the short- and medium-term future?
Breitmeier: RUAG is an exciting business which is developing at a fast pace. We are on the right track. The military sector is where our group has its roots. This area will never be jettisoned. Besides, the military and civilian sides of the business complement each other superbly. There are a number of synergies we can exploit. For example in the areas of aircraft maintenance or ammunition. And in the case of Aerostructures and Space, we are pursuing ambitious growth targets. In this process, we are looking above all at prospects and big opportunities in the USA. In the Middle East we will continue to expand our structures, in part to meet the offset requirements. And in the Asia-Pacific region, we intend to strengthen our presence in order to be able to develop these markets adequately. ■

The questions were asked by Peter Bossdorf.

The Fundamentals of the French Air Force

Eric Martin

It takes two numbers to understand today´s Air Force: three missions and five core capacities make the French Air Force a powerful instrument that serves the nation.

Three missions require responsiveness and permanent presence:

- **Deter:** Implement the airborne component of nuclear deterrence to defend the vital interests of the nation;
- **Intervene:** Quickly deploy forces, project force and power or provide assistance;
- **Protect:** Ensure the sovereignty of national air space and perform space surveillance. Protect populations, support public services.

Five core capacities are essential to all autonomous air actions:

- **Command & control:** Plan and oversee all air operations on, from, within and outside French territory;
- **Intelligence:** Collect and compile information to provide intelligence, make decisions and act;
- **Immediate intervention:** Act with immediate and quick response;
- **Force projection:** Project force to act immediately and far away;
- **Training:** Have airmen that are fully ready to perform their missions at all times.

Arming the Air Force for the Future

To ensure consistent combat capability, the French Air Force is working to integrate new weapon systems while adapting its operational doctrines and the training of personnel responsible for their implementation.

Over the last few months, numerous major weapon systems – for example A400M ATLAS, REAPER drones, new RAFALE fighter jet standards – have been introduced into the Air Force along with related doctrines for operation and training. As part of the "Unis pour Faire Face" strategic plan (United to Face Anything), the Air Force is continuing its efforts to modernise its combat capabilities in order to carry out all of its air activities in a consistent manner. These changes ensure the power and responsiveness of air forces as essential components of their on-going protection, deterrence and intervention missions. To fulfil its operational duties, the French Air Force relies on five modernised "core capabilities". Firstly, its ability to act immediately from air bases in France and abroad is being improved. Secondly, air forces will use new strategic and tactical transport vehicles and aerial refuelling aircraft with the scheduled arrival of the multi-role MRTT tanker, which will oblige us to reshape our projection concepts. The third core capability concerns the organisation of intelligence and the use of new equipment that ensures autonomous assessment of situations. The fourth cornerstone is the modernisation of air operations command and control assets. Finally, the last capability is focussed on changes to air force training and operational preparation.

Changes on the Way for the RAFALE

AESA radars, METEOR missiles, and AASM lasers. These are just a few examples of some of the major and essential technological changes that are shaping the future of the RAFALE in order to anticipate changes to the format of the Air Force's fighter fleet while continuing to fulfil its operational obligations.

Immediate intervention is a unique and essential capability that the Air Force brings to French defence. This has been proven from Libya to Mali with RAFALE being the first to go to such theatres within the first few hours following respective political decisions, thus determining the success of operations. To improve this capability and maintain the responsiveness of the combat tool modernising the flagship of the French Air Force is an on-going prior-

Combat aircraft	90 Rafale	23 Mirage 2000N	67 Mirage 2000D	38 Mirage 2000 S/C	6 Mirage 2000B	
Transport aircraft	6 A400M ATLAS	2 A340	3 A310	27 C160 Transall	14 C130 Hercules	27 Casa CN235
Mission support aircraft	14 C135FR/ KC135RG	3 E-3F	2 C160G			
Liaison and VIP aircraft	1 A330	2 Falcon7x	2 Falcon900	2 Falcon2000	15 TBM 700	5 DHC6
Formation and training aircraft	18 Grob 120	33 TB30 Epsilon	2 Cirrus SR22	77 Alpha Jet	23 EMB121 Xingu	
Display aircraft	12 Alpha Jet	3 Extra 300/330				
Helicopters	40 Fennec	11 Caracal	28 Super Puma/ Puma			
Drones	4 Harfang	2 Reaper		SAM systems	12 Crotale NG	8 SAMP-T

(Graphic: mawibo-media)

The variety of weapon systems for national defence and out of area operations

Author

Lieutenant Colonel Eric Martin is a member of the French Air Force and currently assigned to the Kommando Einsatzverbände Luftwaffe (GAF Combat Forces Command) in Cologne, Germany, as exercise planner.

(Photo: defense.gouv.fr)

The RAFALE multirole combat aircraft is the backbone of the French Air Force and capable to gain air superiority and to strike ground targets in one mission.

ity. As a reflection of the evolution of the format of the fighter fleet, the RAFALE has changed with time. Delivered to the Air Force in December 2004 with an "F2" standard (RAFALE B) and a fully multirole aircraft with standard "F3" since 2008, the fighter is designed to operate until beyond 2040. Among the most recent upgrades, the fourth production batch of the "F3.3" standard has been introduced with the AESA radar. The RAFALE will thus be the first European aircraft to integrate this latest generation system as standard equipment. The active electronically scanned array radar has roughly a thousand separate transmit/receive modules that give it twice as much range. It can detect fighter aircraft well over 100 kilometres away with a tracking capability of more than 60° on each side of the aircraft centreline. With increased reliability and resistance to interference, the radar provides better assessment of tactical situations and more serenity during air combat. Combined with the METEOR missile in the next version of the Rafale F3.R, the AESA will offer impressive air-to-air capability. It is a major step on the calendar of changes scheduled for the multirole fighter following the development contract awarded to the manufacturer by the Ministry of Defence on 30 December 2013. This long-range ramjet powered missile has an NEZ (No Escape Zone) that is roughly three times that of current missiles. The integration of this weapon will give the fighter decisive operational capability in the area of air superiority, particularly for "first-to-intervene" missions. It is truly a technological and capability revolution! Other major technological advances are also scheduled for the RAFALE F3.R.One of the most important items is the New Generation Laser Designation Pod (PDLNG), which will replace the DAMOCLES pod. Combined with the AASM (Armement Air/Sol Modulaire – Air-to-Ground Modular Weapon), which has proven its effectiveness in Afghanistan, during Operation Harmattan over Libya and Operation Serval in Mali, it will significantly improve target discrimination and engagement range. With the addition of a daytime channel that is not featured by current pods, it will provide airmen with precious assistance for target identification and designation. It is a logical development that stems from feedback from recent operations.

Moving Towards Self-Supported and Reactive Capabilities

To remain consistent, the French Air Force is relying on new projection capabilities that are essential to all missions, and the MRTT and A400M are two major components of this.

As a prime example of the French Air Force's ability to be the first in the theatre of operations, the raid in Mali on 13 January 2013 required five aerial refuelling missions using three C135s. "Tankers are the key to all our aerial refuelling operations. Without them, we would not have the responsiveness, reach or endurance needed to perform our deterrence and intervention missions. Without them, our fighter aviation would pretty much be limited to French territory and there would be no airborne deterrence component. Replacing them is a major priority!" affirmed Général Denis Mercier, the Chief of Staff of the French Air Force during a Senate hearing. As Général Vincent Carré, Deputy Chief of the Air Force General Staff's (EMAA) "Preparing the Future" Division explains, "the MRTT (Multi-Role Transport Tanker) is the top priority of the Air Force's materiel programmes. It is an essential part of the "Unis pour Faire Face" plan!" The fourteen aging C135s are now half a century old and pose a risk to maintenance logistics as they are frequently solicited and require many hours of maintenance. The White Paper on Defence and National Security (Livre blanc sur la Défense et la sécurité nationale) provides for their replacement with twelve MRTT aircraft. "The MRTT programme is the merging of C135s, A310s and A340s," explains Général Carré. "We are grouping our current 19 aircraft into just twelve multifunctional MRTTs that will perform deterrence and force, equipment and personnel projection missions. It is a critical necessity that was limited to the strict necessary."The delivery schedule for the new aircraft will require careful vigilance of the C135 fleet, as they will only begin to be phased out from 2020 when the twelfth and last MRTT is delivered. All our strategic transport capabilities will be stationed at Air Base 125 in Istres. As far as tactical projection capabilities are concerned, the C160 TRANSALLs are approaching the end of their service life. The Air Force is extending their operational service to overlap their retirement with the arrival of the A400M.

(Photo: Airbus)

The KC/C-135R/FR air-to-air tanker extends the reach of the French Air Force and will be replaced in the long run by the Airbus A330MRTT.

(Photo: Sirpa Air)

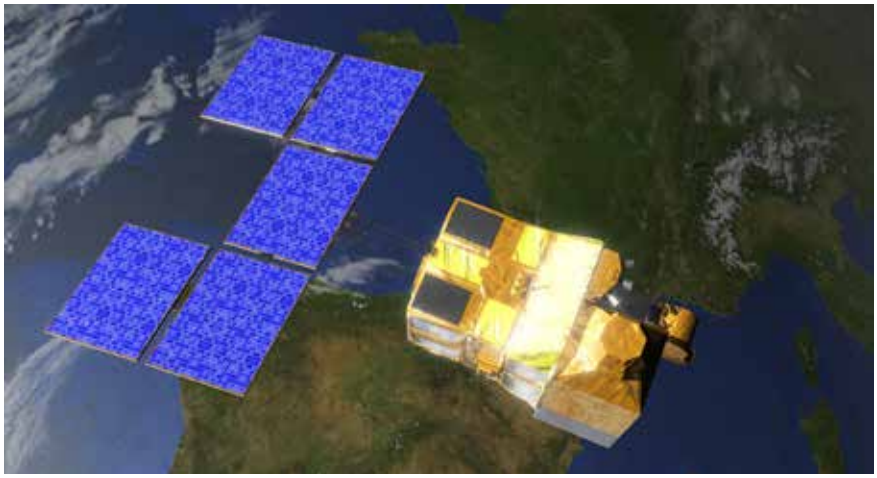
The E-3F Airborne Early Warning and Control System contributes to the production of the recognised air picture in the theatre of operation.

"But the A400M ATLAS is not just a simple replacement for the TRANSALL," iterates Colonel Michel Gallazzini, the Chief of the "Mission and Support Aviation" Division. "It falls into an intermediate category between the C130 and C17. It is a tactical aircraft with strategic reach. It will bring a new dimension to our transport fleet and guide it into a new era." It is a real advance in lift, range and speed capability. "However the A400M cannot perform the full range of missions within the Air Force," underlines Général Carré. "We therefore need to modernise the C130 HERCULES and find a successor by the time it will have finished completing its good and loyal service." Some missions, assigned for example to special operations, require this type of carrier for its sturdiness and discretion. "The modernisation programme is set to begin in 2015 so that an initial prototype is ready in 2018," explains Colonel Gallazzini. "It will include an avionics upgrade as well as improved capabilities that will enable it to perform special operations missions until 2030."The CASA CN235 fleet has already been reinforced with eight additional aircraft in order to compensate for the delay in the A400M deliveries. Smaller than the others, this fourth tactical transport aircraft participates in all overseas missions of the Air Force and external operations."We are currently broadening the tactical capabilities of the CASA," explains Colonel Gallazzini. "We are aiming to have equipment airdrop and high altitude airdrop capabilities by next year." In addition, to preserve the tactical skills of its transport crews and pending the full operational capability of the ATLAS, the Air Force will keep fourteen C160s in service until 2023. The development efforts for the Atlas continue. In September 2014, transport squadron 1/61 "Touraine" was officially reactivated with initial logistics operational capability. The Air Force is aiming at reaching full operational capability at some time in 2017 or 2018.

Improving Command and Control Expertise

The French Air Force is capable of directing complex air operations conducted on French territory and thousands of kilometres away. These capabilities rely on structures and equipment that are in the process of being modernised.
Modern air operations are not just limited to the simple combined action of military aircraft. They encompass a complex combination of planning, programming, control, surveillance and air traffic control. The Air Force has the independent capability to conduct operations at any time inside, from within or outside French territory. This precious know-how has been acquired through concerted efforts made over several decades and particularly through nuclear deterrence and air defence missions to protect national territory. Today, Lyon Mont-Verdun is the nerve centre of the Air Defence and Operation Command (CDAOA –commandement de la défense aérienne et des opérations aériennes). Its command and almost all its staff are in the process of being grouped together at Air Base 942. The underground structure in Lyon also houses the National Air Operations Centre (CNOA –centre national des opérations aériennes), and the Joint Forces Air Component Command (JFACC). Air operations conducted in Central and Western Africa are therefore commanded entirely from Lyon. Supported by highly trained specialists, this French version of the JFACC optimises permanent structures dedicated to the air safety mission and interministerial missions. To ensure the air defence of French territory and to constantly assess threats, the Air Force is equipped with high, medium and low altitude radars that are being modernised and upgraded to become more reliable. This intelligence gathering equipment is relayed to Detection and Control Centres (CDC – centres de détection et de contrôle) that will also be modernised. On air bases, air traffic services squadrons are undergoing metamorphosis with the widespread use of the CLA 2000 system. Several bases, including Avord, Luxeuil and Mont-de-Marsan, are now also equipped with PARNG radars. The Air Force has also purchased GM406 radars that will soon be put into operational service at sites in Kourou (French Guiana), Nice and Lyon. In addition, GM 403 and GM 200 radars with similar performance characteristics are also scheduled for procurement. In the field of airborne control, E-3F AWACS radar aircraft are being upgraded as part of an extensive renovation project. This Mid-

(Graphic: Airbus DS)



For six years the HELIOS 2B European military observation satellites have been providing France and other European partners with high resolution pictures.

Life Update should be completed in 2015. Once finished, the E-3Fs will be equipped with new capabilities while meeting regulatory requirements of the International Civil Aviation Organization (ICAO). This will provide aircraft with better tracking performance and a PC interface that will improve dialogues between operators and the computer. In addition to the significant modernisation of its detection equipment, the Air Force is involved in the development of NATO's Air Command and Control System (ACCS). As the structuring element of the French Air Command and Control System (SCCOA – système de commandement et de conduite des operations aériennes), 24 European NATO countries will eventually be equipped with the ACCS. It will provide France with the strategic depth needed to assess all air threats. Besides sharing a common tactical situation, ACCS centres will benefit from a wide range of real-time communication and coordination tools that will shorten the decision-making process and integrate data links and anti-missile defence. It is set to become operational at the CNOA in mid-2016, followed by the Detection and Control Centre in Lyon. It will then be put in place at the Cinq-Mars-la-Pile CDC by late 2016.

(Photo: Airbus Military)

The A400M will bridge transport capability gaps of the French forces.

Intelligence for Tomorrow

Air forces naturally play a major role in military intelligence. Modernisation of aircraft and equipment dedicated to this mission is programmed to ensure that national authorities are able to independently assess crisis situations.

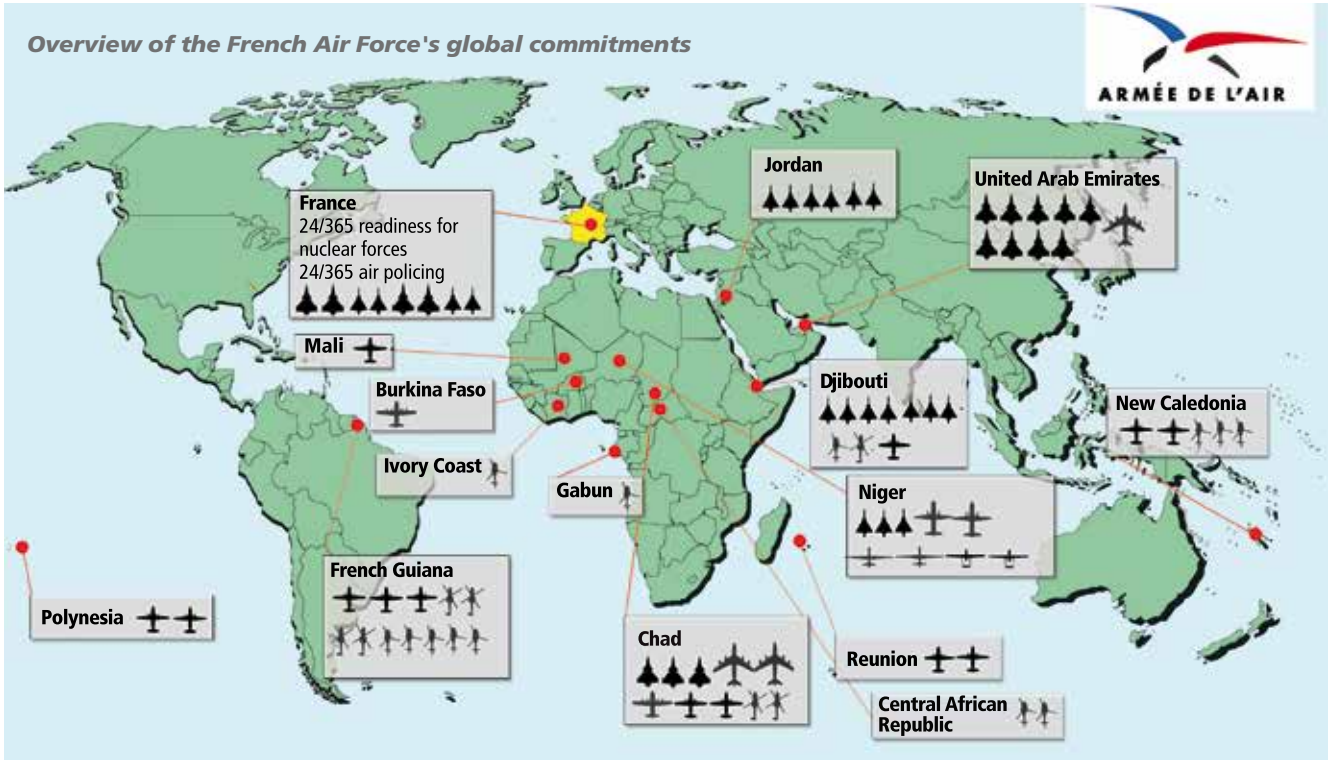
More than ever before, intelligence is at the heart of modern conflicts. The 2013 White Paper on Defence confirmed the crucial importance of this strategic function. Today, intelligence is essential to surveillance and intelligence information related to the opponents. It is also used for target identification and supporting special or conventional forces. In addition, it provides the staff with a map of the threat and battlefield damage assessments. At the heart of the "knowledge and anticipation" function, the Air Force has a natural ability to gather intelligence because it works in the entire spectrum of the third dimension. During Operation Serval, which began in January 2013, many air assets dedicated to ISR missions (Intelligence, Surveillance, Reconnaissance) were used: fighter jets (MIRAGE F1CR and RAFALE equipped with the RecoNG reconnaissance pod), transport aircraft (C160 TRANSALL and C130 HERCULES equipped with various sensors), and drones. Furthermore, images supplied by the HÉLIOS and PLÉIADES satellites were also used for operational purposes via the Military Satellite Observation Centre (CMOS – centre militaire d'observation par satellites), a joint Air Force element located at Air Base 110 in Creil. From 2014 to 2019, the French Air Force's intelligence capability will be enhanced with the acquisition of numerous new types of equipment. As part of this, four MALE (Medium Altitude, Long Endurance) drone systems comprising 12 air vehicles will also be ordered. Two REAPERs have been deployed to Niger since January 2014 to meet the immediate operational needs of French forces in the Sahel-Saharan region. With this new equipment, the Air Force is able to use high performance "wide angle" sensors capable of transmitting video images collected from the field, thousands of kilometres away, in real time. The REAPER drones continue the work along with HARFANG, which have been highly solicited since they were first deployed in overseas operations in Afghanistan in 2009.The French Air Force is also fully involved in work being carried out to create a future European drone. In its ongoing effort to modernise its capabilities, the Air Force will acquire light surveillance and intelligence aircraft (ALSR – avions légers de surveillance et de renseignement) in the near future as an addition to its crisis evaluation and monitoring component. These aircraft will join other intelligence-gathering assets and be shared with other national intelligence services. These ALSRs will be equipped with sensors and transmitting technology that will enable them to be used in anticipation and strategic watch missions as well as in force support phases. For this to take place, the aircraft that is selected must combine autonomy, discretion, low operating costs, the ability to fly at high altitudes and a long-range capability. Furthermore, when the fleet of C160 transport aircraft will be retired, the electronic surveillance capabilities of the recently upgraded TRANSALL GABRIEL will be taken on by a yet to be determined vehicle. As an essential aircraft that is present in all theatres of operation, the missions carried out by the GABRIEL will therefore be continued. The complementarity of these various new intelligence gathering equipment items and their increasing interaction with other specialised services are revitalising the organisation of intelligence in the Air Force. The traditional phases of gathering, assessing and compiling information are evolving and constantly shrinking the intelligence loop. For instance, studies have been conducted on the potential of having specialists dedicated to this mission aboard aircraft in 2020, in an upgraded version of the MRRT aircraft, to speed up the operational pace. Finally, today more than ever before, the role of humans is consolidated within air units dedicated to intelligence as it relies on the men and women who gather, analyse and use information. Using ISR capabilities on a permanent basis in real time does not reduce the size of organisations; it is quite the opposite. It takes many highly qualified specialists to analyse huge quantities of data collected with digital sensors and to supply the right intelligence at the right time.

Simplifying Structures: A Clearer and More Transparent Air Force

The final objective of simplifying and adapting structures is to build an air force based on the missions of air bases. The key to this is airmen, and placing them at the centre of a completely new organisation.

The "Air 2010" plan, a general revision of public policies and military programmes has been among numerous reforms that have played a role in the French Air Force's work to reorganise itself over the last decade.

From the creation of defence base support groups to the restructuring of certain units, the "Unis pour Faire Face" (United to Face Anything) motto has never been more appropriate. To accompany the full extent of these reforms, the Air Force Staff has introduced plans to adapt and simplify its structures to make them clearer and more transparent. Its objective: to guide the



(Graphic: mawibo-media)

transformation already undertaken while ensuring its position towards operational needs. Coherent organisations, command accountability at all levels, innovation in the way that the mission is understood and conceived, etc: These are the aims of the policy to bring about clarification, from the air base to the high command, including organisational commands, directorates and services. This reorganisation integrates the CAP 2016 modernisation process, which sets out to increase the control of maintenance in aeronautical operational condition around the SIMMAD (Integrated Structure for the Maintenance in Operational Condition of Air Equipment of the Ministry of Defence – structure intégrée du maintien en condition opérationnelle des matériels aéronautiques du ministère de la Défense). Furthermore, air forces and support forces will be united under one command. This summer, three air bases will see the creation of four wings that group together all the units contributing to the same mission to strengthen already existing ties. To a broader extent, as the combat tools where all operational and support activities are embodied to make missions possible, air bases will be restructured.

Making the Best out of Each Airman: People at the Heart of the Project

The performance of the French Air Force and the success of the "Unis pour Faire Face" plan depend on the quality and dedication of its military and civilian personnel. Airmen are at the heart of every decision and action. The men and women of the Air Force are the key to the "Unis pour Faire Face" plan. They are what guides its ambitions as the constant principle behind all its actions, like a duty that goes beyond numbers and material logic. When people are not implicitly implied in each of the directions of the project, they are the central focus of one of its driving missions, to make the best out of each airman. Combining innovation and a return to the basics, modernity and tradition, the "Unis pour Faire Face" plan strengthens the identity of the airmen and creates dynamics that give them a new meaning of their work. It opens the door to principled and coherent modernisation that begins by sharing the values embodied by each member of the military and civilian staff: respect, integrity, service and excellence. It begins at air force training schools for officers, non-commissioned officers and enlisted servicemen as training centres of excellence in all fields. However the plan also includes concrete decisions to consolidate skill management in a more individualised approach. In addition, open assemblies on mobility held in June 2013 contributed to defining related concrete measures. Finally, fostering sustained and open dialogue for servicemen in strong institutional structures remains one of the plan's priorities. Command must ensure that its airmen remain motivated and devoted to their work because they are the ones who hold the future of the Air Force in their hands.

Developing Partnerships

The French Air Force works in an environment of growing interdependence, where economic constraints make it necessary to share resources. Increasing partnerships is therefore essential to maintaining and improving capabilities.
Partnerships are multiplying between French armed forces, government ministries, the international community and civil society. At the joint forces level, the Air Force is working to develop new synergies consistent with the goals of the armed forces strategic plan, CAP 2020. The aim: to be capable of training and working together in complete complementarity. Between ministries, new proposals for cooperation based on promoting the aeronautical expertise of the Air Force are being put forward with other ministries. At the international level, partnerships are being extended and consolidated. The Air Force is open to the world. This does not just include the European Union and NATO but also bilateral cooperative actions and entities such as the European Air Group. The Air Force has definitely proven itself as a key European defence player. It must also define its aims and what it needs to do to be in an influential position in NATO's air component since France rejoined the integrated military command. Partnerships with civil society are based on initiatives like the equal opportunities for youth plan, on air bases opening up to the public and the development of industrial partnerships. ■

Leading-Edge Defence Technology from Serbia

From its incorporation up to this date J. P. Yugoimport-SDPR's core business activity has been foreign trade in armament and defence equipment, including both import and export, services in the field of overhaul and upgrades, training and complex cooperation – primarily transfer of defence technologies, capital investment in the field of defence infrastructure, joint development and production.

Against the background of its reputation as an arms dealer, Yugoimport-SDPR has adapted its business policy with an ambition to position itself as a manufacturer of complex weapon systems and defence equipment in the future. The history of the company started on 18 June 1949, with the decree of the Prime Minister of the Yugoslavian Government and the Minister of National Defence, Marshal Josip Broz Tito. Yugoimport was founded on 27 June 1949 as an international trade institution, with the primary objective to import parts and raw materials and semi-manufactured forms for the domestic defence industry. In time, the production capacities of the Yugoslav defence industry exceeded the domestic requirements and, therefore, addressing the international market became an economic inevitability. Since 1953 Yugoimport has been involved in the export business.

(Photos: Yugoimport)

LAZAR 8x8 MRAV

LAZAR (Multi -Role Armoured Vehicle)

LAZAR 8x8 MRAV is a multi-role vehicle, the design of which reflects the latest world trends in the development of wheeled armoured vehicle families intended for various tactical tasks in different armed conflicts. The vehicle features extremely high mobility on all terrains and environmental conditions, ballistic protection up to STANAG 4569 V standard level at the front and up to level IV elsewhere, high protection against anti-tank mines and improvised explosive devices, massive fire power as a result of a turreted weapon station with a 30 mm gun and an anti-tank guided missile system (ATGM). It features an integrated optronic fire control system with an optoelectronic sight for the commander, the capability of battlefield surveillance and target engagement deploying personal assault firearms of the embarked crew, the possibility of network centric warfare integration thanks to an innovative C³I system, as well as communication between the crew members both mounted and dismounted through an intercom system including a personal radio unit. Due to the powerful weapon system mounted on a turret or remotely controlled weapon station (RCWS), LAZAR II also allows for the effective engagement of targets protected by field or urban fortifications, reinforced buildings, bunkers, armoured fighting vehicles, and MBTs. The hull is designed to provide comfortable space for 2+10 crew with personal equipment and weapons.

NORA-B/52 155mm 52 cal.

The NORA-B/52 155 mm howitzer with a 52 calibre barrel is the first complex weapon system developed by Yugoimport-SDPR which has entered serial production; a large number of weapons of this family was delivered to customers in South-East Asia and Sub-Sahara Africa. The system was developed following the principle of open architecture, which means that the technical solutions applied for certain subsystems may be integrated with the system as a whole depending on the specific requirement of the users, their necessities and budget available. The main characteristic of the weapon marked K-I is full ballistic protection of the cabin module and the ammunition compartment, as well as of the weapon module with an automatic gun loader in the turret, and mine protection of certain vital assemblies of the weapon. The NORA howitzer has a high fire power thanks to its long range (a range of 42 km with ERFB/BB projectile has been proven; the estimated range with an ERFB RA/BB projectile which is under development is expected be up to 56 km) and high rate of

NORA howitzer

MORAVA MLRS

Soldier of the Future (VB-10)

fire. High tactical and operational mobility, short transition time from travelling to combat emplacement and quick mission readiness (up to one minute) are achieved thanks to the high degree of automation and the highly sophisticated fire control system / C² system.

MORAVA MLRS (Self-Propelled Multitube Modular Rocket Launcher)

In response to changed conditions in modern warfare a modern rocket artillery system is under development, which will be capable to launch different kinds of missiles featuring:

- Polymorphous (compatible with different calibres and different warheads);
- Modular subsystems;
- Each function fully automated;
- FCS (Firing Control System) integrated;
- Capable of scheduled autonomous operation;
- Effective logistics (interchangeable launching pods);
- Modular multi-calibre multiple launch rocket system;
- Combat ranges: 40 km with GRAD-2000, 28 km with GRAD-M 122 mm, (20.6 WITH OGANJ) 12.5 km with 128 mm PLAMEN-D, 11.7 km with 107 mm M-06 artillery rockets;
- Advanced integrated FCS with INS, GPS, encoders, meteo sensor etc. featuring fully automatic mode of operation with automatic launcher as well as semi-automatic and manual back up modes of operation;
- Automatic platform levelling system to compensate terrain slopes;
- Short in action/out of action time (60s /30s);
- Weapon combat consists of two disposable storage/transport/launching modules with 12 composite rocket cells (tubes) per module (24 rockets per weapon) mounted on a launcher cradle that is based on a rotating platform; this feature enables rapid reloading by logistic vehicles with reloading cranes as well as the system's integration with modern logistic and network-centric operation concepts;
- Combat employment: Battery with 4-6 launchers, with autonomous (self-sufficient) combat mission capability for single launcher;
- Capability of integration with wide range of wheeled or tracked platforms.

VB-10 Soldier of the Future Programme

The Soldier of the Future (VB-10) is a complex development project for the "system of systems" of infantry men, including special forces. The programme comprises the development of several systems such as:

- Fire control system for infantry weapons comprising numerous optoelectronic visual devices which increase the fire control efficiency in all modern warfare conditions, including around the corner and behind the shelter, in urban battlefields or on intersected land;
- Command information system for infantry units integrated with joint tactical groups most frequently up to the level of battalion, including networking of portable computers with personal radio stations and communication equipment integrated with combat vehicles;
- Development of a ballistic protection and carrying system which provides a high level of survivability in infantry combat.

''PARTNER'' 2015

The 7th international Fair of Armaments and Defence Equipment, 23-26 June 2015

In cooperation with the Ministry of Defence of Serbia Yugoimport-SDPR has organised the PARTNER international defence exhibitions in Belgrade since 2004, presenting complex weapon systems as part of its development and production programmes and acting as the coordinator of the Serbian defence industrial base. Owing to the mutual political and economic relations and the geographical location in the centre of South-East Europe, PARTNER is the communication hub for the countries of the region in the entire region and with the rest of the world. The exhibition is held bi-annually at the Belgrade Fair in Belgrade, Serbia.

The PARTNER exhibition is held bi-annually at the Belgrade Fair.

Viewpoint from Madrid

Nuria Fernández

A New Investment Cycle Requires a State Policy

Twenty five million euros. This is the amount by which the Spanish defence budget increased this year 2015, reaching €5,764 million. This is a slight (only 0.4%) but significant increase after seven years of continued reduction. At the presentation of the country's annual budget last September the Spanish Government explained that, with this figure, "defence policy seeks to contribute to maintain the minimum essential operational capabilities of the Armed Forces to execute assigned tasks and fulfil international commitments".

Nevertheless, 25 million euros do not seem enough to recover the lost capabilities during a period in which the defence budget fell from €8,491 million euros in 2008 to €5,739 million in 2014. In October 2012, the Chief of the Defence Staff, General Admiral Fernando García Sánchez, warned of the risk of having "weak and hollow" armed forces if the cuts continued. He said the cuts in current expenses had already begun to affect the level of training in the units that did not participate in international operations. Moreover, it had been necessary to take some vehicles and ships out of service – like the Príncipe de Asturias aircraft carrier – that would be difficult to recover if the budget went on falling. Months later, in a military ceremony, the Defence Minister Pedro Morenés underlined the efforts of the Armed Forces to maintain capabilities and training levels during the financial crisis, but added that the spirit of service must be coupled with suitable and modern materiel to achieve the objective of excellence.

In fact, the other victims of the reduced defence budget were the so called "Armament Special Programmes", as the Eurofighter and A400M fixed-wing aircraft, the NH-90 and Tiger helicopters , as well as the Pizarro armoured infantry vehicles. In May 2013, the Ministry of Defence submitted a plan for the renewal of these programmes that included deferrals of deliveries and cuts totalling at €3,850 million. Secretary of State for Defence Pedro Argüelles said then that the financial situation had forced him to undertake changes in the availability of the budget, the definition of the capabilities and, consequently, the ongoing programme planning. Nevertheless, he added these changes would allow designing a recovery scenario and opening the door to new programmes.

This scenario has arrived in 2015, the year in which stability has begun to return to the country's economic outlook and the defence budget has allowed the start of a new 'investment cycle'. When the Secretary of State explained the budget to the Defence Commission in the Congress, he said the new cycle started with two new important programmes: 8x8 armoured vehicles and F-110 frigates. The Spanish Government has already allocated €78 million to these programmes (€41 million for the vehicles and €37 million for the frigates), an amount that is part of the budget of the Ministry of Industry, Energy and Tourism, assigned for "Support to Technological Innovation in the Field of Defence". The Army's requirement for at least 300 8x8 vehicles was announced in 2009, but it has not received confirmation of funding until now. The estimated value of the acquisition is around €1.5 billion. Also in 2009, work began on a project to procure five F-110 frigates to replace the Navy's Santa María Class ships. The preferred solution for the future frigate was selected last October and the contract, with an estimated value of €4 billion, is expected to be signed in 2016.

More recently, in March the Ministry presented to the industry two "Director Plans" – one for helicopters and another one for RPAS (Remotely Piloted Aircraft Systems) – where the department laid down the lines of action in each area. According to these plans, the Ministry of Defence expects to spend around €2.3 billion on programmes to procure helicopters between 2015 and 2027. Also, work with industry has started in order to purchase different kinds of RPAS – micro, mini, tactical and operational – in the next few years.

The Secretary of State for Defence asked in the Congress for "political consensus to protect investment in defence and endow the Armed Forces with a more stable financing framework". The defence industry have also demanded financial continuity and commitment from the state administration. Even the unions have called for a state pact to protect funding for the most important programmes along different legislatures. However, all forecasts of the forthcoming general elections announce the end of bipartisanship and the establishment, for the first time in the history of Spain, of a coalition government. This could mean that the investment cycle ends at the same time as the government cycle, and this would be terrible news for our defence and security, which are the pillars of our existence as a sovereign and independent country.

"Opportunities resulting from the multinational approach are obvious."

Interview with Major General Christian Badia, Commander of the European Air Transport Command, Eindhoven, The Netherlands

ESD: What are the main tasks of the EATC and how would you assess EATC achievements until now?
Badia: Well, the number one priority of EATC is to improve the effectiveness and efficiency of the participants' Military Air Transport efforts. This is done through pooling and sharing of assets and through enhancing interoperability between the participating nations. The Multinational Air Transport Committee, our Steering Board at Air Chief level, declared the EATC Full Operational Capability on 28 November 2013, about three years after inauguration. This is a real achievement, as there were many sceptical voices during the implementation phase of the EATC. Full Operational Capability means in detail that we are planning and tasking successfully a fleet of more than 200 aircraft which means about 60 missions per day. Within the first four years we managed to transport year on year approximately 290,000 passengers and close to 19,000 tons of cargo – with a significantly decreasing number of aircraft available. Since the EATC inauguration the exchange of air transport services between the EATC nations increased by 600%. In the functional area it will take some more time until we can reap the rewards of our efforts, but the common Flight Duty Regulations, for example, are already in place – and this study item was not too long ago assessed as "mission impossible". Many other studies in relation to harmonisation of processes and regulations are ongoing, especially in the A400M area, where the EATC will play a decisive role to transfer the opportunities into reality.

ESD: Italy joined the EATC in December of last year. For 2016 the Transfer of Authority is scheduled, and the EATC will be assigned Operational Control of the Italian Air Force's transport and air refuelling assets. What does this mean exactly?
Badia: Well, let's start with the Operational Control: OPCON. This NATO term means that the EATC as OPCON holder is responsible for mission planning, tasking and controlling. Assigned units receive their Air Transport Mission Orders from us and we are the first point of contact for all questions and issues related to mission planning and execution. With the Italian types of aircraft the EATC will expand its portfolio. The KC767 and the C27 are new aircraft types in our inventory and together with the C130J, Italy will assign quite modern assets to the EATC. We are really looking forward to this. Last but not least, Italian accession means expansion of the participating nations' territory. This is important, as for example the EATC arrangement concerning diplomatic overflight clearances is now applicable for all EATC flights including in Italian airspace.

ESD: Is the level of authority sufficient to accomplish the tasks associated with the expected operational support?
Badia: The EATC is not an end in itself. We have been created to fulfil the tasks and expectations of our nations, including operations support. In our operational pillar we receive OPCON, sometimes combined with national caveats. The level of authority is absolutely sufficient. The nations are aware of our portfolio and take it into account. Nobody will ask us to move cargo which doesn't fit in any of our assets! Nations have already recognised – several times –

Photos: EATC

The headquarters of the European Air Transport Command in Eindhoven, The Netherlands

European Air-to-Air Refuelling Training 2015: Eurofighter hitting the basket

the advantage of the EATC concept: each nation has at least its own capacity available for operations, but with the multinational approach it has access to the whole EATC fleet of more than 200 aircraft.

ESD: As far as the individual nations are concerned, there are different training concepts, different regulations, and different standardisation patterns. To what extent are these considered while planning for missions? Are there solutions with regard to standardisation among the EATC nations?
Badia: Yes. EATC plans different types of aircraft which all have their specific planning assumptions in regard to, for example, operational restrictions and loading. Even when we plan similar aircraft types, EATC has to take into account all national regulations which can be different for each nation. It is a fact that planning and also optimal utilisation of the EATC fleet is served best by the minimum number of planning assumptions. In our functional division, together with our Partner Nations, we work on those issues where standardisation is most beneficial to the effective and efficient use of our fleet. Dangerous Goods Regulations and Harmonised Ground Handling are two examples of such projects, and as I said before: the EATC Flight Duty Regulations and the Diplomatic Clearance Arrangement are already in place.

ESD: With the operational control of five French and one German A400M the EATC is tasking the most modern military air transport asset. What opportunities and challenges come along with these new aircraft?
Badia: The vision of the A400M project provides its launch nations with a common, interoperable aircraft that can be tasked, operated, supported and shared through the EATC as a single fleet. In addition, its unique ability to conduct both tactical and strategic missions with the same aircraft type creates a force and flexibility multiplier effect, enabling far more capability from a given fleet size. Tactical missions in this context refer to aerial delivery to austere airfields or via airdrop, or operating in a hostile environment. Characteristics for the strategic capability are mainly defined by the range, speed and payload. The A400M affords both, as I said, even during the same mission; starting strategic at its home base, being refuelled in flight, before entering a non-benign area and delivering the cargo at an austere airfield. Those are the operational opportunities. Well, with the programme delay it will still take a while until the nations have the full range of these capabilities at their disposal. But we will get there. The opportunities resulting from the multinational approach are obvious from my point of view: we expect many synergies during peacetime operations but even more so for deployments due to a reduced footprint, for example. Some prerequisites are still to be met before nations can appreciate the benefit. Interoperability is the key word in this respect. And that is the challenge: To remind the nations of the initial vision and to facilitate the necessary interoperability framework. We need to have the same regulations and procedures in place within all A400M nations in order to pool and/or exchange spare parts or high value equipment, in order to exchange and share technical services and in order to operate across national or even multinational boundaries.

ESD: With more than 200 aircraft the EATC is in control of approximately 75% of European military airlift capacity. To accomplish the tasks, are there any issues to be resolved with regard to specific aircraft types and equipment?
Badia: Unfortunately I have to say: currently yes. The delay in the A400M programme pushes us into a capacity gap. Germany and France already decommissioned more than half of their C-160 fleets, but the A400M delivery is still limited, in numbers and capabilities. We are doing our best in order to mitigate the effects for our nations. The fleet mix and the total number of assets is of course a decisive piece in the puzzle to be able to select the most suitable aircraft for a given task. We are increasing the utilisation rate of our assets, but the maximum capacity is a fixed value we cannot influence, hence our nations have, for the time being, to outsource a certain amount of air transport capacity. This becomes a critical issue, if the military risk assessment leads to the requirement for protected assets which cannot be outsourced. To be able to accomplish our tasks even better than today, I would appreciate it if the A400M with the full, ordered tactical capability would be available as soon as possible. And some more strategic freighter and tanker aircraft – or a combination of both – would help to overcome the short term capacity gap.

ESD: Would certain transport helicopter types round off the EATC's portfolio?
Badia: The EATC Concept, signed in 2007, limited our role to tactical and strategic airlift. Nevertheless, an extension to other means such as helicopters or air to air refuelling aircraft was not excluded for the future. The EATC already found its role in the air to air refuelling domain due to obvious reasons: modern aircraft could be used in different roles, sometimes even during the same mission. Size, range and planning considerations for our Air to Air Refuelling assets are similar to our other strategic aircraft. Thus a consistent planning and tasking authority makes absolute sense. Having said that, for helicopter operations we would have to adapt our concept of operations and analyse which type and size of helicopter would be beneficial for our Partner Nations.

ESD: Air-refuelling aircraft are "critical assets", particularly in Europe. Against this background, what level of importance has been assigned to the "European Air-to-Air Refuelling Training 2015" exercise of the EATC? What lessons have been learned from similar exercises?
Badia: EART is one of the important activities in the field of Air to Air Refuelling in which EATC is actively involved. Besides training, a harmonised concept of operations and an effective way to plan and conduct these missions are essential. In 2015 the second EART took place in Eindhoven. As for the concept of the training, this is based on the successful European Airlift Tactical Training (EATT) concept in which EATC plays a major role. Because of our deep involvement in multinational training, EATC can be a nucleus where lessons learned will be seamlessly implemented into the different training events. I expect EART to continue to develop towards a unique, high-quality training event in the field of Air to Air Refuelling in Europe.

ESD: What measures and decisions have to be taken in order to further improve the EATC's effectiveness?
Badia: Looking at the operational output: We are effective. We always managed to fulfil all high-priority requests in the framework of our area of responsibility. If a country denies us overflight or the use of airports or other facilities, this is out of our hands, but even then we work out alternative solutions and accomplish the given task. That's not an issue. What can be improved is efficiency, and this is where the functional side of the house comes into play. Harmonising rules, regulations and procedures leads to reduced workload, reduced footprint in operational deployments, higher flexibility and leaner structures. This is a time-consuming process and requires the full trust and confidence of our nations to adapt their national regulations and procedures. Some increase in the Level of Authority in selected functional domains would help, and make sense, in order to get more benefit out of our work.

ESD: How do you see the future of the EATC? Are there any more interested nations knocking on your door?
Badia: Yes indeed, we regularly receive requests for information and provide information briefings. But let me tell you that EATC enlargement is not a trivial process; not for the EATC and also not for possible new partners. Beside the general complexity it is quite sensitive as there is money involved, sovereignty issues to be dealt with, human resources and national constitutional prerequisites to be taken into account, and so on. The EATC cannot grow unbounded without jeopardising its efficiency and effectiveness. The EATC has, contrary to some other multinational entities, a daily, real operational output and its functioning is essential for the participating nations. Without EATC there is no or at best just a very limited military air transport capability remaining for its Partner Nations. The founding nations considered only full EATC membership, and that was wise for the implementation of this new and unique way of military cooperation. The EATC is facing its fifth anniversary and it's about time to investigate something in between the full and no membership. I call it "other ways of cooperation" and my staff is currently drafting some interesting ideas in this area. You asked me about the future; in about ten years the EATC will have more members, and will have established close cooperation with other nations and with other international organisations. ■

The questions were asked by Ulrich Rapreger.

"We expect collaboration for future programmes."

Photo: Shinichi Kiyotani

Japan has changed its armaments export policy to start exporting and looking for co-development with overseas countries. ESD is very privileged to present an interview with Mr. Toru Hotchi, Director, Equipment Policy Division, in the Bureau of Financed Equipment, Ministry of Defence (MoD). Mr Hotchi is the key person regarding the Equipment Policy of the Japanese MoD.

ESD: What were the main reasons for the Japanese government's decision to change the three Principles on Arms Exports to the new regime of "Three Principles on Defence Equipment Transfer?"
Hotchi: The necessity for change emerged during the administration of the Democratic Party of Japan, which was looking to increase defence equipment cooperation internationally. At that time there was a general ban, apart from some exceptions, and this approach caused a lot of confusion. Thus we really needed to clarify and standardise our processes for arms exports to move forward.

ESD: Was the motivation only economic, to provide the means to achieve a certain production scale of exports to counter the shrinking domestic market?
Hotchi: No, it was not only economic. One of the fundamental reasons for revision of the Three Principles, above expanding the chances for our defence business in the overseas market, was the policy benefits. The revision allows us to increase our international cooperation to enhance peace and security, which has increased benefits. The revision does also allow for the possibility of accelerating overseas defence equipment exports, whereas before this we did not have a route to engage in cooperative or joint development of new systems.

ESD: How, specifically, have the regulations been relaxed?
Hotchi: So, the procedures and regulations and the range of coverage were clarified: previously, as I mentioned, there were too many exceptions and catches. Now, the Ministry of Defence is to be a point of contact for arms exports, supported by the Ministry of Economy, Trade and Industry, with a department of the Ministry of Foreign Affairs taking overall charge.

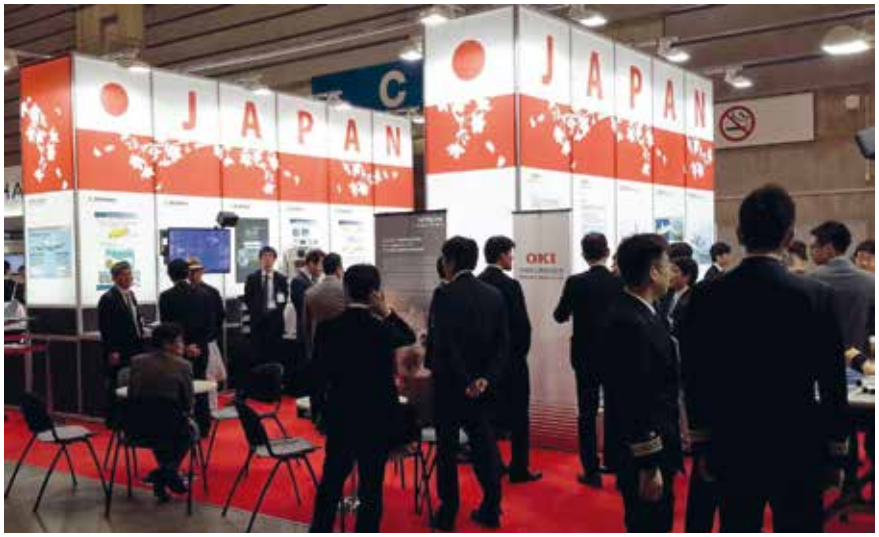
ESD: It seems that the easiest way to begin is with second-hand JDF equipment, or already licensed products such as Raytheon's MIM-23 HAWK (Homing All the Way Killer) surface missile, which already has an international customer base.
Hotchi: Although the National Security Council permitted the first export of US-originated PATRIOT missile components last July, this still required US consent and must be via the US, that is, be under the same US rules governing US arms sales. It's the same for second-hand US-origin equipment. Domestically produced equipment cannot be offered substantially free of charge or without compensation. Also, whether or not we can export is still based fundamentally on a determination of the exports' contribution to peace and security of Japan. The possible permitted exports are limited to five fields, including transport, search and rescue, surveillance and minesweeping. But international joint development and co-production are not limited to these five areas.

ESD: The Acquisition, Technology & Logistics Agency (ATLA) Defence Procurement Agency (DPA) is being established to promote efficiencies in development and pro-

Photo: MoD, Japan

The Japanese Ministry of Defence is located in Ichigaya-Honmurachō, Shinjuku.

Photo: MAST



MAST Asia 2015, Japan's "first ever international defence event" took place in Yokohama from 13 to 15 May 2015.

curement. When will it be set up, and with what staffing levels?
Hotchi: This is currently being discussed in the Diet. The Establishment Bill will probably pass in the autumn. Currently we are looking at about 1,800 staff, which is an order of magnitude smaller than the UK's DE&S and the French DGA. However, it's very difficult to increase personnel numbers in the MoD because of budget limitations and civil service rules. We have to boost numbers and will outsource from the private sector, while training them.

ESD: So how will things change with the founding of the ATLADPA?
Hotchi: Right now we have a vertically integrated and stovepiped structure, divided between the Internal Bureau, the Equipment Procurement and Construction office or EPCO, and the Technical Research and Development Institute (TRDI), along with the staff offices of each service. Each entity has its own priorities and each fails to communicate and share ideas. By gathering up the separate entities, the ATLADPA will have an integration role, overall management of R&D, technology development, volume production, so as to promote budget efficiencies and reduce lifecycle costs. This will overcome today's sectionalism, and focuses on the optimisation of specific projects with an overall agency that can see the big picture.

ESD: The TRDI seems very underfunded compared with peer research organizations.
Hotchi: Yes, this is true. We will change this. As a first step, this we are setting up a three hundred million yen fund for basic R&D into dual-use technology with applied laboratories of private companies and universities. We are investing in R&D in materials, elements such as gallium nitride for applications, sensors and robo-tech, for example, which will be useful for the MOD in the future.

ESD: What will happen to the TRDI. How will it be budgeted?
Hotchi: The TRDI will not disband, but it will become absorbed as is into the DPA.

ESD: At the moment Japan has a system in the Diet where numbers, individual procurement items, acquisition periods and costs are not discussed. It's basically a rubber stamp. What, for example, about adequate project management in the future; what happens if there is a problem with a joint development programme?
Hotchi: It's true there is a problem and we realise this is an issue. The Ministry of Defence is supposed to make specific estimates of procurement costs, and since 2008 we have issued annual lifecycle cost reports for main equipment. But I agree, there is still not enough accountability compared with other countries. From now on we will initiate better systems to precisely monitor performance, schedule and costs and we will also introduce a rule and cut-off giving us the ability to cancel programmes if necessary. We will take better control of our overall portfolio. We need to train more analysts. From this point of view, our current five year Mid-Term Defence Programmes and the Defence Programme Guidelines are insufficient.

ESD: Japan has no experience of offset arrangements for imported equipment and lacks experience in this business. To be a serious international player, you need to understand offsets. What are you doing about this?
Hotchi: We are discussing offset arrangements for exports with other countries. For example we are discussing a 30% offset for US-2 production in India, but our efforts are mainly focussed on achieving harmony with other aspects of the deal, including technology transfer, local maintenance capability, or licensed production. If we ask for some percentage, it may increase costs.
For exports, we are going to negotiate with the customers for direct offsets such as for technology transfers or maintenance facilities. We will continue on a case-by-case basis with indirect offsets such as through imports, for example, of agricultural products, as agreed to by the NSC in consultation with the relevant ministries.

Photo: Tencate

The Japanese MoD will join DSEI in London this year.

ESD: Generally speaking, Japanese equipment is expensive. Isn't that a major bottleneck for exports?
Hotchi: Our domestic defence industry has had little internal competition, and we need that, even for domestic procurement. We must reduce costs to be able to compete internationally. But we are not going to use subsidies. We have to invest, but this is in core technology. Competition is not simply just on price. We can compete on quality, durability, after-sales, on-time delivery and high performance, the traditional strengths of Japanese manufacturing.

ESD: Yes, but Japan's defence prime and major contractors are almost totally dependent on the MOD and don't seem to have a strong motivation to enter the global market. They just seem to paying the government lip service…
Hotchi: The difference between Japanese manufacturers and others is that they have a domestic procurement market. I recently visited Finland and Spain, where, because the internal market in Finland and Spain is too small to sustain their local defence base, companies were forced to compete and export internationally. Their governments have already established support systems to enable this. In Japan, the MoD is the sole customer: there is little in-depth knowledge about products and services, and their value, and little market intelligence for both defence contractors and the MoD itself. Japanese companies need to understand how to create their own value for their products and services and conduct their market research by themselves. For that, we will adopt a non-interference policy and want to wean them of their dependency on the MoD.

ESD: Do you have any plans to support any specific areas or exporters, for example Small and Medium Enterprises (SMEs)?
Hotchi: We have been keeping in touch and examining the practises of peer agencies such as the UKTI. SMEs have, in general, very limited financial and overseas sales capabilities; we have to consider how the government can help them. However this would be mainly handled by METI.

ESD: The MoD will join DSEI in London this year. Is it the first time that the MoD have a booth in this kind of overseas exhibition?
Hotchi: Yes it is, and we got a budget for it. We'll have a booth in the Japanese pavilion and we will be able to explain our R&D and defence policy to overseas people. We expect the exhibit to have a synergistic effect supporting the sales activities of Japanese companies there.

ESD: It seems that the MoD only has information on the prime contractors and the largest defence companies, but no information on subcontractors or components vendors.
Hotchi: I agree. It is important to hold information regarding materials and supply chains for operational, logistics, operational and maintenance management. Also SMEs may be easily targeted for M&A by overseas investors. We need to understand which companies are interested in doing business overseas. From this point of view, we need to gather a lot more data. We will set up a database to achieve these goals.

ESD: Although it's going to be difficult for new entrants in the domestic market, what is required for them to understand and to succeed in the domestic market? Would a database established by the MoD pave the way for new entrants?
Hotchi: We welcome newcomers. Of course, we have to protect IP and preserve domestic technology and capabilities, especially in cases where there are only sole suppliers in a particular field. Bankruptcy in such cases may mean loss of supply or a key domestic technology. But single-source suppliers tend to be more expensive. We need to have fewer single source suppliers and to be able to draw on a variety of sources for competition. We have to promote diversification looking at the facts of each case.

ESD: Can you point to any specific examples of cases of successful defence equipment cooperation overseas?
Hotchi: We already signed intergovernmental agreements with the US and the UK, France and Australia. Also we have been talking to India and the South East Asian countries. We are also strengthening our relationships with many other countries, such as with Finland this March.
It's relatively easy to talk specifics with those countries that share common equipment platforms with us, such as Italy, with the F-35 and the KC-767, etc. There are many potential partners in Europe and we can expect further cooperation for advanced technologies with such countries to discuss a common agenda. For South East Asian countries, mainly we want further cooperation that boosts our contribution to regional security.

ESD: Can you discuss any specifics about co-development programmes with any European countries?
Hotchi: Well, we've already had three sets of consultations with our French counterparts about unmanned systems such as UAVs and UGVs, etc. However at the moment we are just at the stage of basic infor-

Photo: Lockheed Martin

Italy's first built F-35A: " It's relatively easy to talk specifics with those countries that share common equipment platforms with us, such as Italy, with the F-35 and the KC-767."

mation exchange. We are looking at collaboration with European countries for several ongoing Japanese projects and we expect collaboration for future programmes, if at all possible. As it is, such discussions already represent big progress for us and these are already significant signs of progress. For example, we now better understand the positions of major companies such as Thales, Airbus and Safran, what their approach is, and what they need from us. We are also in discussions with UK industry. So, we are starting to really understand the positions of other countries, their contractors, what they can do and what they want/ need more clearly.

ESD: So can we say Japan is ending its period of national isolation and finally opening up. Is this a sort of second opening up, as happened during the Meji era?
Hotchi: Certainly there are parallels. At the moment, however, the issue is that countries have a lot of information about us, but we don't know enough about them. It's a sort of asymmetry. We are receiving a lot of proposals but we are unable to reciprocate. On the present showing we are not yet quite able to act as equal partners. We need to access so much more information about partners from now on and waste no time in doing so. If we find a promising avenue we can gain experience by participating, improving our ability to contribute. This is a great stimulus to nurture our domestic industry.

ESD: At the moment, our domestic defence industry has a strong sense of being a series of state-owned enterprises. What needs to change?
Hotchi: I am asking the Japanese defence industry to come to a better understanding of their strengths and weaknesses and position in a global market. They also have to change their mindsets to succeed. They have to shed the idea of dependency on the MoD or they will lose their influence. They need to be able to change themselves. When they enter international co-development projects, they need to negotiate from a position of strength. They have not established footholds in overseas markets. Therefore they must form alliances and partnerships with overseas players. The point is that there is a big difference in profits between becoming a partner or just a subcontractor.

ESD: The Abe administration seems to focus on landing only "big fish" programmes, such as the US-2 to India, or SORYU class submarines to Australia. But this seems difficult for novices. Don't you think you should concentrate more on smaller, less complex programmes, or exports of components or materials?
Hotchi: Yes, I recognise that it is difficult to reach agreements easily on such projects, but we are already involved in negotiations with the UK regarding the METEOR missile and before we can get to the next stage to make a more feasible strategy, we need to better understand procurement and investment decisions and levels, who are partners and partnering strategies, whether or not projects are UK based or European-based, whether or not they involve the US at some level, and so on. Who is going to invest, and at what percentage? We need to be able to understand and adjust to such issues. If the project goes well, it will be a model case study for the future. I think Mitsubishi Electric Corporation will be the key player on the Japanese side.

ESD: So what are the strengths of Japanese defence companies?
Hotchi: Generally speaking, these are: quality, good after-sales services, and on-time delivery. But this reputation was forged in the civilian sector. We cannot say it's exactly the same for the defence sector, because Japanese defence equipment does not compete in a true market, and because it has only one customer, the Self Defence Force (SDF), so products only fit the specific requirements of the SDF based on the particular Japanese environment. The value of such equipment on the international market is open to question. However, adaptability in the commercial market is a strength of Japanese companies. Now is a good time for Japanese defence companies to rethink their products to meet different user needs.

Photo: MBDA

"We are already involved in negotiations with the UK regarding the METEOR missile."

ESD: What are the main medium and long-term threats Japan faces, and what are the essential platforms required?
Hotchi: Look at the military situation surrounding Japan. For example, reportedly, China is developing its domestic aircraft carrier capability with the Liaoning, along with stealth fighters. Based on the situation surrounding Japan, under the current National Defence Programme Guidelines (NDPG) and Mid-Term Defence Plan (MTDP) <the MTDP defines Japan's defence policy and capabilities for 2014 to 2018 – Ed.> we have a priority to strengthen our capability and have to be able to respond to threats to our southern island chain. So we are procuring and deploying the OSPREYs and AAV7s so that we can improve and are improving our mobility and deployment capability. The Maritime Self-Defence Force (MSDF) is increasing the numbers of its submarine and destroyer fleets. The Air Self Defence Force (ASDF) is steady on procuring the F-35A and we are introducing E-2Ds for better ISR surveillance.
We cannot speak too much about longer-range developments and because we are following the current NDPG and MTDP, which provide five-year and medium-term outlooks. However, the staff offices of each service and the TRDI are assessing longer-term needs, which will be reflected in the subsequent NDPG Outline and MTDPs. The DPA will play the role of mapping out our R&D investments, evaluating long-term needs for each field, and exercising vision. We hope that these plans will ignite private and corporate based investment in and by Japan's defence companies. ■

The interview was conducted by Shinichi Kiyotani.

UAV MALE

Unmanned Aerial Vehicles for Medium Altitude Long Endurance Operations

Peter Preylowski

In recent years Unmanned Aerial Vehicles (UAVs) have turned into important additions to the arsenal of modern armed forces. In particular UAVs performing Medium Altitude Long Endurance (MALE) operations are increasingly employed in crises and conflicts throughout the world. Their mission spectrum includes Intelligence-Surveillance-Reconnaissance (ISR) applications and gradually also the use of weapons.

Medium Altitude Long Endurance (MALE) UAVs typically feature a service ceiling between 5,000 and 15,000 metres and an endurance of more than 24 hours. Although many countries have embarked on the development of MALE UAVs in the last few years, the market is still dominated by US American General Atomics Aeronautical Systems Inc. (GA-ASI) and Israel Aerospace Industries Ltd. (IAI).

General Atomics Aeronautical Systems

General Atomics Aeronautical Systems Inc. (GA-ASI) is an affiliate of General Atomics which was founded in 1955 with its headquarters in San Diego, California. In 1991, General Atomics took over the bankrupt Leading Systems Incorporated (LSI). In 1984, LSI had been engaged by the Defense Advanced Research Projects Agency (DARPA) to develop a UAV which should be suitable both for reconnaissance missions and in a cruise missile role. The so-called AMBER UAV with a wingspan of 8.4 metres and powered by a pusher propeller flew for the first time in November 1986. Seven AMBERs were built before the programme was abandoned in 1990. For civilian applications, LSI had derived the less sophisticated GNAT-750 from the AMBER design which flew for the first time in mid-1989. GA-ASI developed the MQ-1 PREDATOR (first flight in 1994) on the basis of this LSI legacy system and, on behalf of NASA, the ALTUS for scientific applications in the atmosphere. ALTUS was launched for the first time in 1997; two of these systems were built.

(Photo: NASA)

General Atomics' ALTUS was built for the NASA.

GA-ASI MQ-1/(RQ-1) PREDATOR

The PREDATOR MALE UAV was developed as a MALE UAS (Unmanned Aircraft System) in the scope of the Tier II programme. One system comprises four UAVs, a Ground Control Station (GCS) and a PREDATOR Primary Satellite Link (PPSL). All systems are deployable as a container load in C-130-sized transport aircraft. In 2009, the price of a PREDATOR system amounted to US$20 million. The UAV is controlled by a pilot (a fully qualified aviator) and a sensor system operator. Additional maintenance personnel ensure its operational readiness round the clock. Although the PREDATOR UAS has primarily been designed for reconnaissance missions, it is also capable of performing armed operations. Initially it was therefore designated RQ-1 with "R" signifying reconnaissance and "Q" remote-controlled. The designation MQ-1 ("M" for multi-role) was chosen in 2002 after the PREDATORs had been armed with AGM-114 HELLFIRE air-to-surface guided missiles. The PREDATOR was the first UAV to be used in armed operations. The UAV has a wingspan of 16.8 m; it is 8.22 m long and 2.1 m high. It has a maximum take-off weight of 1.020 kg and a payload capacity of 204 kg. It reaches a maximum speed of 222 kph and a service ceiling of 7,520 m.
After its first flight on 3 July 1994 PREDATOR was commissioned in the summer of the following year and series production started. To date, more than 200 PREDATORs may have been built. They have proven their value in numerous operations, for example in Afghanistan, Pakistan, in the Balkans and the Middle East.
In addition to the U.S. Air Force, this system is also in use with the U.S. CIA and the Italian Air Force.

GA-ASI MQ-9A REAPER

The MQ-9A REAPER represents a fundamental advancement of the MQ-1 PREDATOR (it was initially also called PREDATOR B) and was launched for the first time in February 2001. It is larger and, above all, more powerful. It covers an extended mission spectrum and is preferably used for armed missions. Guided by satellites, it performs 24-hour-operations at long ranges. From scratch it was designed as a weapon carrier with one weapon station under the fuselage (which is not used) and three stations

(Photo: USAF)

The PREDATOR was the first weapon-carrying UAV.

GA-ASI MQ-9A REAPER technical data	
Length	11.00 m
Wingspan	20.10 m
Height	3.8 m
Max. take-off weight	4,760 kg
Payload capacity	1,701 kg
Max. speed	444 kph
Service ceiling	15,240 m
Endurance	max. 30 h
Engine	1 Honeywell TPE 331-10T

each under the wings. It may be armed with GBU-12 PAVEWAY II and GBU-38 JADM guided bombs as well as AGM-114 HELLFIRE guided missiles. The comprehensive equipment includes the AN/DAS-1 multispectral targeting system from Raytheon. The REAPER can be disassembled and airlifted in a container by a C-130 HERCULES. The MQ-9 is launched from the standard airbases of the U.S. Air Force. Take-off and landing are performed under line-of-sight conditions. For the longer term, the USA has planned to procure 401 MQ-9; some 230 have already been delivered, and the funds for twelve more REAPERs have been appropriated in the budget plan for 2015. In addition to the USA, the air forces of Great Britain, France and Italy also employ REAPERs. A version for scientific applications was available under the name ALTAIR. In 2007, GA-ASI competed with its MARINER, a REAPER variant, in the U.S. Navy tender for the Broad Area Maritime Surveillance (BAMS) project which Northrop Grumman eventually won with its GLOBAL HAWK version TRITON.

GA-ASI MQ-1C GRAY EAGLE

Another further development of the PREDATOR is the MQ-1C GRAY EAGLE, which was initially also labelled MQ-12 WARRIOR, ALPHA WARRIOR or SKY WARRIOR. The first flight of this variant's prototype took place in October 2004. The GRAY EAGLE is powered by a diesel fuel engine with pusher propeller. Its maximum endurance is 36 hours. It can optionally be equipped with reconnaissance systems or weapons. On 27 July 2013, an MQ-1C version (Improved GRAY EAGLE – IGE) flew for the first time with higher performance. The U.S. Army is going to procure 29 GRAY EAGLEs in 2015 with an envisaged total number of 152 systems by 2022.

GA-ASI AVENGER

An in-house developed project of GA-ASI is the PREDATOR C AVENGER, a UAV of the future that will be employable also over stronger defended regions owing to its stealth features and high speed. It is powered by a turbofan engine (Pratt & Whitney PW545B with 17.70 kN) that provides a constant airspeed of 740 kph, a maximum altitude of 18,300 m and an endurance of 18 hours. Sensor systems and weapons are internally stored. The first flight of the PREDATOR C Avenger took place on 4 April 2009.

(Photo: USAF)

General Atomics' REAPER on mission in Afghanistan

(Photo: GA-ASI)

The GRAY EAGLE UAV is being procured by the U.S. Army.

Israel Aerospace Industries

Israel Aerospace Industries Ltd. (IAI) is a defence technology company operating with some 17,000 employees worldwide. Apart from proprietary developments of combat aircraft like KFIR and LAVI, UAVs lie in the distinct focus of corporate activities. UAVs of IAI's MALAT division may well have completed a total of one million flight hours with more than 40 customers worldwide.

IAI HERON 1

The HERON MALE UAV flew on 15 July 2006 for the first time. Series production followed the same year and the first vehicles were put into operation in 2007.
In 2007, the requirement for an airborne system for imagery intelligence in the depth of the area of operation (System

(Photo: GA-ASI)

A jet engine makes the PREDATOR C AVENGER of General Atomics the fastest MALE UAV.

(Photo: Bundeswehr)

The HERON 1 operated by the Bundeswehr in Afghanistan

IAI HERON technical data	
Length	8.50 m
Wingspan	16.60 m
Height	2.30 m
Max. take-off weight	1,150 kg
Payload capacity	250 kg
Speed	between 11 and 213 kph
Service ceiling	19,800 m
Endurance	>23 h
Engine	1 BRP-Powertrain Rotax 914 turbocharger with 86 kW

(Photo: USAF)

France employs the HARFANG HERON 1 UAV variant in Afghanistan.

zur Abbildenden Aufklärung in der Tiefe des Einsatzgebietes – SAA-TEG) was approved in Germany. The HERON TP (IAI) and PREDATOR B (General Atomics) systems reached the final selection stage in a tender. Owing to the urgency of the matter, an agreement for a SAATEG interim solution was entered with Rheinmetall Defence and the available HERON 1 UAV system in October 2009. Three UAVs, two ground control stations and additional equipment were leased from IAI with the option for an extension of the lease by two more years. The UAV operators of Rheinmetall and the German Air Force were trained in Israel. Starting in February 2010, HERON 1 deployed with the three aerial vehicles and the two ground segments to Afghanistan and was put into service with its first flight at the Mazar-i-Sharif Operations Wing on 17 March 2010. On 27 May 2011, the Bundeswehr announced the full operational readiness of the HERONs in Afghanistan. The HERONs are equipped with infrared and video sensors as well as a ground surveillance radar system and can operate day and night so that 24-hour-surveillance is ensured. An integrated satellite data link enables surveillance of the entire northern half of the Afghan territory. In 2012, a Joint Venture for HERON 1 system maintenance in Afghanistan was established by Rheinmetall and Cassidian (a defence division of EADS, now Airbus Group). The leasing agreement was extended to 22 October 2014.

Since 1 January 2013, the HERONs have been operated by Cassidian Airborne Solutions GmbH (CAS), a fully owned subsidiary of Airbus Group, in a so-called build-lease-transfer framework. Here CAS takes over all maintenance work and ensures the operational readiness of the UAVs. The agreement additionally stipulates that Cassidian "pilots" are responsible for the take-offs and landings of the UAVs while their operation in the air is controlled by Air Force pilots. The operators work in 4-hour-shifts. As of January 2015, about 21,000 flight hours were completed in the Afghanistan mission. The SAATEG agreement has once again been extended and is now going to be effective until April 2015.

In the scope of the "Système Intérimaire de Drone MALE" procurement programme, France purchased four HERON 1 systems that received their equipment from EADS and Thales. First called EAGLE and later HARFANG, the UAV performed its first flight on 9 September 2006. From early 2009, the system was stationed at the Bagram Air Base in Afghanistan. HARFANGs performed missions also in Libya and Mali before France decommissioned the systems in early 2014. ■

UAV HALE

Unmanned Aerial Vehicles for High Altitude Long Endurance Operations

Peter Preylowski

While the previous article in this issue addressed Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicles (UAVs) that patrol at altitudes from 5,000 to 15,000 metres, the following considers High Altitude Long Endurance (HALE) aircraft that perform their long endurance operations above the ceilings of MALE UAVs in Intelligence–Surveillance–Reconnaissance (ISR) applications.

These UAVs are usually large-sized, technologically highly sophisticated and correspondingly expensive. To date, only one HALE UAV has been certified for series production, the GLOBAL HAWK from Northrop Grumman.

HALE UAVs typically feature a service ceiling of more than 15,000 metres and an endurance exceeding 24 hours. A quick glance at history: After a US-American Lockheed U-2 DRAGON LADY reconnaissance aircraft had been downed from the airspace over the Soviet Union on 1 May 1960 and its pilot Gary Powers had been captured and convicted of espionage in a subsequent show trial which was perceived as public humiliation in the USA, the development of unmanned aerial vehicles moved increasingly into the focus of attention. A number of development approaches followed, with Ryan Aeronautical Company taking the lead. In 1951, the company had begun developing the jet-propelled FIREBEE target drone which flew for the first time in 1955 and was to become the most successful aerial vehicle of this type worldwide. Based on the FIREBEE design a number of reconnaissance drones followed. In 1969, Ryan was taken over by Teledyne, then trading under Teledyne Ryan and participating, among others, in the COMPASS COPE programme (see box). Teledyne Ryan was taken over by Northrop Grumman in 1999. Another two remarkable HALE developments preceding the GLOBAL HAWK deserve to be mentioned. On 22 December 1964, the Lockheed D-21 performed its first flight, an aerial reconnaissance vehicle that was launched from an aircraft, approached its target at an altitude of 29,000 metres at triple the speed of sound, shot pictures and returned. On its way back, the D-21 dropped the camera module before it self-destructed. After a series of failures, the programme was abandoned in 1971. On 9 October 1988, the Boeing CONDOR flew for the first time. With a wingspan of 59.16 metres it was the largest UAV ever built for many years. The CONDOR could be deployed in a reconnaissance role, it reached a ceiling exceeding 20 km and an endurance of 80 hours but a speed of just 370 kph owing to its propeller propulsion. The latter in conjunction with its oversize and lacking stealth features eventually defeated its military usability.

The COMPASS COPE Programme – a HALE Precursor

By 1971, the U.S. Air Force had launched a programme for the development of an unmanned aerial reconnaissance vehicle that would perform conventional take-offs and landings on airfields and operate at high altitudes for a period up to 24 hours.

(Photo: Boeing)

(Image: Ryan)

At first Boeing was to be engaged exclusively, but Ryan brought itself into play. The YQM-94 B-Gull (COMPASS COPE B, left) design of Boeing and Ryan's YQM-98 R-Tern (COMPASS COPE R, right) closely resemble each other. In fact, both were gliders (YQM-94 27,43 m wingspan, YQM-98 24,75 m) with fuselage-mounted jet engine and double vertical stabiliser. Boeing's first prototype flew for the first time on 28 July 1973 and was lost during its second flight one month later. The second prototype flew in November 1974 and accomplished the full testing programme. It reached an altitude of more than 16,000 metres and an endurance of 17 hours and 24 minutes. The competing product of Ryan performed its first flight on 17 August 1974. During testing, it reached an endurance of 30 hours. The COMPASS COPE programme was eventually discontinued in 1977, also for lack of suitable sensor payloads.

Northrop Grumman GLOBAL HAWK

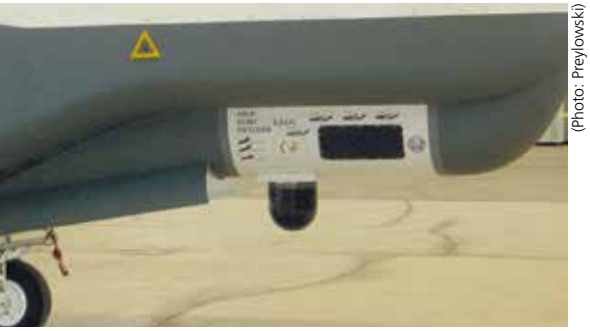
The GLOBAL HAWK family of Northrop Grumman harks back to a development contract awarded by the Defense Advanced Research Projects Agency (DARPA) and the Defense Airborne Reconnaissance Office (DARO) in 1994. The objective was to develop an unmanned aerial vehicle for all-weather reconnaissance operations at high altitudes with extended endurance under the programme designation TIER II+. On 28 February 1998, the first of seven prototypes performed its first flight under the designation RQ-4A (also called Block 0 variant). On 21 March 2001, it already beat the world record for jet-propelled UAVs with an endurance of 30 hours and 24 minutes. Being still prototypes, the first GLOBAL HAWKs were deployed to the Arabian Peninsula after the 9/11 attacks to perform surveillance operations over Afghanistan. Their mission equipment components con-

(Photo: Northrop Grumman)

Northrop Grumman RQ-4B Block 40

(Photo: U.S. Navy)

The MQ-4C TRITON lands at the Patuxent River Naval Air Station, Maryland, on 18 September 2014.



(Photo: Preylowski)

The EADS Cassidian ELINT sensor equipment for the GLOBAL HAWK during testing in Nordholz in Autumn 2003 is the precursor of ISIS.

sisted of a Synthetic Aperture Radar (SAR) and electro-optical and infrared sensors. On 9 September 2003, the first series vehicle of the RQ-4A Block 10 flew for the first time. Seven such systems were delivered to the U.S. Air Force.

RQ-4B Block 20 was a performance-enhanced version flying for the first time on 1 March 2007. It had larger dimensions, a higher take-off mass and, in particular, a higher payload capacity of 1,360 kg compared to 910 kg of Block 10. Six Block 20 systems were procured. The following version, Block 30, was primarily intended to improve the sensor system. This version flew for the first time on 16 November 2007 equipped with, among others, a SIGINT (Signal Intelligence) sensor – the Advanced Signals Intelligence Program (ASIP) of Northrop Grumman. 18 items of this version were ordered. The first flight of the following Block 40 version took place on 16 November 2009. The U.S. Air Force has ordered eleven aerial vehicles of the prototype equipped with the Sensor Multi-Platform Radar Technology Insertion (RTIP) radar system. In 2014, the Air Force operated some 40 GLOBAL HAWKs which are stationed at the Beale and the Grand Forks air force bases (both in California). In worldwide operations, the UAVs are controlled either via satellites or by mobile ground stations in the areas of operation. They have stood the test not only in numerous military missions but also in their operations after the Indian Ocean tsunami and the nuclear disaster in Fukushima.

U.S. Navy

An RQ-4A Block 10 flew for the Navy BAMS-D (Broad Area Maritime Surveillance Demonstrator) programme as early as on 6 October 2004. This programme was further developed into the MQ-4C BAMS (also called RQ-4N) whose flight testing started on 22 May 2013 and ended in March 2014 after 81 flight hours. This version features a payload capacity of 1,452 kg as well as reinforced wings because it should also be able to patrol at lower altitudes. 68 aerial vehicles named TRITON are scheduled for procurement, which operate either autonomously or as a complement to the Boeing P-8A POSEIDON. Their delivery is expected to start in 2017.

EURO HAWK

The RQ-4E EURO HAWK was the first international version of the GLOBAL HAWK. It was a procurement programme of the German Bundeswehr to close its SIGINT capability gap which had occurred when the manned BREGUET ATLANTICs that had previously performed this task were finally phased out in 2010.

From 15 October to 6 November 2003, a GLOBAL HAWK of the U.S. Air Force was stationed at Nordholz naval airbase for a number of demonstration flights and performed six test flights over the North Sea, equipped with a sensor system from EADS Cassidian. In January 2007, EuroHawk GmbH (the company was founded in 2005 as a subsidiary equally owned by Northrop Grumman and EADS) was engaged to develop and test the EURO HAWK airborne long-range surveillance and SIGINT system (Signalerfassende Luftgestützte Weiträu-

EURO HAWK technical data	
Length	14.50 m
Wingspan	39.89 m
Height	4.63 m
Max. take-off weight	14,640 kg
Payload capacity	1,360 kg
Patrol speed	635 kph
Service ceiling	19,800 m
Endurance	36 h
Engine	1 Rolls-Royce Allison AE3007H turbofan with 36.8 kN static thrust

(Photo: EADS Cassidian)

First flight of the EURO HAWK in Manching on 11 January 2013

mige Überwachung und Aufklärung – SLWÜA).
The EURO HAWK is based on the RQ-4B Block 20 version. It was presented on 8 October 2009; its first flight took place on 29 June 2010 from its manufacturing site in Palmdale to the testing range at Edwards Air Force Base where test flights of a total duration of 125 hours were performed with the longest flight lasting more than 30 hours. After a ferry flight of 22 hours and 16 minutes, the EURO HAWK landed as a Full Scale Demonstrator (FSD) in Manching, Germany, on 21 July 2011 in order to be equipped with the national ISIS (Integrated SIGINT System) mission kit. On 11 January 2013, the ISIS test platform took off for its first flight that it successfully completed six hours later. Yet this success could not remedy a fundamental deficiency – the EURO HAWK had not been issued a type certificate so that flights in Germany could only be carried out on the basis of a provisional Certificate of Airworthiness. This problem and the considerably increased costs resulted in the termination of the project in May 2013. The procurement of four more EURO HAWKs was stopped. On 22 July 2013, an investigation committee of the German Parliament took up the EURO HAWK issue while compliance tests continued until autumn 2013.
A study on the MQ-4C TRITON which is under consideration as a substitute system has been commissioned; the results of which should be available in the third quarter of 2015 so that a decision on the way ahead could be taken in the course of 2016.

NATO AGS

AGS (Alliance Ground Surveillance) is a NATO project aimed at providing a battlefield surveillance and reconnaissance capability. At the beginning 15 NATO nations, among them Germany and the USA, participated in this project. While at first a mixed fleet of five Airbus A321 and seven GLOBAL HAWK platforms was envisaged, the AGS Core Capability is now to be provided by procuring five RQ-4B Block 40 GLOBAL HAWKs to which the nations may contribute additional national capabilities. The MP-RTIP (Multi-Platform Radar Technology Insertion Programme) radar has been selected as basic sensor system. The procurement contract was signed in May 2012. The system will be stationed at the Italian Sigonella Air Force base in Sicily. Italy will be responsible for approval and certification of the NATO AGS Core. The delivery of the aerial vehicles has been scheduled for 2017 and 2018. ■

Other HALE Activities

Apart from Northrop Grumman numerous other U.S. companies are engaged in the development of HALE technology. Their activities are partly financed by NASA or the Defense Advanced Research Projects Agency (DARPA) and partly from corporate resources. NASA initiated a rather spectacular HALE project in the 1990s when it engaged AeroVironment to design the HELIOS UAV powered by fuel cells and solar energy which should perform research and communication tasks as a "satellite in the atmosphere". HELIOS HP01 featured a wingspan of 75 m and 14 electric motors. On 13 August 2001 it climbed an altitude of 29,524 metres. Just two years later HELIOS crashed and the programme was ceased. Apart from the Tier II+ programme that produced the GLOBAL HAWK, there was Tier III, a programme for developing HALE stealth features. Lockheed and Boeing developed the RQ-3 DARK STAR with a wingspan of 21.3 metres which flew for the first time on 29 March 1996. DARK STAR crashed during its second flight. Although a modified second version was available, the programme was abandoned in January 1999 because the aerial vehicle lacked the required aerodynamic stability and also missed set objectives for cost and performance. AeroVironment again designed the GLOBAL OBSERVER, financed by the military. Orbiting at 19,000 metres, this aerial vehicle should be capable of replacing communication satellites for a period of seven days in case of emergency; it performed its first flight for one hour on 5 August 2010. In April, GLOBAL OBSERVER crashed, and because the interest of the military had meanwhile dwindled the project was stopped in 2013.
In 2008, DARPA engaged Aurora Flight Sciences to develop the ODYSSEUS, a pseudo-satellite with a wingspan of 150 m which should be operational for five years at altitudes of 20 to 30 km.
In 2010, Boeing started building the hydrogen-powered PHANTOM EYE aerial military reconnaissance vehicle which went on its first flight on 1 June 2012. The prototype was damaged during landing, but its testing could be continued in 2013. On 5 June 2014 it reached an altitude of about 14,000 metres. The twin-engined aerial vehicle has a wingspan of 46 metres and should climb, to an altitude of 20,000 metres.
In the scope of the VULTURE programme of DARPA, Boeing designed the SOLAR EAGLE with a wingspan of 122 m and an envisaged operational period of five years. Its first flight was planned for 2014. SOLAR EAGLE also accommodates ZEPHYR technology of the British QinetiQ company. ZEPHYR had set a record in the USA with more than 336 flight hours and an altitude of 21,562 metres in July 2010.


(Photo: NASA)
AeroVironment HELIOS HP1


(Photo: Lockheed)
Lockheed/Boeing RQ-3 DARK STAR


(Photo: AeroVironment)
AeroVironment GLOBAL OBSERVER


(Graphic: Aurora)
Aurora Flight Sciences ODYSSEUS


(Photo: Boeing)
Boeing PHANTOM EYE


(Graphic: Boeing)
Boeing SOLAR EAGLE

Russia's "Wonder Tanks"

Rolf Hilmes

At this year's "Victory Parade", held in Moscow's Red Square on 9 May 2015 to mark the 70th anniversary of the end of the war, the Russian government wanted to put on an impressive show of power, strength and modernity for both Russians and the world to see.

Furthermore, the event served to strengthen the confidence of the Russian armed forces and as a beacon of hope for the Russian defence industry. Around 80,000 soldiers were involved in the event in 28 cities across Russia. In Moscow alone, 16,000 troops, 194 vehicles and 143 aeroplanes and helicopters were used in a display combining self-confidence, tradition and folklore to leave the invited guests with an impression of a superpower. Given the number of foreign guests of state (including India's Prime Minister), the show was ultimately also an advert for much needed export orders.

New Systems

In addition to vehicles already in use by the Russian armed forces, twelve each of a range of new battle tank systems were on display: the T-14 ARMATA (object 148), the T-15 ARMATA heavy infantry fighting vehicle (object 149) , the KURGANETS-25 armoured infantry fighting vehicle (object 695), the KURGANETS-25 armoured personnel carrier (APC) (object 693) and the 8 x 8 BUMERANG wheeled APC (VPK-7829).

T-14 ARMATA Battle Tank

The new T-14 ARMATA battle tank is the flagship model among these new vehicles, and was hailed as a "wonder tank" by the Russian media, who reported it to be far superior to any existing Western battle tanks and something that would give the Russian military forces a considerable long-term advantage.

In fact, developing its unmanned remotely controlled turret with 125-mm tank gun is an extraordinary and noteworthy achievement – especially for the Russian armaments manufacturers (UralVagonZavod in Nizhny Tagil). However, the unmanned turret is not a design innovation. During the 1970s and 1980s, every respectable Western nation was designing and developing tanks with unmanned turrets. Ultimately, however, they came to realise that the technical and tactical disadvantages outweighed any potential benefits, and they returned to the conventional turret design.

The undeniable advantages of an unmanned turret are that it provides maximum survivability for the crew (at a given combat weight) combined with maximum ergonomic design of the compact crew compartment in the tank hull. However, these advantages were much needed in the T-14 battle tank because its predecessor Russian battle tanks exhibited disastrous vulnerability and – at least from a Western perspective – featured extremely poor ergonomic design.

As with any tank design, as well as advantages, it also has some notable disadvantages. Including in the areas of: battlefield observation ("operational awareness"), target acquisition, automation including reliability, munitions tracking, emergency operating functions, level of protection for the weapons system and mission capabilities. Especially for the functions: take aim; laying the gun at the target and loading the main gun – there are no manual back-up-solutions with the T-14!

According to reports, 20 units of the T-14 battle tank have been produced to date. In the T-14, the crew (tank commander, gunner, driver) is accommodated in a compact and heavily armoured crew capsule. Behind the crew compartment, in the hull, is an autoloader with 32 rounds (separated ammunition). 45 rounds are carried for the main gun. The engine is at the rear end of the tank, behind a bulkhead. The engine is a twelve-cylinder diesel engine, newly developed in Chelyabinsk, with the cylinders in an X-arrangement with two turbochargers and two intercoolers (882 kW continuous power, 1,103 kW short-term peak power capability). It has a 12-speed automatic gearbox and a hydrostatic steering system. The running gear has seven road wheels with conventional torsion bar suspension.

(Photos: Hilmes archive)

The T-14 ARMATA battle tank with unmanned turret and 125 mm gun

The T-14 battle tank's protection system presumably features a combination of multi-layered composite armour and elements of adapted reactive armour. The vehicle is also equipped with an Active Protection System (soft-kill and hard-kill systems). The vehicle weighs 48 t.

The T-14 is expected to cost around 400 million rubles (c. €7.13 million) per unit (three times the cost of a T-90 battle tank) due to its high degree of automation, the high number of electronic components and its data processing capabilities. Following successful completion of testing and field trials, Russia anticipates that around 2,300 vehicles in the ARMATA series of heavy vehicles will be produced by the year 2020 (500 vehicles per year). It is therefore to be expected that the appearance of the vehicles may still change significantly.

T-15 Armoured Infantry Fighting Vehicle

The second vehicle in the ARMATA range is the T-15 heavy armoured infantry fighting vehicle. In contrast to the battle tank

Left: The T-15 heavy infantry fighting vehicle with EPOCH remotely-controlled turret; right: The KURGANETS-25 armoured infantry fighting vehicle with obvious thick armour covering the sides, which is designed to provide protection against RPG-7 grenades

Left: The amphibious 8 x 8 BUMERANG armoured personnel carrier; right: 2S35 KOALITSIYA-SV 152 mm self-propelled howitzer with modified chassis and a new turret

variant, the T-15 has its engine at the front, allowing rear access to the back crew compartment via a ramp. The three members of the regular crew are housed behind the engine. Behind that is the standardised EPOCH turret, designed by the KBP Instrument Design Bureau, which is a remotely-controlled turret.

The main weapon is a 30-mm MK 2A42 with 500 rounds (AP/HE). There are two large observation devices on the turret, which are apparently for use by the tank commander and gunner. Furthermore, there are two lots of two KORNET-EM guided missile launchers on the sides of the turret. A 7.62 mm PKT machine gun serves as an auxiliary weapon. There is supposedly room for eight soldiers in the rear of the vehicle, beneath the turret. This vehicle is also equipped with soft-kill and hard-kill protection systems.

KURGANETS-25 Armoured Infantry Fighting Vehicle

In addition to the heavy vehicles in the ARMATA series, two variants of the medium-sized KURGANETS-25 armoured infantry fighting vehicle were also presented. These vehicles were developed and manufactured by the company Kurganmashzavod (KMZ). The amphibious vehicles' combat weight is to be around 25 t, so that they are buoyant. The AIFV variant also has an EPOCH turret with the corresponding armaments. The crew consists of a regular crew of three soldiers and six grenadiers. In the APC variant, the vehicle is given a smaller turret with a 12.7 mm KORD machine gun. In addition to the three-man regular crew, this variant can also carry eight grenadiers. The prominent heavy side armour is striking, and appears to provide protection against RPG-7 grenades whilst simultaneously providing volume for buoyancy. These vehicle are also equipped with soft-kill and hard-kill protection systems.

8 x 8 BUMERANG Armoured Personnel Carrier

The 8x8 BUMERANG armoured personnel carrier was also presented as a new innovation at the parade. In contrast to earlier Russian models of APC, this vehicle's engine is located at the front, on the left-hand side, next to the driver. The level of protection is said to have been significantly increased compared to previous BTR-series vehicles. The combat weight is expected to be 18 to 20 tonnes. The vehicle in the parade was also fitted with an EPOCH turret. It is an amphibious vehicle and is expected to form the basis of a comprehensive family of vehicles.

2S35 KOALITSIYA-SV 152 mm Self-Propelled Howitzer

Finally, the 2S35 KOALITSIYA-SV 152 mm self-propelled howitzer was presented as a "semi" innovation. Its chassis is a modified version of that of the existing 2S19 armoured howitzer, with a new turret. Because the three crew members are in an armoured capsule in front of the turret, the turret itself is likely to be unmanned and the projectiles and propelling charges are fed to the weapon by an automatic loader. It is expected that the new weapon (2A88) and new ammunition (with new laser guidance) will be able to achieve a range of up to 60 km. The auxiliary weapon is a 12.7 mm KORD machine gun in a remote weapons station on the roof of the turret.

Powerful – but no Wonder

Overall, the vehicles discussed here are modern and powerful systems – but in no way could they be called wonders. The family concept of the ARMATA series is an almost exact copy of the German NGP project (Neue Gepanzerte Plattformen, "New Armoured Platforms"), which was ended ten years ago. Given the outlook for the Russian budget, it is highly doubtful whether the planned procurement of a total of 11,000 new vehicles can be achieved by 2020. The question also remains as to whether Russian industry will be in a position to manufacture the technically complex assemblies with the required degree of precision and quality. Realistically, it is to be expected that the refurbishment programme will be subject to time delays and a reduced production volume. Nor are hopes of exporting the vehicles – at least for the heavy, complex and expensive ARMATA range – very likely to be met. ■

The International Combat Aircraft Market – A Two-Pace Surge

Georg Mader

Over the past few decades advances in electronic sensors, communications technology and guided weapons have considerably transformed the nature of air combat. While this became evident in hundreds of air-to-ground strikes from Libya to IS over Yemen and Mali; on the other hand there have been no reports of air-to-air engagements involving modern fighters in the same period.

It appears as if ground-attacks were properties of the 'contemporary war', while air-to-air combat remains reserved for 'future war(s)'. But why does it seem that the latter is what new manned combat aircraft are prioritised in terms of marketing efforts, with their claws sharpened by air-to-air missiles like METEOR, etc.? Currently there are less than twenty nations with an industrial base capable of building combat aircraft, including China, France, Germany, India, Italy, Japan, Russia, Spain, Sweden, the US and the UK. But Delhi and Tokyo are not present on the export market, and four nations have joined in the scope of the Eurofighter TYPHOON programme, thus leaving just six providers to compete for a global footprint. This article provides a survey of current contenders and their markets at two different paces: Asia/Middle-East vs. Europe.

(Photo: USAF)

It is expected that a 'stabilising' JSF will advance LMCO to control over 50% of the market share.

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In total, IHS-Jane's or TEAL expect the global military aircraft market to be worth ~US$61 billion in 2015, expected to grow to ~US$ 85 billion by 2025. Although the F-35 from Lockheed Martin (LMCO) will only fully impact the market after 2020 and Russian Sukhoi (within UAC), with +500 aircraft of various Su-30-models, will have the top score in selling fighters, the market ahead of us is anticipated to be increasingly dominated by the US, followed by Europe. It is expected that a 'stabilising' JSF will advance LMCO to control over 50% of the market share, bringing. US rival Boeing's share down to 10%. The US will nevertheless remain the largest spender with a cumulative expenditure of US$260.9 billion over the next decade. In terms of segments, multi-role aircraft are expected to account for 56.4% of the total military aircraft market, followed by reconnaissance and surveillance aircraft and tanker/transports. In terms of receptive market regions, the Middle East and Asia/Pacific clearly dominate, while there is definitely a 'surge' of activity for aircraft industries that often cheer just one or two procurements per year worldwide. This is clearly driven by events in regions where security challenges like in the Arabian Gulf region helped drive the Kuwaiti and Egyptian decisions. But that applies only for those regions. Otherwise we can observe reductions, especially in Europe, where the inventories have been halved since 2010.

Contractors and Aircraft

International combat aircraft manufacturers comprise LMCO, Boeing, Saab, BAE Systems, Northrop-Grumman, Airbus, Dassault Aviation, Russian Aircraft Corp. MiG, Alenia-Aermacchi, Eurofighter, Pakistan's Kamra-Complex (with) Chengdu Aircraft Corp., Shenyang Aircraft Corp., Hindustan Aeronautics, Kawasaki Heavy-Industries, Korean Aerospace Industries, Sukhoi, Mitsubishi Heavy Industries, Turkish Aerospace Industries and Yakovlev. The following survey will concentrate on the dominant providers – not all of which are exporting. But, of course, all make MRO revenues for their jets in the course of their lifetime. The LCC (Life Cycle Costs) factor has become increasingly important and has been considered in international competitions and RFP requirements.

Boeing F-15E STRIKE EAGLE

With no older versions in production anymore Boeing's F-15E bears the brunt of the growth of LMCO's F-35. With F-15 derivatives delivered to Korea and Singapore and a second decision by Korea overturned in favour of F-35s, the lack of new contracts might push the company to close down the production of the EAGLE by 2019 after completion of the deliveries to Saudi Arabia. 14 out of 84 F-15SA were delivered in 2014, while 70 earlier model F-15Ss are being upgraded to F-15SA standard.

Boeing F/A-18E/F SUPER HORNET

44 aircraft were delivered in 2014 and, as of 31 December 2014, 68 F/A-18E/F SUPER

(Photo: USAF)

Internationally the SUPER HORNET has lost out on the Saab GRIPEN E in Brazil and Dassault's RAFALE in India.

HORNETs contracted by the U.S. Navy have remained as backlog at Boeing. The 2015 budget added an additional funding for 15 of the F-18G GROWLER EW version, but President Obama's fiscal year 2016 budget-request recently submitted included no additional funding for the SUPER HORNETs . In response to this budget request, the U.S. Navy has indicated the need for 12 F/A-18 through its unfunded requirements list. This need arises as the U.S. Navy plans to retire three squadrons, or 36 older 'Legacy HORNETS' due to obsolescences, hence creating a shortfall of fighters. Internationally the SUPER HORNET has lost out on the Saab GRIPEN E in Brazil and Dassault's RAFALE in India. It only managed to capture the attention of the Australian government so far, with Canberra going for an all two-seat fleet of 24 F-18F and (from 2017 on) 12 GROWLERs. Otherwise the type has continued to struggle to win new contracts, specifically within Asia as presently the fastest growing defence market in the world. But early in May it became public that Boeing won a deal with Kuwait for (up to) 40 SUPER HORNETS, a welcome refresher for St. Louis beating European contenders like Eurofighter or Dassault. The contract – said to have a volume in excess of US$3 billion – has yet to be announced officially by either the US or Kuwait. But officials in Washington have confirmed an agreement is close and – it requires approval by the US-Congress – likely. Boeing officials have said production of two aircraft per month, or 24 per year, is necessary to keep the production line in St. Louis, Missouri at break even.

Lockheed-Martin JSF F-35 A/B or LIGHTNING II

LMCO's F-35 programme covers three variants (F-35A, F-35B and F-35C), with a total of 1,743 aircraft designed to meet the specific needs of America's service branches and with several hundred more for a number of friendly forces such as the United Kingdom, Australia, Italy, The Netherlands, Norway, Japan, the Republic of Korea, Turkey, and Israel. However Michael Gilmore, the U.S. DoD's Director of Combat Testing, has stated that the F-35 has a delicate software and serious radar deficiencies or that its gun will not be operational for another four years. LMCO and the JPO (Joint Program Office) countered, but the new design clearly has to complete quite a number of test campaigns with over 100 built already and with the GAO and Congress questioning engine safety after the fire in June of last year. But the Joint Strike Fighter has full support from the U.S. – who has put all their eggs into its stealthy basket – and other partner countries. It is, however, important to note that the F-35 production cost has decreased. The issue of affordability could subsequently translate into increased international demand for F-35 aircraft, thus expecting it to dominate export markets in the future, possibly capturing over 50% of the global fighter market by 2020. The first non-US assembled F-35A was rolled out at Cameri (Italy) earlier this year. In early April 2015, however, US Navy Secretary Ray Mabus made the point that the F-35 "…should be, and almost certainly will be, the last manned strike fighter aircraft the Department of the Navy will ever buy or fly. Discussions among our community if the 60% F-35 'stealth-striker' is not a real dogfighter with its high wing-loading and if the unprecedented network warrior could overcome this by its superior sensors are legend. But as the half-generation of older F-22A – the inherent air-dominance fighter of our days – is strictly not exported by US Congress, the F-35 offers the utmost '5th generation tool' available…".

Lockheed-Martin F-16C-F FIGHTING FALCON

Since the end of the Cold War the F-16 has been popular enough to keep Lockheed's production lines alive. Not only were 4,500 FALCONs built, the aircraft also is one of the most modified jet fighters in service. While most are still designated F-16C/D, there are actually six major upgrades, identified by Blocks (32, 40, 42, 50, 52, 60), plus the Israeli F-16I, which is a major modification of the Block 52. The other special version for the UAE is called the F-16E or Block 60. As a backbone of several NATO nations – like Turkey with over 250 – the FALCON remains a potent platform. While an additional 30 Block 61 announced last year seem stalled, American commanders believe that the 80 F-16E/F fighters the UAE bought over a decade ago could probably quickly destroy the entire Iranian Air Force by themselves and without foreign assistance. But since or if there are no likely customers elsewhere, the F-16 line will probably close by 2017, with the last F-16 built for Iraq. Baghdad ordered 36, but initial deliveries to Balad air base (north of Baghdad) were delayed because of security concerns after islamist IS militants overran large areas of Iraq and the US Government feared the weapons could end up in their hands. Meanwhile, according to a statement posted on the Iraqi MoD website, the F-16IQ (Block 52) aircraft are scheduled to arrive in mid-July along with the U.S.-trained Iraqi pilots and spare parts and will be earmarked for immediate deployment against ISIL. The F-16 also has a second-hand market. There are some 1,000 F-16s in global service, including 830 Block 50/52s outside the U.S., which according to BAE are candidates for

(Photo: USAF)

The F-16 line in the U.S. will probably close by 2017, with the last F-16 built for Iraq.

upgrades extending their service life from 8,000 to 10,000 hours, which promises to be a valuable investment.

Dassault RAFALE

After an arid 'valley of tears' for 15 years without gaining a foreign customer for its formidable though expensive RAFALE, 2015 is the year to cheer for the men around Eric Trappier. The first announcement on 13 February suggested that Egypt would become the first foreign customer, taking advantage of Saudi money for Cairo's Al Sisi. Then, on 10 April the Indian Prime Minister Narendra Modi announced an order for 36 RAFALEs while in parallel shelving for the foreseeable future the 126 aircraft which had been subject to inconclusive negotiations since 2012.. A week later, the United Arab Emirates said it was restarting talks with Dassault about up to 60 RAFALEs, and by the end of April Qatar declared its intention buy 24 of the French fighter including a large package of modern French and MBDA ordnance for US$6 billion. The RAFALE can justifiably be called combat-proven in Libya, Afghanistan and Mali. In addition, in case of a possible war in a volatile region a steadfast committed single-source supplier like France has its merits, e.g. as opposed to the technically very similar and superb Eurofighter TYPHOON with four parliaments and opposition-parties in its 'back office'. The only remaining challenge for Dassault is to speed up peacetime production from 11/year for the Armeé de l'Air to at least 24. But there are worse fates than that...

(Photo: Dassault Aviation)

A challenge for Dassault is to speed up RAFALE production from 11/year for the Armeé de l'Air to at least 24.

Eurofighter TYPHOON

Following the French surge and the Kuwaiti decision in favour of the SUPER HORNETs, the four-nation Eurofighter consortium is encountering considerations that it might be forced to close production lines in 2018, if new TYPHOON orders were not to materialise this year. While it wants compensation from the core governments for (probably) not executing the option of the last Tranche-3B, the Eurofighter TYPHOON remains the most potent non-US combat-jet programme so far with a standing total of +700 aircraft ordered by the UK, Germany, Italy and Spain including 72 for Saudi Arabia, 12 for Oman and – a decade earlier and affected by political mutilation certainly not the showcase launch-customer – 15 for Austria. But it has painfully lost out to rivals in recent years for significant orders, like in the UAE or India. Also a long-awaited supplementary order of 48 by the Saudis has yet to materialise. In a BAE-systems investor presentation in mid-2014, the group predicted that the TYPHOON would account for 16% sales of £ 16.6 billion, but states that without continuing manufacture of high-performance aircraft, BAE risks to lose the industrial and engineering skills needed to compete in a next generation combat aircraft market. The same is gradually valid for the other three participating nations' industries. As indicated before, compared to the French a problem for the TYPHOON might be inconsistencies in the four core nations' foreign policy, with Paris considered far better at backing national industry with military initiatives. Also, due to the multinational ownership structure of Eurofighter it has taken long to agree on upgrades – like the recent P3E agreement announced in Abu Dhabi in February – with regard to the aircraft's weapon strike and BVR capabilities or its AESA radar system. Both features are already on offer with the French and Swedish aircraft. For the moment Bahrain, Denmark, Malaysia and Indonesia are Eurofighter's most pursued markets, with a slim chance that India might open up again after the initial government-to-government RAFALE deal and the commercial MMRCA-tender for 126 subsequently buried.

Saab GRIPEN

In mid-2014, Saab Aircraft's Deputy Chief Executive Lennart Sindahl said in an interview with the author that there was "growing interest in the GRIPEN from countries spread across Russia's European flank, amid rising tensions over Ukraine." The Czech Republic and Hungary have already prolonged their lease of 14 JAS-39C/D each and Mr. Sindahl declared to be "open to more such solutions as others in the region with limited budgets more or less desperately seek more modern air power. Even if they do not expect a Russian intervention, there are more tensions, and robust air policing becomes necessary; so if you have only a few MiG-21s left you could need to have a more capable system. Also, as leasing-solutions such deals generate significant support deals." While he referred to the currently available C/D-versions, of which the last new-built one was recently handed over to the Flygvapnet (Swedish Air Force), he also underlined "upgrades of existing versions (as) an increasing part of the business." Subsequently Saab announced a new Mark 4 version for the in-house radar of the current version, which it hopes Sweden will adopt. Obviously, Saab is upbeat about exports after scoring a breakthrough in Brazil where – beating RAFALE and SUPER HORNET – it is now finalising a US$5.4 billion order for 36 and maybe later up to 108 next-generation GRIPEN Es. Despite the setback of 22 such new jets rejected in the Swiss referendum in May 2014, Saab expects total exports of 300-450 GRIPENs over 20 years. And it has not abandoned hope of winning business in two countries where it suffered past setbacks. While other Saab officials were inofficially quoted to be back in Switzerland by 2017, the other one (again) is India. After the 'mother of all deals' with RAFALE more or less dead, Saab believes that there could still be opportunities for a light jet. "We hear clear signals from India that something else is needed and we are here and ready to transfer ample technology up to full-fledged production to fulfil the country's 'Made in India' policy", Mr. Sindahl explained.

The Russians

Russia – or better the Government of the Russian Federation – continues to remain a special case, both geographically and politically. Since early 2014 Russia has distanced itself from Europe and 'the West' in a way only the hardcore pacifist would not be shocked about. However, the Ukrainian conflict requires Russia to be considered with even more attention, in particular its

militarised Western districts geographically situated within Europe. With about 1,300 noteworthy combat aircraft in service, Russia remains self-sufficient in terms of fighter procurement, thanks to its renowned and established manufacturers who have meanwhile as well arrived at the 5th generation. According to the Russian state-run United Aircraft Corporation (UAC) joint stock company, which encompasses Irkut, Mikoyan, Sukhoi, Ilyushin, Tupolev, Beriev and Yakovlev, Russia built more combat aircraft in 2014 than the U.S. While in 2013 the UAC companies delivered 68 aircraft, the output rose to 100 aircraft in 2014, though with 95 of those destined for the Russian Air Force. Russia is successfully exporting (+)4th generation fighters to Africa and Asia, with the Su-30-series even being the world's unchallenged top seller with +500 in 15 countries. According to Russia's Deputy Minister of Defence Yuri Borisov in 2015 27 Sukhoi Su-30SMs (out of 72) will be delivered to the Air Force and Navy, as well as four to Kazakhstan. The Air Force's premier offensive element will be the Su-34 PLATYPUS which entered service in 2011. This aircraft is not subject to any export activities, and the Russian inventory will comprise 124 of the side-by-side seated strikers by 2020 . The Air Force is also receiving the last 14 Su-35 (out of 48), the latest single-seat 4++ FLANKER version now also offered to China and Indonesia. The latest Russian design is the sound-looking, externally stealth-designed Sukhoi T-50 (PAK FA), with four test airframes flying. The programme is financed and executed in cooperation with India, where it is designated PMF (Perspective Multifunctional Fighter) but numbers are down to 127 (from originally 250), and although India has requested a two-seater, Russia is not considering one. For the Russian Air Force, too the T-50 was recently slowed down to 12 until 2020 (from 55), due to the economical downturn partly induced by Russia's role in the Ukraine but also by the halved crude-oil price. Meanwhile the Russian naval aviation is replacing the few Su-33K's in the air wing of its sole carrier ADMIRAL KUZNETSOV with 24 more modern MiG-29K/KUB. These are similar to those 25 delivered and 12 contracted until 2016 for the two carriers of the Indian Navy.

The Chinese

Emerging China is perfectly capable of exporting modern fighter/trainer aircraft, but so far has done so to threshold countries only. At the same time Beijing is intensively upgrading the technical standards of its 100% state-owned domestic aircraft manufacturing industry around its Chengdu- and Shenyang aircraft corporations (GAC and SAC). While Bangladesh has received the final Chinese-built MiG-21 derivatives with the F-7BGI, the FC-1 XIAOLONG fighter (co-produced as JF-17 THUNDER in Pakistan, with the first two of Block-2 launched in June 2014) appears suitable for use by developing countries that cannot afford fifth-generation fighters. FC-1/JF-17 is an affordable solution for such nations, as they are less likely to be attacked by stealth aircraft and have no need to carry out long-range strikes. In the past, countries like Azerbaijan, Egypt, Nigeria or Serbia have been named by the Chinese AVIC-umbrella organisation, but so far, apart from Pakistan, no contracts have been signed. The same applies for Chengdu's J-10 fighter, marketed as FC-20. The Chinese J-11A/B FLANKER derivatives – mainstay of the Chinese Air Force (PLAAF) until the forthcoming 5th generation J-20 – have so far not been offered for export.

Global Markets

Asia/Pacific

India remains both the world's most populated democracy and the world's largest arms importer. But even with close to 200 licence-built Su-30MKIs and several dozens of JAGUARs, MIRAGE 2000s and MiG-29UPGs under modernisation, lawmakers in New Delhi these days are again criticising that the Indian Air Force (IAF) faces a critical shortage of both aircraft and pilots. They attack the Indian MoD over the poor state of the IAF in comparison to its Chinese and Pakistani counterparts. The Standing Comittee on Defence in late April lamented that "the number of 35 current active fighter-squadrons is seven below the sanctioned strength of 42. And with the number of squadrons even further to decline over the next seven years when MiG-21s and MiG-27s are outphased, a dramatic drawdown has already begun and by 2022 the IAF will have just around 25 squadrons, thereby losing even the slight edge over rival neighbouring nations." All of that outspoken urgency makes foreign fighter jet makers see fresh multi-billion dollar opportunities in India after the obvious decision by Prime Minister Narendra Modi to free-up cash to buy a new fleet of mid-range planes. He announced that India would now buy 36 French RAFALEs for an estimated U$4.3 billion, in effect ending the endless discussions about a larger commercial deal for 108 planes built locally by HAL that would have sucked up some $20 billion, thus locking out rivals for a whole generation. With this new contract yet to be signed, the Indian Minister of Defence Manohar Parrikar already indicated that required additional RAFALEs could be purchased G2G or off-the-shelf, as "the best option for the acquisition of strategic weapon platforms like fighter-aircraft" while criticising that in the former MMRCA programme "the lowest bidder (L1) was decided by a questionable life-cycle cost factor." With all this duly considered, Sweden's Saab and US Lockheed-Martin are already set to re-pitch their latest GRIPEN and F-16 variants as the kind of lighter, single-engine aircraft that Parrikar said the IAF needed to complete its fleet, though both types had been eliminated in the MMRCA tender. The more so as the indigenous HAL LCA or TEJAS has just now reached IOC after 30 years and has been criticised for several critical shortcomings (20 permanent waivers/33 temporary concessions) not to be addressed until it's Block-II in 2019. The other – or another – big project for the IAF is the 5th-generation stealth(y)

(Photo: Bundeswehr)

For the moment Bahrain, Denmark, Malaysia and Indonesia are Eurofighter's most pursued markets.

FGFA fighter, co-developed around Russia's Sukhoi T-50 PAK FA and lately called the Perspective Multifunctional Fighter (PMF). The preliminary design phase (PMD) of the US$ +10 billion project was completed by June 2013, but currently the Indian side suggests that its version will be designed for two pilots while the Russians would only have single-seaters. While it remains unclear if the twin-seat configuration has made it into the PMD, there were reports on Indian dissatisfaction with the access to information the Russians have provided, like following an engine fire last June. The completed PMF, the numbers of which for India have come down from +200 to 127 – will include a total of 43 improvements compared to the Russian T-50 version, including supersonic cruise, advanced (different) sensors and avionics and networking.

(Photo: Sukhoi)

The latest Russian design is the externally stealth-designed Sukhoi T-50 (PAK FA), with four test airframes flying.

As explained above, China has been self-sufficient and not a market for fighter jets until today, at least not in the conventional way of importing combat aircraft from abroad. It is nevertheless acquiring technology to be adapted for own designs by various clandestine means, leading to several court sentences against Chinese nationals or Chinese-born citizens in the US.

Beside these two Asian giants, the Asia/Pacific markets can briefly be described by what LMCO and sources close to the company predict as an 'Asian sweep' for the F-35 JSF. When South Korea in late 2013 overturned its procurement agency's choice of the Boeing F-15SE SILENT EAGLE for the ROKAF's new fighter and announced that it would buy the F-35A Joint Strike Fighter, Japan had already chosen the new U.S. fighter over the Boeing F/A-18E/F SUPER HORNET and Eurofighter TYPHOON, with the latter also passed over by South Korea. Singapore is expected to follow suit, with Singaporian Defence Minister Ng Eng Hen confirming that while the country was in "no particular hurry to buy the F-35, it was seriously looking at it to replace our F-16s." Other nations in the region – gradually influenced by factors like regional economic developments, the dynamics of the arms market and technological progress – show similar motivations, driven by the desire to either match their neighbours and/or the growing threats from China or from nuclear sabre-rattling North Korea, which has asked for but does not get modern Russian jets, making Seoul outlining a pre-emptive strategy aimed at degrading the North's nuclear strike capability to the point where missile defence can handle surviving threats. Thus South Korea's and Japan's decisions were both influenced by their national strategies as well as their close relationship to Washington, which has been known to exert pressure on allies to acquire the JSF. While the US JPO is hard working on its affordability, the F-35 remains expensive.

(Photo: MoD India)

The Indian Minister of Defence Manohar Parrikar indicated that additional RAFALEs could be purchased.

Seoul is acquiring only 40 F-35s with deliveries starting in 2018, with the funds that would have paid for 60 EAGLEs. South Korea also wants to upgrade its +130 F-16s, but at the request of South Korea the U.S. Government cancelled the preliminary US$1.7 billion contract with the U.S. unit of Britain's BAE Systems in November 2014. Now South Korea pursues a similar upgrade deal with LMCO, the FALCON's original manufacturer. Not surprisingly it selected Korea Aerospace Industries Ltd. (KAI) as the preferred bidder of a multibillion dollar deal to develop a new twin-engine 5th generation stealth fighter in March. The project, known as KF-X for 'Korean Fighter Experimental' will replace a decade-old fleet of F-4s and F-5s. The initial investment in the project is 8.7 trillion won (US$7.9 billion), with the total production costs expected to more than double that amount. 80% of the funding will be provided from Seoul and 20% from Indonesia, in a previously agreed deal for joint development and production for both air arms.

While the 42 F-35 on order comply with Japan's requirement for possible strikes into areas covered by advanced integrated air defence systems, it is said to replace the F-4EJKAI fighters used in the air defence role. But that will depend on changes in Japan's defence strategy under the conservative administration of Prime Minister Shinzo Abe. With Japan Air Self-Defence Force (JASDF) fighters scrambled 944 times against Chinese (and Russian) military contacts until March the new doctrine views China as a rising adversary, with long-term plans to acquire Japanese-held islands. It also emphasises offensive weaponry and leans toward relaxing Japan's post-World War II constitutional ban on defence exports. For the foreseeable future this has got nothing to do with fighters, as the JASDF still must decide how many of its F-15Js should be upgraded to MJs incorporating the most recent mechanically scanned APG-63(V)1 radar and a new EW suite. Beyond that and the F-35, Japan is funding Mitsubishi's Advanced Technology Demonstrator-X (ATD-X) stealth fighter prototype SHINSHIN. The 5th generation programme has been underway for a decade, with a full-scale, detailed radar cross-section model tested in the massive French indoor RCS range in Bruz, back in 2005. ATD-X was recently rolled-out and is due to first fly any day at the time of writing.

Indonesia and Malaysia are both operators of various Su-27/30 series, and the new Su-35 has been offered as a candidate in both nations' current fighter contests, with Indonesia confirming its dedicated interest in the type. Both could nevertheless enter into competitions with U.S., Russian and European fighters as both the Eurofighter

TYPHOON, of which reportedly also used aircraft are considered, and Boeing Advanced SUPER HORNET (with IRST and stealth features) were promoted hard at the Lima show in Malaysia in March. But also Saab sees prospects for its GRIPEN E/F in Asia, but with its foothold in Thailand one idea is a lease of fighters (to begin with and later to be upgraded) to Malaysia where proposals have been accepted to replace the 18 aging MiG-29Ns. Indonesia has already shortlisted the GRIPEN together with Su-35 and F-16/60. Thailand has received two batches of 12 GRIPEN C/Ds and according to a Saab spokesman the Thais would want more, based on the assumption that funding can be provided.

While rising Vietnam is another Sukhoi market, New Zealand has no plans to acquire fighter jets. Australia is another determined F-35 follower despite the JSF's requiring more tanker support in fulfilling regional strike-missions over long distances if compared to the retired F-111s. In the long term Australia has committed to 72 F-35A aircraft for three operational squadrons, with two already flying in the US.

(Photo: MoD Japan)

Japan is funding Mitsubishi's Advanced Technology Demonstrator-X (ATD-X) stealth fighter prototype SHINSHIN.

Middle East

The region around the Arab GCC monarchies may be today's most profitable market for combat aircraft, accounting for 29% (or US$38 billion) of the TEAL Group's US$ 130.5billion 2015-2024 export forecast. There is a strong likelihood of orders for about 200 high-end fighters from countries in the Middle East over the next two years. In mid-May White House officials sought to tamp down speculation that King Salman of Saudi Arabia recently cancelled his attendance at Camp David when the U.S. had indicated that his country – as opposed to all other GCC members, namely Kuwait, Bahrain, the United Arab Emirates, Oman and Qatar – would not be permitted to buy F-35s. US officials quickly denied that the 2015 US/GCC-summit was ever meant to present the Gulf states with a check list on weapons. And a security-adviser to Vice-President Biden urged to keep in mind that "under the Obama-administration the US provided a package for the Saudis that includes the most advanced F-15s in the region. The Emirates fly the most advanced F-16s in the world, even more advanced than the ones the USAF flies." And he perfectly illustrated the region's importance when he counted that "taken as a whole, the GCC together last year spent nearly US$135 billion on their defence. The Saudis alone spent more than US$80 billion. And taken in comparison, the Iranians spent something like US$15 billion on their defence…".

That suggests how the region's table is 'served': A clearly felt deeper concern because of an assumed and highlighted Iranian desire to re-create the 'Persian Empire', than attention paid by the rulers towards their own clerics and citizens funding and fuelling IS or Al-Qaeda. Besides they participate with half of a squadron in a US-led coalition with 'intimidating' strikes against the Islamists in Iraq and Syria – but also in Libya. Today, some Arab nations are not sure if the US would cut them off in the context of the pursued nuclear deal with Iran, with the side-effect of Saudi-led airstrikes involving RSAF TYPHOONS and TORNADOs as well as F-15S against the Houthi rebels in Yemen, which are viewed as Iranian proxies. Nevertheless, security challenges in the Arabian Gulf region following the drastic geopolitical changes initiated by the social revolution of the so-called 'Arab Spring' likely helped drive the Kuwaiti decision for F-18E/F and – in turning towards Europe as a dual source – the Egyptian and Qatari ones for RAFALE. Another driving factor is Russia's decision to sell S-300 air defence systems to Iran, as this could potentially increase Iran's ability to combat the Gulf States' stronger air forces in the event of a war.

While Oman has already opted for 12 Tranche 3 TYPHOONs for delivery from 2017 as probably the most capable ones available, Bahrain represents another market. The kingdom provided twelve fighter jets to the Saudi-led 'Operation Decisive Storm' over Yemen. The fact that the UK announced plans to set up a permanent military base in Bahrain is considered by Britain as an advantage for the Eurofighter TYPHOON in a yet undecided selection.

The UAE's planned follow-on purchase of 30 F-16E/F Block 61s – announced in January 2014 – seems to have stalled, with the country also now more likely to go European. But while the case looked quite prosperous for the TYPHOON, Abu Dhabi confirmed in April another round of contract negotiations for the RAFALE, but demands an upgraded version as opposed to the off-the-shelf deals for Egypt, India or Qatar.

(Photo: Mader)

F-15S of the Royal Saudi Air Force (RSAF)

It remains to be clarified if Israel's commitment to up to 72 F-35As – modified after steadfast demand with Israeli EW and datalink – constitutes the reason for the rumour that no GCC nation would get the JSF, as there already are F-15I and Saudi F-15S and even forthcoming SA versions.

Unless UN sanctions will be lifted as a result from an agreement related to Iran's nuclear policy, the country and it's largely obsolete Air Force (IRIAF) with roots in the Shah era during the 1970s and an inventory consisting of F-14A, F-5A/B (plus indigenous derivatives), MiG-29As, Su-24, ex-Iraqi Mirage F.1s and Chinese F-7N/TN continues to remain under a Western embargo.

(Photo: Saab)

Between 60 and 80 new Gripen-E on the basis of the sole NG-demonstrator for the Swedish AF Flygvapnet have been secured – even without Switzerland.

Europe

In comparison to the markets considered above, Europe seems to qualify for the imperative of "Forget everything you have heard so far." Europe has arrived at the point where much moaned about austerity struck defence budgets in very different European nations. Of those the EU members have paid attention to a EU commission that has left decisions on defence to its 28 members, but does propose "measures to create a more open competition in a market dominated by big companies such as BAE Systems, pan-European AIRBUS or Italy's Finmeccanica." What the commission proposes against a 50% drawdown in European ORBAT inventories over the last 10 years remains unknown…

As by far the largest European programme the Eurofighter TYPHOON was combat-proven over Libya and is now deployed to Yemen and remains in production for the four member countries UK, Germany, Italy and Spain with the so-called Tranche 3A until at least 2017. As far as Tranche 3B is concerned, Britain was to hold the largest commitment with 48 aircraft, followed by Germany with 37, Italy with 25 and Spain with 14. All but Germany, however, are suffering from significant public finance constraints, which have led to reductions in defence spendings and to the split of Tranche 3 in 2009. Germany and Britain, however, have already firmly ruled out further procurement efforts, and it appears likely that Tranche 3A will be the last production batch on order to the original consortium countries. Last year Airbus brought forward up to one billion Euro in compensation demands for Germany's Tranche 3B cancellation, while Britain tried to compensate its non-exercising of the Tranche 3B option by substituting 3A models for Saudi Tranche 2 jets, which were procured under a direct G2G deal. Also, by the time the last Tranche 3A aircraft will enter service around 2020, the first batch of Tranche 1s – with no 'reflections' known regarding the yet rarely flown Austrian fleet of 15 early Block-2/-R2/-5s – are approaching the end of their service-life.

But Europe is also F-35 territory. As 'dual-users' the UK and Italy are also TYPHOON operators. The British, who will be likely down to an all-time low of 110 RAF jets once Tornado GR.4s and Tranche-1 TYPHOONs are phased out by 2020, are leading the European commitment to the JSF as the programme's only co-producing Level-1 partner. With 48 expected (down from a 150 in earlier stages) they have fallen behind Italy which has still plans for 90 (60 F-35A for the AMI and 15 F-35B STOVL jets each for AMI and Navy) following significant investments in the final assembly line at Cameri. Norway sticks to the planned 52 F-35A. This has also to be seen against the background of an agreement with LMCO, according to which Kongsberg will deliver the JSM anti-ship/strike missile system for any other customer requesting such capabilities. Like all other JSF countries it has just firmly ordered single-digit numbers with final service introduction as an F-16 replacement not expected to commence before 2018. The Netherlands formally signed a binding order for their first batch of eight F-35s in Washington D.C. on 25 March. Defence-Minister Jeanine Hennis-Plasschaert said that "after 13 years of discussions, with this decision, we have crossed the point-of-no-return to begin replacing the RLNAFs 60 F-16AMs fleet before 2020." When it first signed up for the project back in 2002 the country had planned to procure up to 85 aircraft, but now the funds are just providing 37 F-35s. Turkey has a long-term plan to procure 100 F-35s to replace its ageing F-4E/2020 and also gradually its F-16 fleet. With 270 F-16 in service Turkey is the largest non-US F-16 operator after Israel. By mid-2014 Ankara committed to the purchase of an initial two F-35A Block-3F for delivery in 2018. It has also entered into the pre-design phase for the development and production of an entirely indigenous twin-engine (stealth) fighter-jet designated TFX, with SAAB providing design assistance for TAI and, based on an MoU between Eurojet and Aselsan, with the option of an EJ-200 derivative as the aircraft's engine.

As far as Sweden is concerned it is not surprising that the latest version of Saab's successful JAS-39 GRIPEN will form the centrepiece of the Flygvapnet's future fighter force. According to Lena Erixon, a director at Sweden's defence procurement agency FMV, this is also driven by "regional developments like Russian steps in the Ukraine, like changing of borders by military means and its air actions in the Baltic." This also means that between 60 and 80 new Gripen-E on the basis of the sole NG-demonstrator for the Swedish AF Flygvapnet have been secured – even without Switzerland. The new jets are due for delivery from 2018. Other than for Brazil no twin-seater or GRIPEN F is planned for Sweden.

Romania has completed the acquisition of 12 pre-used F-16AM/BM FIGHTING FALCONs from Portugal, in part to replace their modernised MiG-21 LANCERs and thus bringing its air force up to NATO standards. Bulgaria could follow a similar avenue, especially after murky 'middlemen' personally threatened Defence Minister Nikolai Nenchev, blackmailing him to sign a three-times more expensive life-extension for the country's 15 MiG-29A. Nenchev intends to visit the US to discuss the proposed acquisition in the summer of 2015. Eight new fighters are expected to be procured by 2016 to replace Soviet-built MiG-21 aircraft. Of these eight, four would be available for Alliance operations, while the remaining four

would protect Bulgarian airspace as part of NATO's NATINADS air defence. Apart from that Pakistan has offered its JF-17 to Sofia.
Denmark remains a market. Even though the country has joined the JSF programme as a Level-3 partner and the RDAF is considering the replacement of 48 of its aging F-16 fighters with F-35As, there is no firm commitment. A decision to complete the selection process for +30 new platforms is expected to be reached after the next parliamentary elections, probably this summer. Contenders include the two-seater Boeing F/A-18F SUPER HORNET, Eurofighter TYPHOON, and LMCO's F-35A. Last year the Swedish defence-export agency FXM withdrew the GRIPEN from the Danish competition, as the Swedes assessed the requirement as weighted in favour of the F-35. FXM's Ulf Hammarström commented: "We should not repeat the Norwegian example...".
While Poland itself is "happy" with its F-16C/D Block 50 and partly modernised ex-GDR MiG-29 mix, it constitutes a market to replace Europe's last remaining iconic Su-22M4/-UM3s, of which either 32 for five years or 16 for 10 years have been life-extended and modernised. Thus a decision to buy new fighters has been postponed, but it appears to be sure that Russian bids would not be considered in any forthcoming competition.
In January Belgium issued a request for information (RFI) to government agencies and manufacturers regarding various aircraft that could replace the BAF's 54 ageing F-16s before their retirement after 2023. The requirement is for about 40 aircraft to be introduced from 2022, and contenders are the F-35A, JAS-39 GRIPEN E, F/A-18F, RAFALE F3, and TYPHOON.
Following parliamentary elections and a change in government in Finland in April 2015, the next administration in Helsinki will also need to find the money to purchase new combat aircraft to replace the Finnish Air Force's 62 HORNETS, but the number will likely decrease. A final procurement-decision should be made in the early 2020s, with the new jet fighters to be delivered from 2025.
Europe is a model of 'joint defence projects', like in the case of Slovakia. Saab has opened an office in Bratislava and with their Czech and Hungarian neighbours already taking advantage of a GRIPEN C/D leasing contract, Slovakia is expected to follow suit. A year ago, the Czech and Slovak ministries of defence signed an agreement to "launch joint air patrols next year, joint radars and to increase interoperability of the two armed forces." Slovakia needs to replace the remaining 12 MiG-29AS/UBS from 2016.
In Croatia, the MiG-21bisD/UMD inventory of eight remaining ex-Ukrainian wartime 'embargo busters', overhauled in Romania in 2003, continues to be in service; in 2013 the fleet was supplemented by five former Yemeni MiG -21s, also from Ukraine. The MiGF-21s had been slated for replacement since 2006 until last year. But due to persistent economic troubles, the young European state sent eight aircraft to Odessa for 're-re-prolongation' instead. Besides, Pakistan offered its JF-17 to Zagreb.
During a major overhaul carried out in Switzerland in 2014, a crack found in the supporting structure of a F-5E TIGER resulted in inspections for all F-5E/F in Swiss service. By January cracks were found on 16 aircraft. Faced with this situation, the Swiss Air Force – anxious to save money and optimise its fleet following the May 2014 referendum, as a result of which a majority voted against the 22 GRIPEN E selected – has decided to retire 10 and to keep 26 F-5E TIGER (F-5F are not affected) in service along with the 32 F/A-18C/D HORNETs. Repair work is planned for six F-5Es, but RUAG's capacity in this area is limited. As a result, Saab may expect to be called back to Switzerland within a few years.

The Americas

While the USA is self-sufficient in its supply of high-end platforms and does not constitute an export market, Canada remains officially undecided. But despite many believing it not to be suitable in response to Canadian military needs, the acquisition was seen as clearly 'tilted' towards the neighbouring F-35. The competition even had to be re-opened for contenders like F-18E/F or TYPHOON, because in 2012 the Auditor General concluded that the Department of National Defence "did not fully inform the decision makers, did not exercise due diligence and understated the known costs around the F-35 to Parliament." Meanwhile falling oil prices reduced the value of the Canadian dollar and inflation plus increased F-35 unit-costs resulted in a DND report indicating that the planned acquisition of 65 F-35s can no longer be executed within the planned budget.
In Latin America Brazil went for 36 GRIPEN E/F, and the need to replace the F-5Es and AMX probably offers another option for the procurement of more GRIPENs. While Venezuela does not seem to have the funds necessary for the acquisition of the Su-35s that President Chavez had plans for, Argentina remains to be an interesting case. The country's inventory still comprises A-4 SKYHAWKs and MIRAGE DAGGERs, as they had already been in use during the Falkland War in 1982. Replacement ideas of the Argentine MoD include 12 Su-24M FENCERs, Chinese FC-1 or an add-on of 24 to Brazil's soon-to-be built GRIPEN E/F, with the latter opposed by London referring to the British share in the GRIPEN.

Africa

Following the U.S. embargo inspired by the anti-Islamist military coup of president Al-Sisi, Egypt is looking for a diversified supply and decided to go French. The other large North African air force, namely that of Algeria, is believed to be a strong FLANKER follower, same as Angola, Ethiopia, Eritrea and, only recently, Uganda. Africa could be a promising market for Chinese FC-1s or jet trainers, but with South Africa satisfied with their 28 GRIPEN C/Ds, there are no real markets for new top-notch aircraft. However, it remains noteworthy that the long struggles at Darfur or against the Nigerian Boko Haram terrorist group has resulted in acquisitions of quite a number of overhauled ex-Ukrainian and ex-Belorussian second-hand MiG-29s, Su-25s and even Su-24s by Chad, Niger and Sudan. Nigeria is looking for Pakistani JF-17s or Bell-Textron's new SCORPION jet, the latest 'star' at the (lower-end of the) global fighter market.

Finland will also need to find the money to purchase new combat aircraft to replace the Finnish Air Force's 62 HORNETS.

The German Military Aviation Industry – Sectors and Outlook

Bernhard Gerwert

The German military aviation industry has been a reliable and indispensable partner to the Bundeswehr [German Federal Armed Forces] for several decades. Over the last 40 years, the industry has progressed from producing aircraft under licence to systems integration capabilities. Thanks to to our technological excellence and the size of our market, we are an accepted and equal partner of European Community programmes.

Photo: BDLI

Our strategically important sector contributes significantly to the operational capability and operational readiness of all airborne weapons systems. It provides the Bundeswehr with the most powerful, state-of-the-art systems it needs to meet the requirements of its capability profile. The German Luftwaffe is our largest national customer and represents an excellent recommendation for the products and services supplied by our businesses.

The products and services are provided by 22,300 directly employed, highly skilled staff, working in around 100 companies – predominantly medium-sized suppliers, but also systems manufacturers – in the military aerospace industry. In the fiscal year 2013, our industry generated turnover of around €6.8 bn.

With 70 percent of sales coming from the civil aviation sector, this branch is the growth generator in the German aerospace industry today. The military aviation sector currently accounts for 22 percent of sales. 25 years ago these proportions were reversed. At the end of the 1980s, the military aviation sector accounted for approximately 70 percent of revenue, while the civilian sector brought in around 20 percent of revenue. This comprehensive restructuring of the balance between military and civilian aviation happened in the wake of the dramatic political changes of 1989/1990, in line with the re-orientation of the German socio-political landscape.

The military and civil aviation industries both face the same issue: There are no new, extensive research and development programmes – like those of the A380, the A400M, the A350 or the Eurofighter – planned for the near future.

If we look at our transatlantic NATO allies, the USA, we can see that new development and procurement programmes help promote the future viability of the military aviation industry in the US.

The proposed development of a European unmanned aircraft system (UAS) is a step in the right direction. Every armed force in the world with modern equipment will wish to use UAS technology to protect its servicemen and women. The European armed forces need a system that has been jointly developed in Europe. UAS lie at the heart of ground breaking 21st century technologies. The UAS segment is the fastest growing branch of the aerospace industry.

The German military aerospace industry already has superior technological capabilities for the development, construction and operation of unmanned platforms, for example, high-performance flight control systems, sense and avoid, mission equipment, autonomous mission command, efficient propulsion, secure broadband data transmission systems, data analysis, and ground stations for flight and mission control.

The latest, cutting-edge technology provides a basis for maintaining industrial systems capability. It creates the foundation of our ability to compete on the European and international stage. In the past, the majority of key projects were common European programmes, where German industry was an equal partner due to its technological excellence and market size.

It is strategically important to develop ground breaking technologies for the next generation of aircraft, as well as product enhancements (improved combat effectiveness) for ongoing aircraft programmes. Achieving this objective is fundamentally important for manufacturers in Germany – in the aircraft, rotary wing aircraft and engines sector, and for the supply industry, which is dominated by medium-sized companies.

The Military Aviation Sector: a Trendsetter for other Industries

Thanks to its achievements in development work, the military aviation industry has always been a technological pioneer. "Spin-off" is the key term here, and one that could benefit the systems and equipment industry. Developments there have helped shape the huge success of Airbus – examples that immediately spring to mind include modern flight control systems and lightweight designs and materials. In particular, the – originally military – UAS technology will also find a broad range of civilian applications in the medium term.

With this in mind, it is clear that trailblazing technological developments in the German military aviation industry are of extraordinary importance. They can act as a significant impetus for other – civilian – industries and contribute to their success.

In this context, it seems to me that it is important to significantly increase investment in military research and technology and that it be specifically targeted at future needs. ■

Author

Bernhard Gerwert is Chairman of the German Aerospace Industries Association (BDLI) and CEO of Airbus Defence & Space.

Cooperation of Airbus Defence and Space and Cisco

(df) Airbus Defence and Space and Cisco announced a new global partner agreement that will combine their efforts in the defence, security and satellite communi-

(Photo: AD&S)

cation industries to create products and systems in software-defined networking, cybersecurity, mobility, cloud, data intelligence and the Internet of Things (IoT). The agreement comprises access to sales and technology training, joint go-to-market activities, as well as joint solution and service development.

As part of the agreement, Cisco will provide Airbus Defence and Space with an extensive range of industry leading networking, design and engineering expertise from Cisco Services along with networking equipment and infrastructure. At the same time Airbus Defence and Space global sales and engineering teams will have access to Cisco sales and technology training programs, such as Cisco Sales Expert and Cisco Vertical Solutions Architect.

New Testbeds for Galileo

(Photo: ATC)

(df) Galileo, Europe's future satellite navigation system, is scheduled to become fully available with the planned 30 satellites in 2020. These satellites, evenly distributed among three orbits at an altitude of nearly 24,000 kilometers, will provide precise positioning signals more reliably than today. The fully deployed system will guarantee full global coverage. Moreover, the system will be complemented by regional and local ground segments to meet special requirements.

By using two Galileo frequencies simultaneously, a positioning accuracy anywhere in the world between eight and four meters can be obtained. Supplementary ground-based systems will enhance that precision to one meter on a local basis.

Galileo will constantly monitor its own functionality. This integrity information will be transmitted with the navigation signals. The time before a user is informed about any malfunction within the system is to be less than six seconds worldwide, on a local scale less than one second.

A variety of test facilities within which Galileo-conformable signals are transmitted were set up in Germany. Here, innovative receiver technologies and applications are now being investigated and developed, so that industry may have proven and tested technology available when Galileo enters it's full service. The last testbeds, automotiveGATE and railGATE, opened on May 22 2015.

The other three testbeds GATE, SEA GATE and aviationGATE are already in service. All of the testbeds were funded by the German Space Agency (Deutsches Zentrum für Luft- und Raumfahrt = DLR) by order of the German Federal Ministry of Economics and Technology (BMWi).

First Quarter Results of IAI

(df) Israel Aerospace Industries Ltd. (IAI), Israel's largest commercial aviation and defence company, issues its consolidated interim financial statements for the period of three months ended 31 March 2015.

The company's sales in Q1 2015 amounted to €836 million compared to €899 million in the corresponding quarter of 2014, a 7% decrease. The decrease in sales in the first quarter compared with the corresponding quarter of last year is mainly a result of the deferral of recognising revenue from mega development projects in the Systems Missiles & Space Group and the decrease in the revenues of the Commercial Aircraft Group.

(Photo: IAI)

Sales for export in the first quarter (Q1) 2015 accounted for 80% of sales (20% to Israel) compared to 78% (22% to Israel) in the corresponding quarter of 2014.

Cooperation of Russia and China on a Heavy-Lift Helicopter

(df) Russian Helicopters and Aviation Industry Corporation of China (AVIC) have signed a framework agreement to work together on creating an advanced heavy helicopter. The agreement was signed at the Moscow Kremlin in the presence of Russian President Vladimir Putin and Chinese President Xi Jinping by the CEO of Russian Helicopters, Alexander MIkheev, and the Chairman of the Board of Directors of AVIC, Lin Zuoming. Under the terms of the agreement the parties will work on all areas of development and preparation to launch serial production of the new aircraft, designated Advanced Heavy Lift (AHL).

Experts estimate that demand for the new helicopter in China could exceed 200 aircraft by 2040. The AHL is planned to have a take-off weight of 38 tons, and to be able to carry 10 tons of cargo inside the cabin or 15 tons on an external sling. The helicopter will be designed to operate round-the-clock in hot climates, mountainous terrain and all weather conditions, and will be able to fly a highly varied range of missions from transportation to medevac, firefighting and much more.

(Photo: Russian Helicopters)

As of now Russian Helicopters and AVIC have drawn up the preliminary technical specifications of the new helicopter and are continuing work on finalising its figure. The parties plan to sign a general contract later this year.

Sales to the military market in Q1 2015 accounted for 77% of sales (23% to the commercial market) compared to 74% (26% to the commercial market) in the corresponding quarter of 2014.
"IAI marks the end of the first quarter of 2015 coping with various challenges in those global markets in which it operates," Rafi Maor, Chairman of the Board, said. "The military segment continues to play a central part of IAI's operations and offers innovations that have aroused considerable interest in the company's main markets. We anticipate continued growth in this segment despite several deferrals of mega-technological projects which led to a deferral in recognising sales."

Heading for a European UAS?

(df) Europe's aerospace companies Airbus Defence and Space, Dassault Aviation and Finmeccanica have welcomed the agreement of France, Germany and Italy to conduct a definition study for a European developed unmanned aerial system. Under the terms of a Declaration of Intent (DoI) signed by the nations, the companies will conduct a two-year definition study for a Medium Altitude/Long Endurance (MALE) Unmanned Aerial System (UAS).
The purpose of this study is to determine a set of operational prerequisites and to develop a prototype to meet common requirements in terms of performance, schedule and cost. "The main functional parameters that will guide the definition phase are airworthiness and certification, so to permit the UAS' insertion into European airspace, as well as the competitiveness of the product itself," are the obstacles as described in the DoI. "The contract for the definition phase will be awarded in the course of this year, with OCCAR being responsible for programme management and the European Defence Agency (EDA) providing support in the areas of air traffic insertion, airworthiness and certification."
The declaration followed the three companies' submission in May 2014 of a next-generation MALE UAS study proposal envisaging a 24-month "Definition Phase", immediately followed by a full "Development Phase". This will allow the delivery of the first solutions in the early 2020s, the companies said.

Winners of Cyber Defence Exercise Locked Shields 2015

(df) The largest international cyber defence exercise named "Locked Shields" ended end of April in Estonia. A team of NATO cyber defenders from the NATO Computer Incident Response Capability (NCIRC) based in Mons Belgium was able to win this international competition while Estonia and Poland took second and third place.
In total 16 nations plus the NATO team participated in the exercise, meaning a total of about 400 people were involved. Locked Shields is an annual real-time network defence exercise, which has been organised since 2010 by the NATO Cooperative Cyber Defence Centre of Excellence based in Tallinn.
The scenario demanded that the NATO team generate and deploy a Rapid Reaction Team (RRT) in support of the fictional nation Berylia. Imitating the way a real NATO RRT would be generated, the team included core members of the Cyber Security Service Line and other agency staff to provide specialist knowledge that was essential to the mission. Importantly, the Exercise also used the RRT equipment recently provided by the NATO Computer Incident Response Capability (NCIRC) Full Operating Capability Project.
In addition to technical and forensic challenges, Locked Shields also includes media and legal injects. Therefore, it provides insight into how complex a modern cyber defence crisis can be and what is required from nations in order to be able to cope with these threats.

"DSEI provides a unique global platform hosted in one of the world's leading military powers"

Interview with Rear Admiral (ret'd.) Simon Williams, Chairman of DSEI organisers, Clarion Defence and Security

ESD: This year's DSEI will be of record size – what key factors can account for this?'
Williams: In an uncertain world there is a search for security, and in a fiscally constrained world there is a search for value. These two major forces are acting together and driving the need for nations to find solutions to their defence needs that are both operationally and cost effective. To achieve this most difficult balance nations are working together and driving their armed forces to deliver ever more "joint" solutions. DSEI provides a unique global platform hosted in one of the world's leading military powers; it is unique because in one place it brings together the many dimensions of modern defence and security capability: sea, land, air, information and cyber, C4I, and the remaining critical joint enablers including logistics and medical.
Defence companies are constantly seeking to drive in cost effectiveness and harness the innovative power demonstrated by new entrants to the market. This can be seen in the constant evolution of major defence companies as they consolidate and rationalize their holdings. Despite this seeming reduction in the number of participants in the market place there is always room for new thinking, new ideas, and opportunities to diversify and strengthen the supply chain.
DSEI provides the ways and means to satisfy these strategic demands: the event provides an international event at scale, across the full spectrum of defence capability that appeals to the military customer, the defence procurement agencies and to the defence industry itself as it seeks to crystallise opportunities for effective business to business solutions.

ESD: What major developments have taken place at DSEI – what's new this year?
Williams: DSEI is an evolving platform; each edition builds on the strengths of the previous edition, and responds to the changes in the defence environment. Maritime, land and air equipment and their associated support all show growth. But in terms of new areas to focus upon, the joint enablers that featured in 2013 are now mainstream elements of the event. These joint enablers include a greater focus on medical capabilities, information and cyber warfare, and logistics. The value added by the intellectual content offered in 2013 has been strengthened, the theatres that are located on the exhibition floor have been redesigned to improve the audience experience, and a structured narrative has been used to underpin the design and flow of the content available in 2015.
At any event organised by Clarion Events the logistics of moving large bodies of people is critically examined, and we go to great lengths to develop the audience experience. DSEI is no exception and there a number of exciting innovations for 2015.

ESD: How will DSEI address emerging challenges in defence and security?
Williams: Taking NATO's recognition of hybrid warfare as an emerging concept

Photo: DSEI

"DSEI as a defence and security platform demonstrates the desire between nations to cooperate and collaborate within legal boundaries and transparent compliance frameworks."

DSEI is developing its offering to our audience of military users, policy professionals, academics, and of course the defence industry. The blurring of the lines between defence and security that lies at the heart of hybrid warfare is central to the success of DSEI: the rise of challenges in the information domain and in cyber space are reflected in the content and exhibitor base at DSEI. However, as the concept of hybrid warfare emphasises, it is the simultaneous use of all the techniques and equipment available that makes it so challenging to counter. DSEI reflects this as we ensure the key aspects of defence and security are represented within the context of the event.

ESD: In your opinion, how can sustained growth in the sector be achieved?
Williams: The provision of defence and security requires a constant evolution of tactics, techniques and procedures that will either contain or exploit the technological and intellectual developments of those who would seek to do us harm, through the development of our own technological advantage. Growth in the defence industry is therefore intimately related to how industry can deliver a qualitative edge to the forces they supply. Sustained growth depends upon the quality of the innovation and its cost effective production and sustainment, and it is clear both of these will be on show at DSEI.

ESD: The crossover of technology, expertise and services from defence into areas such as emergency management and medical support continues: how will this be reflected at DSEI?
Williams: There is no hard and fast line between public security and national security, and DSEI reflects this in the way in which critical capabilities are clustered in areas of the exhibition. Furthermore, the diversity of the audience who are invited to attend DSEI reflects the number of agencies that are operating in the defence and security sector.

ESD: The current challenges posed across Europe from radicalised youth do not seem set to abate. Is this the responsibility of the security sector or the military or both? How can European countries cooperate better to improve intelligence and resilience?
Williams: At the end of the nineteenth and beginning of the twentieth centuries Europe and the United States were gripped by a fear of violent anarchism. Heads of state were assassinated, and public places were being bombed. The scale and speed of the challenge was different to that which we face today, but the fear it generated was probably broadly comparable. It took an "inter-agency" response to contain that threat to the societies of the day, and at the beginning of the twenty-first century the same multi-agency response is needed.
Protecting the public at large and the stability of the state are inter-related, and there are clear constitutional divisions of responsibility that reflect how our societies wish to divide how these responsibilities will be addressed. The defence and security industries work within the bounds of the law, and the solutions they develop will only be acceptable if they are compliant with the wishes of society at large as reflected in the established legal frameworks. Cooperation and collaboration across national boundaries are reflections of political will; systems are neutral and industry can and will change or develop systems to match the political intent. DSEI, as a defence and security platform, demonstrates this desire between nations to cooperate and collaborate within legal boundaries and transparent compliance frameworks. ■

The questions were asked by Stephen Barnard.

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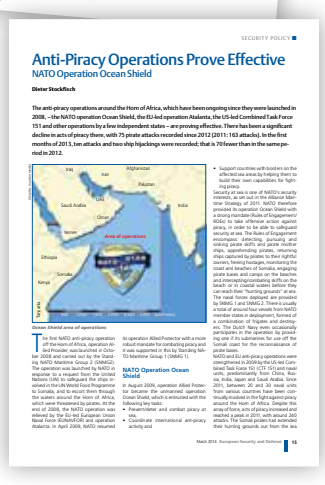

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Eurofighter Typhoon

Effective Proven Trusted