COUNTRY FOCUS: THE NETHERLANDS

European Security & Defence

6/2015

Sniper Equipment

New Emphasis on Collective Defence

NATO's Readiness Action Plan – progress and challenges on the road from Wales to Warsaw

A Diverse Market for Diverse Missions

Auxiliary ships – often an overlooked but critical component of today's sea services around the world

November 2015 • www.euro-sd.com • 5,90 € • ISSN 1617-7983

Politics · Armed Forces · Procurement · Technology

DEFENCE & SECURITY INTERNATIONAL EXHIBITION

2016

EUROSATORY

13 - 17 JUNE 2016 / PARIS

THE LAND & AIRLAND SOLUTION

Identify your company as a key player

GICAT

www.eurosatory.com

COGES

The Ukraine Must Be Stabilised

Almost two years after the first mass protests on the Maidan, and well over 17 months following the taking of office of State President Petro Poroschenko, many observers in the West were expecting that the Ukrainian communal elections might be providing information on the prevailing mood in the country. Would the electorate in view of the precarious security situation in the East and the continuing threat to the state integrity by Russia, still gather behind the actors of the upheaval of 2014? Or would they, out of desperation over their desolate economic situation and the slow pace of reform, want to give a lesson to the government?

The electoral results suggest that the population currently has neither in mind. Their enthusiasm for the work of the central government seems to keep within limits. However, they are also not inclined to look for new saviours or to have the pendulum swing back in favour of the epigones of the old regime. At any rate, the turnout of 46.5 per cent is anything but a sign of political apathy. In many European states, in similar elections it is no higher. Other than in the "guided democracy" prevailing in Russia, the citizens could choose between a wide range of highly heterogenous parties and candidates. Nevertheless, in spite of all pluralism, the division of the country that has characterised the Ukraine since its independence can also be measured from the results of these elections.

The encouraging conclusion that the local elections do not constitute a spark for further destabilisation of the Ukraine should not however blind us to the fact that the political and economic situation of this large and important neighbouring state of the EU is more alarming than ever. The World Bank estimates that the Ukrainian gross national product (GNP) will shrink by 12% this year. The inflation rate exceeds 50%; at the same time, the wage level has decreased with rising unemployment. Foreign debt already lies beyond 150% of the national product. The territories over which the Kiev government has lost control due to the Russian annexation of Crimea and the revolts of the separatists protected by Moscow, represent 20% of the economic performance of the country. It is assumed that from the civil war territories in the East, about one million people have flown abroad and 1.3 million to the western parts of the country. These circumstances must be taken into account before blaming the government for a lack of initiative when applying state and economic reforms. The Ukrainian population, which is the victim in all this, seems rather more inclined to do so than many Western partners that distance themselves because their well-intentioned, yet much too simple, advice is not effective. But this may also overstrain the patience of the population at some point.

The hopes associated with the Maidan Revolution will remain unfulfillable as long as the sovereignty and integrity of the Ukrainian state are threatened. The key to the solution of this problem lies in Moscow, but it is unwilling to surrender it; instead, the strategy is one of wearing down the neighbour until it bows to Russian will. The Ukraine will not be able to resist these hegemonic claims all by itself. As in the other "frozen conflicts" in the post-Soviet hemisphere, Russia is playing for time, and the West will need staying power if it wants to prevent the success of this strategy.

Some groundwork for this was laid at the NATO summit in Wales. Non-NATO-member Ukraine benefits from the new focus on national and Alliance defence. Yet this engagement will remain fruitless if it is not associated with economic aid. The Ukraine must be stabilised economically so it is not additionally burdened by social unrest and remains able to act politically in spite of ongoing tensions in the East. Here especially the Kiev government is naturally called upon. Its consolidation packages and deregulation measures may have dampened the economic downturn, but it has not been successful in stemming the corruption that paralyses the country. The political influence of the oligarchs is still unbroken. Only those that were on the wrong side in the Maidan Revolution were plucked. The Western European partners also have an obligation to act. They must accept that the stabilisation of the Ukraine will not be possible without a long term cost.

Peter Bossdorf

Content

Quo Vadis Pentagon?

The Russian annexation of the Crimean Peninsula and the war in the Eastern parts of the Ukraine have given an entirely new significance to the military presence of the USA in Europe. Page 10

Current Trends in Simulation and Training

Simulation helps prepare for new situations, and this can include quick reaction to explore the best ways of countering threats that had not been anticipated before. Page 52

COLUMNS

VIEWPOINT FROM ...

COUNTRY FOCUS: THE NETHERLANDS

- Security Policy
- Armed Forces
- Defence Industry

Pages 22-35

AN/TPS-80 Radar

(df) Northrop Grumman has been awarded a $51 million contract from the US Marine Corps to develop and test the Ground Weapon Locating Radar (GWLR) mode for the AN/TPS-80 Ground/Air Task-Oriented Radar (G/ATOR).

(Photo: Northrop Grumman)

The GWLR mode is a software update that brings additional mission capability to the ground-based multi-mission Active Electronically Scanned Array (AESA) radar developed by the Department of Defense. G/ATOR will perform four principal missions using the same hardware. Software loads optimise the operation of the radar to perform each mission. When all modes are fully implemented, Marine Corps operators will have a common hardware solution with the ability to switch between air surveillance, air defence, ground weapon locating, and air traffic control through software.

The GWLR mode enables G/ATOR to detect and track time-critical incoming threats, such as rockets, mortars and artillery rounds. Once the radar has detected incoming threats, the system rapidly analyzes their ballistic trajectories and computes their impact points which enables rapid and accurate threat engagement.

Saab Sells Live Training Systems to Austrian Army

(wb) Saab has signed a contract with the Austrian Federal Ministry of Defence to supply a new advanced training system for the Austrian army. The order value is approximately €19.2 million (SEK180 million) and deliveries are planned from 2015 to 2018. Production will take place in Huskvarna.

(Photo: ESD archive)

The Austrian army has previously purchased Saab simulation systems for its tanks, anti-tank weapons and soldiers. This contract includes Saab's next generation of soldier training systems with new add-on equipment that will extend the current system. Saab will also deliver a mid-life upgrade for Austria's existing vehicle and anti-tank training systems.

Examples of other users of Saab's live training systems are the US, UK, Netherlands, Sweden, Denmark, Norway, Finland, Slovenia, Bulgaria, Estonia and Czech Republic.

Correction

In response to the article headlined "NIAG IIG – the Link between NATO Logistics and Industry" in our September issue we received a letter from Mr Patrick Auroy, NATO's Assistant Secretary General for Defence Investments, in which he made the following remarks:

"The highlight of the article mentions that The NATO Industrial Advisory Group (NIAG) is charged with providing advice from industry to the Conference of National Armaments Directors (CNAD) on how to foster government-to-industry and industry-to-industry armaments cooperation within the Alliance. This is a generously stated mandate for the NIAG as, in reality, government-to-industry armaments cooperation remains primarily a national prerogative. More accurately, one could have said that the NIAG role is to provide advice on how to foster NATO-to-industry and industry-to-industry cooperation." Furthermore, Mr Auroy pointed out that the NATO-Industry Forum is not organised by NIAG, but rather by the Supreme Allied Commander Transformation and the Assistant Secretary General for Defence Investments. Finally, Mr Auroy explained that the former NATO Maintenance and Support Agency and NATO Standardization Agency were renamed NATO Support and Procurement Agency resp. NATO Standardization Office I in 2012.

We apologise for any inconvenience that may have been caused by incorrect statements in the article.

ESD Editorial Team

New Radar for Royal Aircraft Carrier

(Graphic: BAE Systems)

(df) A cutting-edge 3D radar system, capable of detecting objects as small as a tennis ball and travelling at three times the speed of sound more than 25 km away, has been successfully installed to the Royal Navy's future aircraft carrier, HMS Queen Elizabeth.

Known as Artisan 3D, the radar system will be used for the first time to deliver air traffic management, providing the aircraft carrier with unparalleled awareness and control of the skies around them. The Artisan 3D system designed and developed by BAE Systems, can monitor more than 800 objects simultaneously from 200 to 200,000 metres and cut through radio interference equal to 10,000 mobile phone signals. The radar system has already proven its capability to deliver uncompromising air defence and anti-ship operations on the Type 23 frigate and helicopter carrier.

The new aircraft carriers will become the flagship of the Royal Navy and demand the very best radar technology to deliver uncompromising carrier strike capability anywhere in the world. The installation of Artisan marked another milestone in the preparation for sea trials.

Software-Defined Radio for the Finnish Defence Forces

(df) Bittium (former Elektrobit) has received a purchase order from the Finnish Defence Forces for further development of the waveform of the software-defined radio-based Bittium Tactical Wireless IP Network (TAC WIN) system. This development of the waveform enhances the system used by the Finnish Defence Forces with additional features and optimized performance.

Due to the software-based functionality of the Bittium TAC WIN system, it can easily and cost-efficiently be updated with additional performance during the whole lifespan of the system.

(Photo: Bittium)

Bittium Tactical Wireless IP Network (TAC WIN) is a wireless broadband network system intended for military and public safety use. With the MANET (mobile ad hoc network) system, link and connection networks can be formed into one logical IP network quickly, no matter what the location is. It is compatible with existing fixed and wireless network infrastructures.

The core of the system is a software-defined radio based tactical router, which is versatile, easily adaptable to different needs and can be easily updated with software for future needs.

With the tactical router users can freely form both wired and wireless broadband data transfer connections. The system also comprises three types of radio heads, and each radio head covers its own frequency band area and can be used for flexible formation of different network topologies for different communication needs. All the products of the system are designed for harsh conditions, and the implementation of the system can be done quickly.

Blue Force Tracking

(df) Israel Aerospace Industries (IAI) introduced the BlueDome blue force tracking sytem at AUSA. BlueDome rapidly identifies friendly forces on the battlefield and therefore improves combat efficiency while minimising fratricide. It is an independent, self-contained system, operating from dismounted troops and various ground and air platforms.

(Photo: IAI)

The interrogator can be integrated into various equipment such as field binoculars, ground vehicles and helicopters. The interrogator activates the transponder, carried by each soldier. The transponder is a small, very lightweight device that transmits coded information with the soldier's data (identification and location). It is worn on the soldiers' uniform or helmet. When the interrogator receives the response from the transponder, this confirms that a friendly force has been detected.

BlueDome operates independently of any other system, without the need for radio-communication or using navigation means that may reveal the force's location to hostile entities. The system is highly reliable and protected against hostile jamming, misuse or interception. The immediate and dependable detection of friendly forces shortens and streamlines dynamic battle management situation and minimises friendly fire events.

In recent tests during a large-scale demonstration where many technical and operational issues were verified BlueDome's capabilities were successfully proven in various conditions including night activity and throughout urban spaces and open fields. The system successfully identified

Ceska zbrojovka Uhersky Brod (CZUB): Equipment and Services By Professionals, For Professionals

(Photo: CZUB)

At the MILIPOL 2015 exhibition the renowned Czech gun manufacturer CZUB will continue to enhance its range of both hardware and support services that were introduced to acclaim and attention at DSEi in London this year.

In particular, building on the presentation of the new CZUB ballistic vests (see European Security & Defence issue 5/2015) the company takes this opportunity to engage with the first responder community, offering a level of protection that is not only the lightest in its class, but is also buoyant in water, making it ideally suited to counter-terror and homeland defence missions – including first responder, police and customs officers – on or near water.

Specialist training is a new component in CZUB'S inventory, and includes the uses and applications of the vests.

This new string to CZUB's bow – specialist training and support – is enhanced even further in respect of the company's traditional activities. In addition to being able to set up at a customer's own facilities, CZUB now has a complex of ranges throughout the Czech Republic with which customized training programmes for the entire shooting community can be created and conducted: from basic shooting to highly-demanding Gunsmith and Armourer training, from static to mobile training, from open area to built-up (FIBUA) training – and even indoor/outdoor: all are available. Beneficiaries of CZUB's in-house training expertise (most instructors are former military with recent, extensive combat experience) range from gun designers and builders right up to Grand Masters in the art of the most complex repairs.

As a company CZUB has a very significant number of specialists who are actively looking to engage with the customer and to accompany them in the journey of CZUB product ownership; and the combat experience and lessons learned that these veterans are able to pass on will directly impact not only their selection and use of the weapons available, but also their tactics and survivability in theatre – wherever that theatre may be.

In offering a complete through-life support solution to its customers CZUB will be able to track and measure the long-term performance of its weapons, while the owners, be they military, police or first responder, will have the full-spectrum benefit of the most expert, knowledgeable people in the world – the manufacturers – supporting them. Closer engagement of the company with the owners of its products, from initial acquisition, through training and in-service support, to final disposal, will enhance the complete ownership experience and create the true through-life engagement and partnerships that the company is now offering.

friendly forces within a room, even when soldiers were not directly observed through the windows.

New Long Range Strategic Bomber of the U.S. Air Force

(df) One of the biggest development orders in recent years has been awarded to Northrop Grumman: The Long Range Strike Bomber (LRS-B). This new bomber shall replace the famous 50 year old Boeing B-52 Stratofortress strategic bombers of the U.S. Air Force.

Some details of the new bomber have been revealed. It should – just like the Stratofortress – be able to operate autonomously, have a global range and carry all the weapons the U.S. has, including the 13.5 ton GBU-57A/B.

The new bomber is said to be almost the size of the Stratofortress and it will also be hardened to meet the necessities of nuclear war. First initial operating capability (IOC) is planned for 2022 to 2023 with certification to carry nuclear weapons two years later.

Another plan is to enable the new strategic bomber to fly unmanned and remotely controlled, but this is a future capability not expected to become reality before 2030.

(Photo: U.S. Air Force)

The initial order is €20 billion, but if all 100 bombers are ordered it will rise up to €72 billion. No demonstrator exists so far, but prototype activities have already been done.

Successful Tests of the CAMCOPTER in the South African Navy

(df) Schiebel's CAMCOPTER S-100 unmanned remotely piloted aircraft system (RPAS) demonstrated its capabilities to the South African Navy from October 20 to 23 2015 at False Bay, Western Cape, South Africa. All flights started from the deck of the SAS Protea, a Hecla class deepocean hydrographic survey vessel of the South African Navy. Turbulent head and crosswinds beyond 25 knots, limited deck size as well as lack of NATO landing grid represented exceptional challenges during the trials. But the unmanned helicopter conducted automatic takeoffs and landings and all other required maneuvers without problems, thanks to its integrated GPS-independent

(Photo: Schiebel)

positioning system, enabling pinpoint precision at a high dynamic range.
During the trials the payload of choice was the Selex ES SAGE Electronic Support Measure (ESM) system, rendering the CAMCOPTER S-100 capable of detecting, identifying and geo-locating radio frequency sources while it routinely operates out to ranges of 200 km or remains on-station for periods of more than 6 hours. This system provides the perfect support for maritime surveillance missions or anti-piracy operations in which the South African Navy was interested.
The South African Navy as well as a number of delegates from other South African governmental authorities could convince themselves of these capabilities near the Naval Base Simon's Town.

New FLIR Instruments

(df) FLIR Systems announced the release of two test & measurement instruments featuring FLIR's Infrared Guided Measurement (IGM) technology, the CM174 Imaging.
Clamp Meter and the MR176 Imaging Moisture Meter Plus. Both instruments might help to quickly locate hidden problems by visualising temperature differences.
The new CM174 is the world's first all-in-one electrical clamp meter equipped with a built-in thermal imager. Designed for elec-

(Graphic: FLIR Systems)

trical professionals, the CM174 is the only clamp meter that visually identifies temperature anomalies before they become a major problem.
When facing cluttered wires or scanning complex panels for hazards, IGM guides users without requiring any direct contact with the test site, increasing user safety. The CM174 verifies findings with advanced contact measurement features to help solve the most complex electrical issues. IGM is also vital for post-repair checks to ensure problem areas have been addressed.

New Products from Esterline

(df) Esterline Control & Communication Systems showcased a wide range of its products at AUSA. Especially the displays and consoles and Racal Acoustics headsets, recently selected by General Dynamics UK for the UK's Ajax programme (formerly SCOUT SV), are of interest.
Among the novelties shown by Esterline are the Codis SV-231, a smart touchscreen display for vehicle-mounted C4ISR applications and the Codis HD-30/2 30-inch ultra-high-resolution monitor. Another new product is the Codis RNA-110 rugged network adapter and RNA mini-rack for crewstation-over-IP (CSoIP) remote multi-desktops.

Stryker-Launched Assault Bridge GECKO

(gwh) At the Association of the U.S. Army's annual exhibition in Washington, DC, Krauss-Maffei Wegmann from Germany presented a scale model of its GECKO assault bridge integrated on a Stryker platform.
The 12 m aluminium bridge is able to bridge gaps up to 11 m and weighs just three tons. The two lanes (width 1.25 m) support vehicles with maximum Military Load Class (MLC) 40 (exceptional load MLC 50). This system enables horizontal bridge launching in the driving direction of the AFV. All the hydraulic and electrical bridge control systems are placed inside the vehicle for automated bridge launching within two minutes with a closed hatch by a crew of two.
The Stryker platform will be enhanced with mechanical interfaces at the vehicle front

(Photo: KMW)

and rear. Hydraulic and electrical bridge control system are installed inside the vehicle. A vehicle front support is to stabilize the vehicle during launching. The laying arm with bridge advancing unit handles the bridge during the horizontal launch.
The Stryker with loaded bridge has a combat weight of 25 t (MLC 30) and can cross its own bridge.

Link 16 in the German Air Force

(df) Frequentis and Airbus Defence and Space have officially handed over the ground-based Link 16 radio network to the German Air Force. The project includes the development and delivery of a nationwide radio data network based on the Link 16 standard.
A special feature is the additional secure voice communication. Like the other Links it also facilitates the secure exchange of real-time situational awareness between command and control centres with MIDS-terminal-equipped platforms such as Eurofighter, AWACS and ships.

(Photo: NATO)

The Link 16 radio system consists of ten fixed Link 16 Equipment Suites at radio sites all over Germany, five fixed Link 16 Host Access Points collocated with the fixed and deployable control and reporting centres, and one transportable Link 16 Host Access Point.
For secure voice transmission from the operator at the control and reporting centre to the platform, the system provides a Link 16 Secure Voice Panel connected to the Host Access points. For the management of the Link 16 radio system, two Link 16 Remote Control Stations (Main/Standby) are provided. As the radio stations are normally unmanned, using the installed Crypto Control Unit the MIDS-Terminals at the Equipment Suite can be remotely re-keyed with the necessary crypto keys.
The unique Link 16 radio network offers radio coverage all over Germany at about 5,000 feet above ground level and allows the German Air Force flexible use of Link 16 infrastructure. The system provides a secure multi-MIDS, multi-host and voice-conferencing capability with all communication taking place over IP.

Quo Vadis Pentagon?

Trends in US Defence Policy and the Consequences for Europe

Marco Overhaus

Russian annexation of the Crimean Peninsula and war in the Eastern part of the Ukraine have lent an entirely new significance to the military presence of the USA in Europe, as reflected in the urging of the Baltic countries and Poland for the permanent stationing of NATO (i.e. US) troops on their territories as well as high media interest here in this country when decisions on the deployment of specific units or weapon systems to Europe are made in Washington.

The future defence policy role of America in European security policy is not only characterised by the events that have occurred in Eastern Europe since the spring of 2014. More basic and longer-term trends that make up the US defence policy are at least as important. Thus, since the beginning of Barack Obama´s presidency, three significant developments can be identified that refer to the domestic policy context in the USA, to the role of the military in dealing with violent conflicts, and finally to structural planning decisions.

Domestic Policy

First trend: Even though the American domestic policy framework conditions have become more restrictive, they still leave the President and the Pentagon much room for manoeuvre.

Domestic-orientated attitudes that especially focus on economic and social problems in the USA have undoubtedly gained ground under the impression of the wars in Iraq and Afghanistan, as evidenced in surveys like those conducted by the market research institute Pew. At the same time, public opinion remains an ambivalent factor, because, paradoxically, Obama´s image in the USA has suffered on account of being viewed by a majority of Americans as too lenient regarding foreign and domestic policy issues. Furthermore, single events, like the beheading of the US journalist James Foley in August 2014 which was published on the Internet, can quickly influence public opinion in favour of stronger military engagement.

The party political polarisation in Washington – by this, I mean the growing ideological gap between Democrats and Republicans – is very real and has continuously increased in the past few years. However, this primarily applies to the still unsolved disputes on budgetary policy as well as domestic and social policy issues. The effects of the polarisation on security and defence policy are less straightforward to determine.

Finally, the financial endowment of the US armed forces is also a factor that is determined by domestic policy. In 2011, the Budget Control Act came into force that provided for cuts in defence spending of about a quadrillion US dollars in total – however, measured to the then expense planning and spread over a period of ten years. Between 2010 and 2014, the American defence budget (basic budget of the Pentagon plus special costs for the military operations in Iraq and Afghanistan) shrunk by more than 20 per cent. From a long-term perspective, however, these cuts are not overly dramatic. Measured in absolute inflation-adjusted figures, the USA still spent more money on its national defence in 2014 than in any other financial year between 1946 and 2007.

In addition, the USA currently still has a higher defence budget than the nine next largest military powers together.

(Photos: U.S. Army)

The Baltic countries and Poland are urging for a permanent stationing of NATO (i.e. US) troops on their territories.

Deployment of the US Armed Forces in Crisis Situations

Second trend: Under President Obama, the military restraint and the "Light Footprint" doctrine have characterised the operations of the US armed forces. Yet it is questionable, whether this approach will outlast the next US presidential elections in 2016.

Obama´s doctrine of military restraint not only concerns the end of the combat

Author

Dr Marco Overhaus is associate of the Research Division "The Americas" of the German Institute for International and Security Affairs (SWP) based in Berlin.

operations in Iraq and Afghanistan, but generally speaking the efforts to avoid any military entanglements with large numbers of American ground forces whether within the framework of crisis management (counterinsurgencies) or stabilisation operations. In his address to recruits of the Military Academy in West Point in May 2014, Obama said that the biggest and most serious mistakes of America had not been caused by too much restraint, but by "throwing itself into military adventures".

Obama´s policy should not be put on a level with an isolationist stance or even a general reluctance to use military power to assert American interests abroad. Nevertheless, US defence policy under Obama has been characterised by a clear preference for the "Light Footprint", which in the main has two aspects. On the one hand, it is about sending US troops with a mandate strictly limited in space and time. In this respect, this often concerns the deployment of Special Operations Forces in combination with intelligence activities and drones to combat extremist and terrorist groups. David E. Sanger calls this core characteristic of Obama´s defence policy "a precise, directed economy of force". On the other hand, the "indirect approach" has taken on a much greater significance under Obama. This can be described as the endeavour to minimise the necessity of direct intervention by the USA through developing security and defence policy capacities in partner states.

The Light Footprint especially characterises Washington´s defence and military policy in the Middle East and in Africa. In spite of the advance of the "Islamic State" (IS) in Iraq and in Syria, as well as the associated domestic policy pressure, the White House refuses to approve a larger deployment of US forces that goes beyond air strikes and the advice to and training of Iraqi forces. In Africa, US troops were active in about 20 countries in 2014, from Kenya in the East, to Guinea in the West, whereby in most cases, these were military exercises and operations with a very limited number of US troops and without a comprehensive infrastructure.

The continuation of the "Obama doctrine" after 2016 is questionable because three factors come together. Firstly, the spreading and deepening of worldwide security policy crises already calls for political adjustment on the part of the White House, as reflected in the increase of military advisers in Iraq from 1,600 to more than 3,000 between 2014 and 2015. Secondly, from a domestic policy point of view, the pressure on the President for more military engagement has also been increasing since the "defence falcons" in the Republican Party emerged stronger from the Congress elections in November 2014. The third factor concerns the upcoming presidential elections. The issue of "national security" is already playing an exceptionally important role in the early phase of the electoral campaign. The positioning of the candidates, whether Democrat or Republican, suggests that the political spectrum in the USA may become more interventionist after 2016.

The U.S. Army is to shrink from 508,000 active-duty troops in 2014 down to 420,000 until 2020.

Planning Decisions

Third trend: "Planning decisions" differ from "crisis decisions" to the extent that the former are more structural and long-term than the latter. After a relatively short era of counterinsurgency which was characterised by the expansion of interventions in Afghanistan and in Iraq, the Obama administration has fallen back again on the guiding principle of a "transformative approach" since 2010 that hadalready characterised the policy of former administrations. What is new under Obama, however, is its linking to a stronger shift towards the Asian-Pacific region.

The focus of this defence policy programme is the concern that, through the spreading of military technologies to state (e.g. China, Iran) and non-state actors, the USA may lose access to the Global Commons (maritime trading routes, outer space, cyber-space) and other major operational areas (anti-access, A2) or rather be strongly restricted in their scope of action there (Area Denial, AD). As a strategy against this A2/AD challenge, Washington, for its part, is increasingly relying on its technological edge. This is done on the one hand, through the further development of established technologies (e.g. stealth characteristics of combat aircraft and bombs) and, on the other hand, through the development of relatively new technologies (autonomous systems, miniaturisation, energy weapons, cyber-capabilities). In order to create the financial headroom necessary for this, the quantitative scope of the forces is to be further reduced. The cuts planned by the Obama administration particularly concern the Army. It is to shrink from 508,000 active-duty troops in 2014 to 450,000 or even 420,000 by 2020.

The "Transformative Approach" of the Obama administration thus differs from a more traditional perspective in which the focus primarily lies on interstate conflicts that have a symmetrical and territorial character. This traditional approach not only characterised the US defence policy after the Second World War and the Korean War (1950-53), it has continued to influence the planning departments of the Pentagon after the end of

the Cold War (Second Golf War 1991) until today. The question which currently remains open is whether the escalating conflict with Russia since 2014 will make the defence planning pendulum swing back more towards such a traditional understanding.

Consequences for Transatlantic Co-operation

Defence policy decisions in USA also often have an impact on the planning and operative co-operation within the North Atlantic Alliance.

The transformative guiding principle of the Obama administration, with its focus on the global capacity to act and access to critical world regions, has also shaped the American view of the role of the Europeans.

From the perspective of the USA, the value of Europe as "unsinkable aircraft carrier" – as described by the former commander of the US armed forces in Europe James Stavridis – has been steadily increasing. Besides their participation in the military crisis management, the European allies thus make valuable contributions through the provision of bases and infrastructure, through transit and overflying rights and medical care possibilities.

As a consequence of the Ukraine crisis, the USA have increased their military presence again in NATO territory after decades of withdrawal.

To the extent in which a more traditional defence policy paradigm prevails in Washington, at least as far as Europe is concerned, the well-known issue about transatlantic burden-sharing will rise again. As a consequence of the Ukraine crisis, the USA has been increasing its military presence in NATO territory again after decades of withdrawal, if not initially in the form of new bases and permanent troop stationing. This is associated with the expectation that the Europeans will invest more political and financial capital in their own defence capabilities. Nevertheless, the special challenge of NATO in the coming decade may be that it really, and not only on strategic document paper, must provide collective defence and global crisis management simultaneously. The prospect that the next US president will rely more strongly than Obama on the deployment of US troops is not the only reason for this. The spreading and deepening of security policy crises will also challenge the Europeans directly. The current refugee crisis is a clear sign in this regard. ■

Russia's 2014 Military Doctrine and beyond: Threat Perceptions, Capabilities and Ambitions

Polina Sinovets and Bettina Renz[1]

Published on 26 December 2014,[2] Russia's new doctrine did not attract a great deal of public attention, especially in the West. Contrary to expectations and widespread rumours in the run-up to its publication, the Kremlin neither issued a doctrine of nuclear pre-emption, nor explicitly named its perceived foes.

Indeed, at first sight, the new text looks very similar to the Military Doctrine of 2010. Still, the latest version of the Doctrine is much clearer in formulation of the two main ideas:

1) The West is presented as a source of danger and threats to Russia. These include the movement of military infrastructure of NATO member states towards Russia's borders, which was already mentioned in the 2010 doctrine, as well as the deployment of strategic missile defence systems in Europe. Large-scale military exercises in Russia's neighbourhood are also described as threats. An important nuance in the 2014 doctrine is the fact that, unlike in the 2010 version, cooperation with NATO is no longer regarded as a means of reinforcing collective security.[3] The 2014 doctrine merely mentions NATO as a potential partner for "equal dialogue." This seems to indicate that Moscow has abandoned any hope or ambition for future cooperation with NATO.

2) Russia clearly outlines its vital interests, defining "red lines" for opponents in a fairly explicit manner. The term "neighbourhood" (more precisely "states bordering the Russian Federation") is widely used in the 2014 doctrine. Some main military danger and threats, according to the doctrine, stem from: a) regime change in the neighbourhood, and b) military exercises, as well as military mobilisation in the neighbourhood.[4] Obviously, the 2014 military doctrine is sending a clear message to Russia's neighbours and beyond: the Kremlin considers the former Soviet area its vital sphere of interest and has a high level of commitment to its defence. Another interesting nuance of the 2014 doctrine is the inclusion of the Arctic in Russia's vital spheres of interest for the first time. This could be interpreted as a signifier by Russia to other states with a stake in the Arctic region that the exercise of perceived undue influence will not be accepted.

(Photos: mil.ru)

Military base in the Franz Joseph Land archipelago: The Arctic is included in Russia's vital sphere of interest.

The Restoration of Russia's Great Power Status and Military Might?

A peculiarity of Russian strategic culture is the clear interconnectedness of the "greatness" of the state and its military power. This idea was borne out by the experience of the Russian empire, when military power became the "chief institutional foundation of Russian statehood."[5] This peculiarity goes some way towards explaining the renewed attention paid to the restoration of Russia's great power status and military might under the Putin regime.

Conventional Military Capabilities

Until recently, conventional capabilities and deterrence were considered Russia's weakest points, although the situation has started to change. A significant and steady rise in the defence budget over the past decade in addition to the implementation of systematic reforms since 2008 has led to a resurgence of Russian conventional military capabilities. Recent improvements in Russian military

Authors

Dr Polina Sinovets is an associate professor at the Odessa National I.I. Mechnikov University, Ukraine; **Dr Bettina Renz** is an associate professor at the University of Nottingham, UK.

capabilities – though impressive – need to be seen against the background of almost total neglect throughout much of the post-Soviet era. With a defence budget that had collapsed from more than $300 billion towards the end of the Cold-war era to a mere $20.8 billion by 1998 there was no money for training flights or large-scale military exercises.[6] As a result of low salaries, poor working conditions and corruption, the prestige of the military profession slumped, making any ambitions Yeltsin might have had to do away with the unpopular system of conscription and move towards a professional military a pipe dream.

Russian recruits: The boost to the Russian defence budget was accompanied by thorough and systematic plans for reforms.

The Russian military's fortunes changed with Putin's election to the presidency in 2000. From the outset he afforded military-related matters more political importance and pledged to return the defence budget to a more realistic level. Assisted by a recovering economy and growing GDP, not least due to rising oil and gas prices, the Russian defence budget has increased to almost $90 billion by 2013. This boost in funding was accompanied by thorough and systematic plans for reforms, announced by then-Defence Minister Anatoly Serdiukov in 2008. In addition to emphasising the need to procure new equipment with the goal of modernising 70% of military hardware and technology by 2020, the reforms sought to increase the general efficiency and cost-effectiveness of the armed forces: streamlining central command bodies; decreasing the size of the officer corps, which had made the Russian military particularly top-heavy; cutting the number of military units in favour of a smaller core with permanent readiness status; and driving up the recruitment of professional soldiers to lessen reliance on conscription. Some questions remain about the Russian defence industry's ability to deliver certain products in the areas of sophisticated computer technology and shipbuilding. Western economic sanctions will exacerbate this problem. The inability to acquire such technology domestically meant that defence procurement included foreign imports for the first time in recent years. Of course, the sanctions have closed Russia's access to Western advanced military technology, at least for the foreseeable future. Having said this, the achievement of 2020 procurement and modernisation targets does not seem entirely unrealistic.[7]

An issue worth mentioning here is the fact that in 2015 Russia finally withdrew from the Treaty on Conventional Forces in Europe (CFE). From a practical standpoint this might not mean a great deal, as Russia ceased abiding by its obligations under the Treaty some years ago. Moscow's subsequent announcement on the future of the CFE looked to be symbolic, implying the final removal of the integrated CFE-based confidence-building and arms control measures, as an integral part of the security system.[8] This may or may not signal Russia's readiness to escalate the conflict were NATO to increase its pressure over the Ukrainian issue. The recent large-scale military exercises, demonstrating the rapid deployment of the "Iskander" missiles in the Kaliningrad oblast, seem to add credibility to this signal.[9] Alternatively, it may carry the message that Moscow is ready to start a dialogue over the proposal of a new treaty on conventional forces in Europe. Such an ambiguous "carrot and stick" approach seems to be a characteristic of the 2014 doctrine, as currently demonstrated by Russia's behaviour.

Russian conventional military capabilities have experienced a resurgence of kind in recent years. However, as Dmitry Gorenburg has argued, Russian operations in Crimea and in East Ukraine tell us nothing about "the extent to which the Russian military has increased its ability to conduct complex combined arms operations that involve ground, naval and air units all working together against a capable enemy."[10] Russia's operational performance in Crimea was down to small units of elite special forces, which account for less than one percent of Russia's armed forces overall.[11] Recent evidence also suggests that the crisis in Ukraine has overstretched Russian military capabilities, and limitations in military and financial resources mean that military operations in and around Ukraine could not be sustained for more than one year. In this sense the recent intervention in Syria might be interpreted as a type of Khrushchev-risqué strategy to demonstrate superiority in the spheres of weakest state capabilities.

As a result, to make up for shortcomings in conventional capabilities, Russia's nuclear arsenal is likely to continue to form the backbone of the country's deterrence against the West for the foreseeable future.

The Role of Nuclear Weapons

Nuclear weapons continue to form the cornerstone of the Russian deterrence arsenal. Besides the seat in the UN Security Council, the only superpower criterion Moscow inherited from the Soviet Union was nuclear weapons, so they still play a paramount role not only in Russian military strategy.

In spite of the fears expressed by some observers in the run-up to the publication of the 2014 doctrine that Russia might decide to lower its nuclear threshold in response to heightened tensions with the West, the nuclear component of the latest doctrine did not change substantially. The current doctrine still envisages the potential use of nuclear weapons in two types of conflict: large-scale and regional ones. This typology had already been introduced in the 2000 doctrine to define the role of nuclear weapons as a deter-

rent against any aggression against the Russian Federation, including the use of conventional force[12]. Therefore the main task assigned to Russian nuclear forces in the current doctrine is the "de-escalation of conflicts"[13], which means not only to defeat potential enemies, but also to compel them to stop military actions against Russia.

The implications of this concept for any potential adversary are clear: intervention by outside actors into Russia's vital sphere of influence will be deterred by the country's full spectrum of capabilities to compel the enemy to stop military actions and to withdraw from the region. For NATO this implies that military support to Ukraine or Georgia might not be an option unless it is willing to risk nuclear escalation, at least in theory. In this context, it is clear that Russian tactical nuclear weapons (of which Russia still has the largest stockpile, totalling more than 2,000 warheads[14] vs. 1643 deployed strategic ICBMs[15]) are still seen as a compensatory measure for conventional inferiority vis-à-vis the West and NATO.

Certain plans in this field of nuclear weapons modernisation have already been adopted. According to the state armament programme, the new edition of the "TOPOL-M," called "YARS," started deployment in 2009. From 2018 onwards, the heaviest MIRved ICBM "SS-18"called "SATAN" (produced by the Ukrainian enterprise "YUZHMASH" during Soviet times) will be gradually substituted by the new heavy liquid-fuel ICBM "SARMAT," capable of carrying ten nuclear warheads.[16] Unlike the modernisation plans for conventional capabilities discussed above, this domain will not substantively be affected by Western economic sanctions, as most nuclear technologies were inherited from the Soviet Union and the investments in research and development have already been made.

Conclusion

To what extent does the 2014 military doctrine add anything substantially new to the understanding of contemporary Russian politics? Although on the surface the 2014 doctrine does not differ significantly from its previous versions, the devil is as always in the detail. And this detail, as it turns out, is not very reassuring. The main theme of the doctrine is rivalry with the West, which it politely calls "equitable cooperation" whilst avoiding the word "partnership."

For foreign audiences the message appears to be quite clear. Overall, the 2014 doctrine gives an impression of déjà-vu, and harks back to the great power doctrines of the past. In the manner of the Monroe doctrine, it sends Western powers the message that Russia's neighbourhood should be regarded as its sphere of influence, which Moscow is ready to defend, if necessary by all means. The implicit concern in the doctrine over the threat to Kremlin-friendly regimes in neighbouring states is like a modern version of the Brezhnev doctrine, where direct military intervention is camouflaged by hybrid war-type activity.

The successful use of hybrid tactics in Crimea and to an extent in eastern Ukraine has been the Kremlin's most successful military endeavour in the past two decades. For those states that Russia considers to be a part of its sphere of vital interests this is a major concern, especially since those outside of the NATO alliance do not have the capacity to stand up against such approaches alone. Improving conventional capabilities and strong nuclear posture will only exacerbate such fears, as they deter any powerful actor or nation from interfering in conflicts in Russia's neighbourhood. ■

TOPOL-M (SS-27 "Sickle-B"): Nuclear weapons continue to form the cornerstone of the Russian deterrence arsenal.

1 This article is based on the Research Paper No. 117 of the NATO Defense College Research Division (http://www.ndc.nato.int/news/news.php?icode=830). The views expressed in this paper are the responsibility of the authors and do not necessarily reflect those of the NATO Defense College or the North Atlantic Treaty Organization.

2 Voyennaya Doktrina Rossiyskoy Federatsii [Military Doctrine of the Russian Federation], December 26, 2014, http://static.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf

3 Voyennaya Doktrina Rossiyskoy Federatsii, February 5, 2010, http://news.kremlin.ru/ref_notes/461

4 Voyennaya Doktrina Rossiyskoy Federatsii, December 26, 2014, http://static.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf

5 F.W. Ermarth, "Russian Strategic Culture in Flix Back to the Future?" Strategic Culture and Weapons of Mass Destruction. Culturally-based insights into Comparative National Security Policy Making, ed. J.J. Johnson, K.K. Kartchner and J.A. Larsen, New York, Palgrave McMillan, 2009.

6 Figures in $ US in constant 2011 prices and exchange rates as per the SIPRI Military Expenditure Database 2014, www.sipri.org/research/armaments/milex/milex_database

7 For a more detailed assessment of rearmament see Dmitry Gorenburg's posts on the state of procurement plans of the Russian ground forces, navy and air force posted on his https://russiamil.wordpress.com/ blog on January 5, 14 and 27 respectively.

8 I. Antony, 12 Mar.2015: Death of the CFE Treaty: The need to move arms control back to the centre of security policy, SIPRI, March 17, 2015, www.sipri.org/media/expert-comments/12-mar-2015-death-of-the-cfe-treaty

9 Vzglyad, U NATO net zashchity ot operatsii, khod kotoroy otrabatyvaet Rossiya, 2015, http://vz.ru/politics/2015/3/17/734911.html

10 D. Gorenburg, Crimea taught is a lesson, but not about how the Russian military fights, War on the Rocks (blog), May 14, 2014, http://warontherocks.com/2014/05/crimea-taught-us-a-lesson-but-not-about-how-the-russian-military-fights/

11 I. Sutyagin quoted in UK House of Commons Defence Committee, Oral evidence: Towards the next security and defence review, Part II: NATO', HC 358, June 24, 2014.

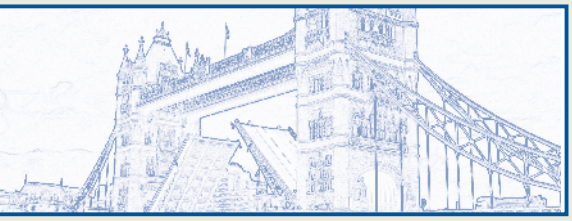
12 Nezavisimaya Gazeta, Voyennaya Doktrina Rossiyskoy Federatsii, April 21, 2000, www.ng.ru/politics/2000-04-22/5_doktrina.html

13 Voyennaya Doktrina Rossiyskoy Federatsii [Military Doctrine of the Russian Federation], December 26, 2014, http://static.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf

14 The Center for Arms Control and Nonproliferation, Fact Sheet: Global Nuclear Weapons Inventories in 2014, April 30, 2014, http://armscontrolcenter.org/issues/nuclearweapons/articles/fact_sheet_global_nuclear_weapons_inventories_in_2014/

15 U.S. Department of State, Bureau of Arms Control, Verification, and Compliance, New START Treaty Aggregate Numbers of Strategic Offensive Arms, April 6, 2012, www.state.gov/t/avc/rls/178058.htm; U.S. Department of State, Bureau of Arms Control, Verification, and Compliance, New START Treaty Aggregate Numbers of Strategic Offensive Arms, September 1, 2014, www.state.gov/t/avc/rls/235606.htm

16 H. Kristensen and R. Norris, Russian Nuclear Forces in 2014, Bulletin of the Atomic Scientists No. 70, 2014, http://bos.sagepub.com/content/70/2/75.full.pdf+html



Viewpoint from London

The West looks, and probably is, weak.

Ian Talbot

Reading a statement by General Mark Milley, the Chief of the US Army, that "I would put Russia right now as the No 1 threat". Russia is the only country on Earth that retains a nuclear capability to destroy the United States. It's an existential threat" set me thinking about Russia, its recent activities and where it all might be going.

My first thought was that Milley's concentration on the nuclear aspect probably doesn't reflect the feelings of countries neighbouring Russia which were, in most cases, the Soviet Union's buffer states. I suspect their concerns are related to more direct threats which are reinforced by recent Russian activity in Georgia and Ukraine and enhanced by the recent spate of actual and announced Russian military activities. A threat which is recognised by NATO's very limited deployment of personnel and equipment to its eastern flank.

Why is this happening? Russian history, which their society is steeped in, may enable some understanding of their recent activities. Russians have huge pride in Russia and particularly their efforts in, and the effects of, the Great Patriotic War. Historically, the Russian strategy against invasion has been based on the reality of their geography which enabled them to trade space for time, a strategy supported by the establishment of the USSR and the Warsaw Pact. There is almost paranoia about threats from their neighbours which emphasise their reliance on buffer states. The collapse of the Soviet Union meant the loss of these buffer states and a resultant feeling of exposure, a feeling enhanced by the perception of defeat and the perceived gloating by the West. President Putin has harnessed this by adopting an aggressive policy, recently commented "Russia would now avenge itself for the years of disrespect." His annexation of Crimea, and now his Syrian blitz, have sent a clear message to the West: who's impotent now?

Such concerns were supported when some of the Soviet buffer states joined NATO and the EU and more so by further overtures of the EU. This activity provided the Russian leadership with an excuse and reason to take action based on their being a direct threat to Russia and on Russia's reduction in influence. To the Russian these linkages with the West pose two separate threats: a direct military one which, however unrealistic to the West, is a perceived one to the Russian. Second, a concern that the increasing political and economic freedoms enjoyed by these countries may spread across the border in to Russia. Such concerns may explain recent events in both Georgia and Ukraine.

Russian attitudes, manifested by "muscle flexing" are exemplified by what has happened in Ukraine and are linked to the tendency for the Russians to respect dictatorial rulers. The Ukraine's moves towards the EU produced a perceived threat which generated the Russian annexation of the Crimea. Crimea, the home of the Black Sea Fleet and Russia's only access to the Mediterranean and warm water, was about to become a Western- oriented country and therefore a direct threat to Russia's power, influence and security. Thus, to a Russian mind a logical step was to annex Crimea. The next step, again logical if not moral, is to link Crimea with Mother Russia by a land corridor which may well result in further action by "separatists" to establish that link.

Whilst the West has been reducing defence spending the very opposite is happening in Russia. Russia is modernising fast and with increasing sophistication – a sign of Russian virility and a response to the "slights" of the collapse of the Soviet Union. Further support for this self-belief is Russian activity in Syria which is linked to the support of Russia's ally Assad, the retention of a Mediterranean port and airfield and to show the West's weakness. Putin is providing strong leadership which the West certainly isn't and which may well result in, to quote James Rubin, "a different kind of success: the weakening of the West's resolve with respect to Ukraine. My guess is that it is going to get harder and harder to maintain support for sanctions against Russia when the country is busy reinventing itself as a responsible leader helping to solve the world's problems".

So, Russian actions may be explained by a mixture of history, national pride, perception, a bullying mentality, the weakness of the West, a lack of resolve and inactivity. Is the very limited deployment of NATO forces to the Baltic States a meaningful deterrent? Is Russian global activity and the passage of time going to see the reduction or removal of meaningful sanctions related to Ukraine?

The Russians respond well, and are used to, a strong leader; they have one who has clear aims and objectives. At the same time the West is obsessed by book-balancing, seen as war-weary and unable to cope with the problems of the Middle East. The result is that the West looks, and probably is, weak – certainly when viewed through a Muscovite telescope.

What is to be done? The first step should be a clear and agreed set of foreign policies, linked with a clear and credible NATO policy and leadership and actions from the US in order to provide some deterrence and buy time. But: will these be coming, and will they be in time?

The Security Dimensions of the Greek Crisis

Michael Paul

Relative to its population, Athens maintains the largest standing army in Europe and has one of the highest defence budgets in NATO. Why, then, doesn't the Greek government just cut defence spending to reduce the country's debts and borrowing, especially given that the current situation in the region involves a wide range of humanitarian issues rather than a concrete military threat? What should be the assessment of the security policy environment surrounding the Greek crisis?

A left-wing party gains power in Athens and has to save money. At first glance, reducing the defence budget (rather than the pension pot) seems like an obvious part of the solution to Greece's financial problems. After all, Greece has more military personnel per capita than any other country in Europe, and its bailout referendum on 5 July 2015, failed not just because of planned pension reductions, but also due to the proposed cuts to defence spending. Under pressure from the conservative-nationalist coalition partner in the Syriza government, whose leader, Panos Kammenos, has been the Minister of National Defence since January 2015, rather than cutting the Greek defence budget by 400 million euros, it is set to be reduced by only half that amount.

Turkey, which is regarded in Greece as the main threat to national security, is the principle reason for Greece's high defence spending. However, it is not only because of this sense of danger that nationalists on both the left and right-wings of the political spectrum support the military. The army is also a focus for the country's pork-barrel spending, with the state viewed "as a legitimate object of exploitation by the parties" (Andréas Stergíou). The conservative Prime Minister Antonis Samaras (2012-2015) was heavily criticised when he cut the wages and salaries of military personnel. In fact, Greece has reduced spending on the armed forces since the start of the crisis in 2009.

Author

Dr Michael Paul is Senior Fellow in the Research Division: International Security, and Project Director of Armed Forces Dialogue, at the German Institute for International and Security Affairs (SWP) in Berlin.

The defence budget stood at €7.25 billion in 2009. By 2014, it had dropped to €4.1 billion – and this reduction had a significant impact on military wages, given that personnel expenditure used to account for 73.3 percent of the defence budget.

(Photo: NATO)

According to the International Institute for Strategic Studies, there are 144,950 active personnel in the Greek Army.

According to the International Institute for Strategic Studies' (IISS) The Military Balance 2015, the Greek army comprises 144,950 active personnel (Army: 93,500; Navy: 18,450; Air Force: 21,400; paramilitary forces: 4,000) plus reserves numbering 216,650. The share of GNP spent on the armed forces is currently estimated at 2.4 percent, and is therefore greater than the NATO guideline of two per cent. In terms of GNP, Athens spends twice as much on its armed forces as Berlin does – German spending stands at 1.2 percent.

In order to make further savings – in light of the Greek financial crisis – there is a need for a fundamental review of every aspect of the defence sector, from threat analysis to procurement to the structure of the armed forces. There is a need for "intelligent and efficient solutions", as called for in the 2014 white paper published by the Greek Ministry of National Defence. Whether the crisis in Greece can be used as an opportunity to implement further reforms depends on the conditions surrounding them – and, here, Turkey is especially relevant.

Relations with Turkey

"Our country is threatened from the East. We cannot stand defenceless", said Kammenos, the leader of the Independent Greeks and new Minister of Defence, in a radio interview in February 2015. The historic Greek image of the enemy is based on 400 years of Ottoman rule in Greece

(Photo: NATO)

The NATO Missile Firing Installation in Souda Bay, on Crete, is under the command and management of the Hellenic armed forces.

while the ongoing Turkish occupation of Northern Cyprus and territorial disputes in the Aegean Sea are straining bilateral relations. The Turkish Government itself, however, has had to note a "spectacular failure" (Günter Seufert) in its foreign policy; Turkey has not been able to establish itself as a regional power in the Middle East, and is in fact rather isolated in the region. In this context, it remains troubling for Athens that Ankara would like to further expand its arms industry to support its regional ambitions and become one of the world's ten largest arms producers. Developing its own armament capabilities – and the advent of new arms suppliers, such as China – could reduce Turkey's dependence on the USA and Europe, and increase the scope of its foreign policy.

The Turkish Prime Minister, Ahmet Davutoğlu, has offered financial aid from his country to help Greece overcome its debt crisis. However, it might be more helpful to reduce political tensions – and that is one area where Ankara could make a contribution without having to make major concessions. This could involve reducing the Aegean Army, which is directed against Greece, and through an easing of territorial disputes. The unresolved dispute over territorial rights in the Aegean Sea brought both countries to the brink of military confrontation in 1996. Since 2014, the number of violations of Greek airspace by Turkish combat aircraft has been increasing. Such shows of force between two NATO partners are unnecessary, and dispensing with such mock battles would ease tensions.

Hopes of seeing an easing of tensions in Greek-Turkish relations seem almost as old as the conflict itself. The potential for Greece to become involved in a conflict remains – not forgetting the dispute with the "former Yugoslav Republic of Macedonia" – at a historically low level, and a confrontation with Ankara is unlikely given the numerous issues facing Turkish foreign policy in other neighbouring regions; the situation in Syria and Iraq and the terrorist threat from "Islamic State" (IS) all pose a far greater threat than the long-running dispute between Greece and Turkey. The fact that both countries are members of NATO has a further stabilising effect.

The Sino-Russian Factor

"Right now, we are at the heart of a storm. But we are a seafaring people, and we are not afraid to sail on the open seas, and we will certainly reach a safe haven," said Greek leader, Alexis Tsipras, when he met the Russian President, Vladimir Putin, in Moscow in June 2015. Greek sympathy for Moscow is no new phenomenon. At the height of the Cold War, the first Socialist Prime Minister, Andreas Papandreou, allowed the Soviet Navy to anchor between Crete and mainland Greece, and Soviet warships were allowed to enter Greek shipyards for emergency repairs. President Putin wants to build on those great times and believes that a stronger presence on the world's oceans will lend credence to Russia's claim to be a major world power. Admiral of the Russian Fleet, Vladimir V. Masorin, said in 2007 that the Russian Navy would rise to become the second largest naval force in the world within 20 years (and that the Navy should therefore be regarded as being of similar significance as the nuclear arsenal). However, the Navy of the People's Republic of China has twice the number of cruisers, destroyers and frigates, and it still remains to be seen whether the ambitious Russian modernisation programme will be fully realised. Joint Chinese and Russian naval exercises in the Mediterranean in May 2015 served as a reminder of Russia's ambitions and, above all, were a visible demonstration of Sino-Russian cooperation. With these exercises, Beijing and Moscow also signalled that the Mediterranean should no longer be considered NATO's "Mare Nostrum" and that a new competitor could be established. The Russian Navy would like to use the Greek port of Piraeus; the Syrian port of Tartus – home to Russia's last remaining naval base in the Mediterranean – is now judged to

(Photo: COSCO)

China Ocean Shipping Company (COSCO) was awarded the concession to operate half the Greek container port in Piraeus for a period of 35 years.

be unsafe. However, China has already established itself there through the presence of a state-owned business: In 2009, the logistics company China Ocean Shipping Company (COSCO) was awarded the concession to operate half the Greek container port (Piers II and III) in Piraeus for a period of 35 years. COSCO plans to invest a total of €3.5 billion in the port. China hopes that Greece will serve to give it an economic toehold in Europe and that Piraeus will be developed into a hub for container traffic. There is also strong Chinese interest in Athens airport. Unlike Moscow, Beijing also has a presence in Greece and the Kremlin has found itself in the role of junior partner. Chinese Communists have evolved into cold and calculating capitalists. However, Russian government interest in Greece extends beyond Greek ports, because Russia sees the European Union as a geopolitical rival and Greek support would allow Russia to increase pressure on disintegrative forces in the European member states. Moscow therefore supports national populist parties in Hungary and France, and is seeking to win over governments in countries like Greece in order to weaken the EU (and therefore, following Russian logic, the USA). But Russia is no longer the Soviet Union, and its available resources have shrunk; the annexation of Crimea and providing support to pro-Russian separatists in Ukraine are taking their toll; so why should Athens receive undue support? In practice, Moscow has declined to buy Greek government bonds and has announced that it will only spend money by investing in a new gas pipeline (to bypass Ukraine in carrying Russian gas to the EU). The Russian Finance Minister, Anton Siluanow, made a succinct appraisal of the situation, saying "If Greece offers commercially interesting projects, we will evaluate them." So, what does Greece have to offer, over and above commerce, that is relevant to security policy?

The Maritime Context

Although the Aegean Sea between Greece and Asia Minor does not lie directly on the major shipping routes of the north-eastern part of the Mediterranean, it is key for maritime access to the Black Sea in the north-east (via the Dardanelles, the Sea of Marmara and the Bosporus). Access to the Bosporus has always been of high strategic importance for both civilian and military shipping. It provides the Russian Black Sea Fleet with an east-west route to the Atlantic Ocean, and from there into the Indian Ocean. Since the annexation of Crimea in 2014, and the ongoing conflict in Ukraine, NATO has expanded cooperation with Ukraine and Georgia, both of which border the Black Sea, and has increased the number of its naval operations; in March 2015, NATO conducted naval exercises off the Bulgarian coast. This resulted in a few isolated military incidents, with ships under NATO command being "attacked" by Russian combat aircraft.

NATO uses Crete to give it a geographically strategic toehold in the Middle East. Moreover, the region around Crete plays an important role in the deployment and training of NATO forces. For that reason, NATO bases have often been a focal point for domestic disputes in Greece. Like Papandreou in the 1980s, after winning the election in 2015, Tsipras relaxed his rhetoric about NATO – as recently as the 2012 election campaign, his party, Syriza, had been calling for the closure of NATO operational centres. These calls have disappeared from the current debate. In Greece, NATO has a naval base, which is used by the Member States for stopovers and re-supplying (most recently by German units during emergency rescue operations in the Mediterranean), a NATO Missile Firing Installation (NAMFI), which is under the command and management of the Hellenic armed forces, and a NATO Maritime Interdiction Operational Training Centre (NMIOTC). All three facilities are located in Souda on Crete. In addition, the military part of the airport in Chania, on Crete (Souda Air Base), is used by NATO air forces, especially by the US Air Force during operations in the Middle East.

As a member of the Schengen Area, Greece plays an important role in the internal security of the EU, stemming uncontrolled immigration and the organised crime associated with it. The war in the Middle East is causing increasing numbers of people to flee Syria via the eastern Mediterranean. The number of refugees arriving in Greece via the Aegean Sea and the Maritsa river, on the Greek-Turkish land border, rose from 6,500 last year to 77,100 in the first half of 2015. Nearly 60 percent of these refugees are from Syria; others come from Afghanistan, Iraq, Eritrea and Somalia.

Greece is overwhelmed by the tasks of receiving, registering and providing for the refugees, and is not in any position to get the growing refugee problem under control.

Improving the Situation in the Long-Term

Without external support, organised crime and illegal immigration threaten to grow in Greece and there is a risk that nationalist parties will win support. A fragile state could lead to military conflicts in the Mediterranean region if other countries believe their security is threatened. The possibility of a military coup in Greece is not something that can be ruled out in a politically explosive situation. In the medium term, therefore, Berlin and Brussels need to stabilise the unusually populist government in Athens in order to improve the situation in Greece for the long term.

As long as Greece remains rooted in the EU and NATO, the conflict with Turkey can continue to be effectively contained in the future. If the crisis is used as an opportunity to implement further reforms, the Greek armed forces could be better structured for the future, and it may even be possible to further reduce Greek defence spending. ■

(Photo: Bosporus Shipyard)

Access from the Aegean Sea to the Black Sea through the Bosporus has always been of high strategic importance.

Israeli-UK Geopolitical Chaos

Tim Guest

Before reading what is predominantly a geo-political take on the frenetic, current political stages in both Israel and the UK, interested readers should know – and be reassured by – the UK MoD's current stance on relations with Israel when asked the simple question by ESD last month.

ESD was told by a spokesperson in the Directorate of Defence Communications in Whitehall, that: "Israel is one of the UK's important regional partners and we have a focussed defence relationship in areas of mutual interest, which supports wider UK Government policy on Israel." This is fine when dealing with the new/old PM and his Conservative Government. It's what else has gone on in British politics in the six months since this magazine last looked at the relationship between Israel and the UK, in the context of their political and defence relations, that may be of interest.

(Photo: dpa)

Jeremy Corbyn, Leader of the Labour Party and Leader of the Opposition, calls for a ban on sales of weapons to Israel.

At that time, Mr Netanyahu had just been returned to power in yet another coalition and the UK waited, expectantly, for its own coalition of "some sort" to be handed the reins of power. As it turned out, the UK's Conservative party surprised all comers by winning an outright, albeit slim, majority, avoiding a repeat of the impotent coalition of the previous five years. The UK's losing parties, however, were left in disarray by the election, with the main opposition Labour Party seriously damaged. And while a reinstated David Cameron as PM, probably means business as usual with Israel, the implication for this relationship from a new Labour opposition leader has been one of uncertainty, until now. How much this matters in the coming months and years is questionable, but it's worth being aware of the UK's new political landscape vis à vis who is for good Israel/UK relations and who is not…

Having said a quick goodbye after the election to previous, forlorn leader, Ed Miliband, May to September was full of expectation as to who would follow. Expectation was quickly replaced by incredulous speculation, as far-left option for party leader, in the form of one, relatively unheard-of, Jeremy Corbyn, gathered considerable support.

The run-up to the party leadership election saw Corbyn, together with three other Labour hopefuls, begin mini-election campaigns, including a four-way debate. (…back in Tel Aviv, Mr Netanyahu can be forgiven for failing to notice these secondary UK political goings-on, though I expect even he was given a running brief when the subject of relations with Israel entered the leadership debate in July).

In that set-piece battle, three of four candidates voiced pro-Israel views with the fourth, left-wing Corbyn, alone in his call for a ban on sales of weapons to Israel. He stressed that while he agreed the UK should have "relationships with all sections of society in Israel", a "nuanced" view of the country would be his approach. He said that not everything to do with Israel should be viewed "through the prism of whatever Benjamin Netanyahu is saying from one day to the next", adding – which was generous of him – that Israel's politics are much wider than that. That said, he clearly has Israel "issues" based on his July performance, further underpinned by insistence in the debate that, if elected leader of the party, there would need to be "robust discussions" on Israel's siege of Gaza, its West Bank settlements, as well as alleged mistreatment of Palestinian children detained in Israeli prisons.

On the possibility of a full boycott of Israel over its ongoing occupation of the Palestinian territories, Corbyn, indicated he would support an arms embargo on Israel as well as banning products from West Bank settlements, which, under international law, are viewed as illegal, though Israel contests this. He further questioned the wisdom of continuing arms sales to Israel considering both the Palestinians and Israelis are being inves-

tigated for war crimes following 2014's Israeli assault on Gaza.

But with a clear understanding of how his words would be analysed by all comers, he stressed that a right to question the "behaviour of the Israeli state towards Palestinians" should not and must not lead to anti-Semitism.

Some years back, Corbyn hosted members of Hamas and Hezbollah in Parliament and referred to them as "friends" during the visit. In July, he defended this by saying, "You don't achieve progress by only talking to those who you agree with. You have to address the rights of everybody if peace is to be achieved across the whole region. Conflicts are settled politically, not necessarily militarily."

That Jeremy Corbyn, with his views on UK/Israel relations, did win the Labour leadership, has had UK political heads spinning ever since, though it's probably not of major interest to Mr N at this time, as he deals with what looks like the terrible arrival of a 3rd Intifada. Four years down the line, however, the political landscape of the UK and the wider world may be in such a place, that Jeremy Corbyn might, conceivably, be elected as UK PM. If such were to take place, it'll be worth Mr Netanyahu having a basic grasp of the man, so he knows what not to expect.

Footnote at time of writing:

Potentially Dangerous End to the Year

Mr Netanyahu certainly has his hands full at time of writing to be too distracted by current political events in the UK. Israeli-Palestinian politics of the moment, with an apparent 3rd Intifada seeing increasing levels of violence between the Palestinians and the Israelis, far outweigh worries about UK-Israeli issues.

Saeb Erekat, the Palestinian Authority's (PA) Chief Negotiator, speaking in a 23 Oct interview with a leading Middle Eastern media outlet, implied that attacks by Palestinians on Israel's civil population have been fuelled by Mr Netanyahu wanting to dictate rather than negotiate. "He is a non-negotiator. When he was given the choice between settlements and peace, he chose settlements; when he was given the choice between negotiations and dictations [sic] he chose dictations [sic]."

Drawn on comments made during the summer about the Palestinian Authority disbanding by the end of this year if there wasn't a two-state solution, Erekat said that Mr Netanyahu's intentions seem to have been to make the PA "an authority without authority", which he said had now been done. He said this situation is not sustainable and that "soon enough" Mr Netanyahu will find himself as the only one responsible for events between the River Jordan and the Mediterranean, because "he has destroyed the PA." As to when and if the end of the PA was truly imminent, Erekat said, categorically, "I think very, very soon you are going to hear some decisions. The PA was born to transfer Palestinians from occupation to independence, which is being destroyed, finished by Netanyahu." He said strongly that by December the PA may well tell Benjamin Netanyahu that the "status quo can no longer be achieved' and that Israel will be 'invited to assume power as the occupying power". ■

The Netherlands – "We will uphold."

Thomas Bauer

Considering the fact that about half of the country lies only one metre above sea level, one might misinterpret the motto of the Netherlands as the defiant attitude of the people towards the Atlantic tides. Yet "je maintiendrai" refers much more to the Dutch understanding of a unshakeable state integrity and sovereignty. This attitude also shows in the political concept of the country with respect to security and defence.

It is not easy for an outsider to understand the Netherlands. It already starts with the question what state you are actually talking about. The name Netherlands refers to the territory of the twelve provinces that are located between Belgium and Germany on the European continent, which a few countries often call "Holland". Besides the Netherlands, the actual Kingdom of the Netherlands also includes overseas territories. Until 2010, these were summarised in the group of the Dutch Antilles. Since then, Aruba, Curacao and Sint Maarten are governed as independent countries in the Kingdom while Bonaire, Sint Eustatius and Saba are viewed as special municipal corporations of the Netherlands which however are not associated with any of the twelve provinces. More than 230,000 people in total live in the overseas territories. The population of the Netherlands per se is almost 17 million, resulting in the country, due to its small surface area, having the highest density of population in Europe after Malta and the two city states of Monaco and Vatican City. The Netherlands can look back on a turbulent history which brought them from the Declaration of Independence from the Spanish Crown in 1581 via an era of economic prosperity as a maritime and trade power in the 17th century to integration into Napoleon´s French empire. Following the defeat of the French Emperor in the Battle of Leipzig, the Netherlands once again proclaimed their independence in December 1813. At the end of the 19th century, they endeavoured to expand their own colonial possessions in the Indian Ocean, whereby they fell back on the already existing territories and bases of the former Dutch East Indian Company (VOC) that was taken over by the Dutch state in 1799 and had already set up trade bases and harbours in Indonesia since the early 17th century. With the exception of the already mentioned Caribbean territories, the colonies became independent after the Second World War, partly following bloody, fiercely contested fights and punitive actions against the local independence movements, also on the Dutch side. The fear that there would be an economic recession in the country as a result did not materialise. In fact, quite the opposite. Just like the Federal Republic of Germany, the Netherlands experienced a marked economic wonder through which they came out stronger from post-war years. This was the requisite condition for the country, along with Belgium, the Federal Republic of Germany, France, Italy, and Luxembourg, to become a founding member of the European Coal and Steel Community, the foundation stone of the current European Union (EU).

(Photo: Photothèque de la Ville de Luxembourg)

Constitutive meeting of the High Authority of the European Coal and Steel Community in Luxembourg on 10 August 1952

Strategic Understanding

Taking a closer look at the security and defence policy orientation of the Netherlands, it is striking that a marked understanding of the connections and interactions between strategic and operative level as well as between national associations and multinational structures is reflected in the conceptions, doctrines and instructions for the individual branches of military services. This fact is not least based on a comprehensive process of new orientation of the Dutch armed forces that began in the late 1990s. Until then, the doctrines primarily geared to the individual branches of military services had provided the strategic framework. Yet experiences from the international military operations for the resolution of the conflicts in Bosnia and Kosovo have shown clearly that, in the future, co-ordination and deployment within the framework of Joint and Combined Operations would play a key role for the successful implementation of own security policy interests. The comprehensive transformation process led to the publication of a first Netherlands

Defence Doctrine (NDD) in 2009, which in the main was based on the specifications of the NATO doctrine. Two years later, the first Netherlands National Security Strategy (NNSS) was published in which five key interests of the Netherlands were defined:
"(1) Territorial security: the undisturbed functioning of the Netherlands as an independent state, and more specifically the territorial integrity of our country. Territorial integrity is jeopardised, for example, if there is a threat of occupation of the Kingdom's territory.
(2) Economic security: the undisturbed functioning of the Netherlands as an effective and efficient economy. Economic security could be affected if, for example, trade with an important foreign partner is discontinued.
(3) Ecological security: Having sufficient self-restorative capacity in the environment to repair damage. Ecological security can be threatened by, for example, disruption to the management of surface waters and also by climate change.
(4) Physical security: the undisturbed functioning of humans in and around the Netherlands. Physical security is put under pressure if, for example, public health is threatened by the outbreak of an epidemic, or in the event of a massive breach of a dike or an accident in a chemical plant.
(5) Social and political stability: the undisturbed existence of a social climate in which groups of people can coexist peacefully within the confines of the democratic constitutional state and shared core values. Social and political stability can be threatened if changes occur in the demographic make-up of society (e.g. solidarity between generations), in the social cohesion or in the extent to which the population participates in social processes."

(Photo: government.nl)

The Dutch Parliament meets at the Binnenhof building in The Hague.

An updated version of the NDD appeared in 2013 in which not only the main insights and experiences from the operations since 2005, but also the changed geostrategic framework conditions, were taken into account. At the same time, the document was purged because specific groups of themes, like command and control as well as intelligence, were externalised in separate doctrines and there represented in depth from a perspective more strongly orientated to the operative level. A major change of the NDD 2013 as compared to the version from 2009 was the focus on comprehensive actions. This is associated with a particular appreciation of the enlarged concept of security which, besides the classic actors and action levels, like e.g. national states, armed forces and warlords, also includes indirect factors of influence, like climate change, demographic developments or dealing with minorities, which can be contrasted with a mixture of diplomatic, economic and military means for mastering security-relevant challenges. In this respect, seven strategic functions can be ascribed to the Dutch government:
"(1) Anticipation: To be prepared for foreseen and unforeseen developments and events which could affect the interests of the Kingdom and the international rule of law.
(2) Prevention: To operate within and outside the national borders to prevent threats to the interests of the Kingdom and to the international rule of law.
(3) Deterrence: To discourage activities that are at odds with the interests of the Kingdom and the international legal order by presenting the prospect of credible retaliatory measures.
(4) Protection: To protect and if necessary defend national and allied territory and guarantee the safety of Dutch citizens at home and abroad and of Kingdom-registered properties.
(5) Intervention: To enforce a change of behaviour in actors deemed to pose a threat to the security interests of the Kingdom or the international rule of law.
(6) Stabilisation: To assist in the termination of a conflict and to support stable political, economic and social development in a (former) conflict area to serve the interests of the Kingdom and the international legal order.
(7) Normalisation: To restore acceptable living conditions after a conflict or a man-made or natural disaster."
Dealing with the geostrategic framework conditions is paramount in virtually all European countries when drafting security and defence policy interpretative documents

(Photo: defensie.nl)

Dutch SP howitzer in operation in Afghanistan

and conceptions. Yet the stringency and consistency in implementing the specifications within the different hierarchical structures is particularly pronounced in the Netherlands.

International Engagement after 1945

What very few observers remember when taking a closer look at the Dutch security and defence policy is the fact that Dutch soldiers were already involved in independence fights in Indonesia immediately after the liberation from the German occupation. With the collapse of the Japanese rule in South East Asia, Republican and nationalist forces had developed in the resulting power vacuum (the former European colonial rulers with their troops were entirely focused on crushing the last Japanese resistance). From 1945 to 1949, the Netherlands waged a fierce war against the independence movement in Indonesia, which was only abandoned as the USA threatened to freeze payments within the framework of the Marshall plan. On 27 December 1949, Den Haag accepted the independence of Indonesia. Shortly afterwards, almost 3,500 volunteers and a few destroyers and frigates of the Dutch could be found fighting at the side of the USA in the Korean War from 1950 to 1953. 120 Dutch soldiers lost their lives in the operation.

The largest operations took place outside the Dutch territory in the Balkans in the 1990s as well as in Afghanistan and in Irak in 2001. During the operations in Bosnia and in Kosovo, the main focus of military engagement was on the Dutch fighter jets of type F-16. One of the most controversial chapters in the Bosnian war was probably the deployment of Dutch ground troops to secure the UN protection zone in Srebrenica in 1995. The operation revealed, from today's perspective, the vulnerability of Western military engagement in both military and politically unclear conflict situations. The poorly equipped and without clear politically instructions Dutch battalion was not in position to prevent the massacre of up to 7,000 to 8,000 Moslems. Reading the investigation reports on Srebrenica and the role of the Dutch blue helmet soldiers that were prepared as a follow-up to the Bosnian war from today's perspective, one quickly realises how important the co-ordination of a uniform and efficient approach between international partners is to be able to maintain a robust and serious force projection also in hybrid threat scenarios. With the experiences from Srebrenica, it was not an easy task barely four years later to send 2,000 Dutch soldiers to Kosovo to secure the peace process that was negotiated there.

(Photo: defensie.nl)

Dutch F-16 aircraft are involved in air strikes against the "Islamic State" terror organisation.

Following the terrorist attacks of 11 September 2001, the Dutch government demonstratively supported Washington's military attempts to catch the wire-pullers. Within the framework of Operation Enduring Freedom, various air and marine forces were sent to the operational areas in Afghanistan and at the horn of Africa. From 2006, the contingent in Afghanistan was increased with land forces to secure the province of Urusgan, which at the end of 2010, after massive protests of the Dutch population against the military engagement of their country in the war against terrorism, were withdrawn again. Under Minister President Jan Peter Balkenede, Dutch troops were also deployed in Irak. The Dutch may not have been involved in the initial stages of Operation Iraqi Freedom, but a contingent of 1,400 soldiers was sent to Irak between 2002 and 2005. Five years later, Balkenede had to defend himself against the accusation that the decision to send Dutch troops to Irak had occurred primarily upon pressure from London and under false pretences vis-à-vis the Parliament.

Quo Vadis Netherlands?

The Netherlands are one of the major proponents of the comprehensive approach for the resolution of national and international conflicts as well as for the mastering of the hybrid threat or risk scenarios summarised in the enlarged security concept. In this context, in recent years, the Dutch government has kept insisting on a stronger role and positioning of the common foreign and security policy of the European Union. Contrary to many other countries in the European Union that have misused the comprehensive approach partly as a welcome legitimation to dispense with military intervention, the government in Den Haag sees a clear necessity to expand the possibilities of military interventions via the further expansion of the international cooperation within the framework of the EU and NATO. In this respect, an important factor is the acceptance and other dealing with hybrid warfare, which has not only emerged as a future scenario since the Ukraine conflict. Looking at the development of conflicts and crises in the past years, it is crucial to acknowledge the importance of a modular solution based on outermost flexibility for the resolution of future military conflicts. In this context, the objective of the Dutch security and defence policy shall be to have all necessary information and situation pictures ready to be able to provide effective and sustainable answers to crises and conflicts. For this, the results of several studies and analyses were compiled for the Dutch government, inter alia within the framework of the Strategic Monitor 2014 published by the Hague Centre for Strategic Studies (HCSS). Thereby it became apparent how much the Netherlands are striving to integrate the geostrategic developments and the global and regional trends into their own strategic understanding in order to have a stronger position for situation analysis in the case of emerging conflicts. Many other countries in Europe should take this comprehensive strategic understanding as an example to draw their own conclusions for the long overdue adjustment of the relevant security and defence policy concepts and military doctrines. ■

In the Interest of the Netherlands

Tom Middendorp

The year 2014 was when threats and risks manifested themselves in no uncertain terms on the borders of Europe: the conflict in Ukraine and the developments in the Middle East and North Africa. Now, in 2015, we are seeing the effects of those events.

(Photo: defensie.nl)

The struggle continues in eastern Ukraine and the conflict in the Middle East has worsened. These developments also illustrate how in today's world everything is linked, and how events elsewhere in the world affect our lives. The images of Syrian refugees on their way to Europe and the Netherlands remind us of this fact. Freedom and security are vulnerable and certainty cannot be taken for granted. Through its personal, economic, political and cultural ties, the Netherlands makes up an active part of the global community. That brings the Netherlands a lot of good, but it also brings very real risks and vulnerabilities.

The emergence of threats and conflicts that are played out thousands of miles away is difficult to predict. The international security situation is constantly changing and directly or indirectly affecting Dutch security interests, as well as Dutch society itself. These developments underline the need for reliable and agile armed forces that make it possible to act if risks – national and international – become a threat to freedom, security and prosperity. Partly because of these developments, public opinion on defence has changed, and the majority of Dutch citizens would like to see more money spent in this area.

Over the last two decades, since the end of the Cold War, the Netherlands armed forces have been reduced drastically both in terms of size and capabilities. The effect of the 2010 coalition agreement was the implementation of austerity measures to the tune of €1.4 billion, which resulted, among other things, in the loss of 12,000 functions. Furthermore, the number of mine countermeasures vessels was halved, the tank battalions were disbanded and the number of F-16s reduced from 85 to 68. The supporting and directing elements of the organisation were also radically reorganised, whereby 30% of the non-operational staff capacity disappeared and the materiel-logistic domain changed drastically.

In 2012, the winning parties in the election, the VVD and PvdA, set out their coalition arrangements in the memorandum entitled "Bruggen slaan" [Building bridges]. For Defence, this coalition agreement meant no specific new cuts, which signified a break from past trends. It was agreed that a decision would be made on the F-16 replacement and that a vision of the armed forces would be developed, all on the basis of the available budget. The findings of this study are set out in the memorandum entitled "In het belang van Nederland" [In the interest of the Netherlands], which was issued in September 2013 and which presented the ongoing development of the armed forces. The memorandum described a multifunctional military force which remains deployable for all strategic functions, but which has surrendered a great deal in terms of ambition and is able to conduct fewer operations simultaneously. For the defence elements, this course has now been translated into clear "dots on the horizon". The military organisation of the future is proactive, robust, internationally embedded, affordable and operationally durable.

This article describes the developmental trend of the Dutch armed forces and looks successively at the strategic position of the Netherlands and the tasks, functions and toolbox of the Netherlands' armed forces. This is followed by an explanation of the required capabilities and finally by the main choices made as a result of the memorandum "In the interest of the Netherlands". Lastly, the article will outline the most re-

(Photo: NATO)

From left: German Minister of Defence Ursula von der Leyen, SACEUR General Philip Breedlove and the Netherlands' Minister of Defence Jeanine Hennis-Plassschaert at the NATO minister meeting

Author

General Tom Middendorp has been the Chief of Defence of The Netherlands since 2012.

cent developments following the summer of 2015 that could provide a new stimulus for the further evolution of the defence organisation.

Situation Outline: Strategic Environment of the Netherlands

The world is in a constant state of change as a result of shifts in the geopolitical and economic balances of power. The transatlantic axis that has brought freedom, security and prosperity to Europe and North America for decades still exists. But a new multipolar world order is gradually emerging, in which new actors are appearing. Against the backdrop of these shifting global balances of power, the United States is focusing more than ever on Asia. Europe, and therefore the Netherlands, will increasingly have to protect its own interests. Global sources of instability, such as ineffective and illegitimate governments, competition for raw materials, lack of economic prospects, humanitarian emergencies, rising unemployment and refugee movements, are therefore all topics that are high on the European security agenda. What is more, vulnerability is further increased by the relentless advance of digitisation and interdependence of networks. And all this at a time when European countries, unlike those in other parts of the world, are facing substantial cuts in defence spending.

It is clear that disruptions in the supply of raw materials and goods to and from Europe will have major economic implications. Such risks can be mitigated by guaranteeing access to raw materials, securing supply routes and routes to market outlets, protecting vital infrastructure and promoting stability within states or regions. The Netherlands has an interest in international cooperation in arms control and nuclear security, as well as in combating international terrorism and the proliferation of weapon technologies.

Tasks and Functions of the Netherlands Armed Forces

The armed forces serve the security interests of the Netherlands. Article 97 of the Dutch Constitution states: "there shall be armed forces for the defence and protection of the interests of the Kingdom, and in order to maintain and promote the international rule of law".

(Photo: defensie.nl)

Dutch forces are deployed to Mali.

The three core tasks of the armed forces that ensue from that are:

- Protecting Dutch and Allied territory, including the Caribbean parts of the Kingdom;
- Promoting stability and the international rule of law;
- Supporting civil authorities in law enforcement, disaster relief and humanitarian assistance, both nationally and internationally.

The experiences of the past two decades illustrate the diversity of missions that our military have to be able to conduct. They include the missions in the Balkans, including Operation Allied Force in Kosovo, the various contributions to the stabilisation missions in Iraq and Afghanistan, air policing over the Baltic states, the maritime embargo Active Endeavour, the counterpiracy operations Atalanta and Ocean Shield off the coast of Somalia, the ongoing contributions to UN observer missions, the deployment of Patriot units to Turkey and now the intelligence contribution to MINUSMA. The essence is that we do not choose the conflicts, but the conflicts choose us and are unpredictable in nature. A military force needs to be able to deal with unpredictability and to be employable in every type of conflict. Furthermore, a third of the armed forces is occupied on a daily basis with tasks within the kingdom, such as border control by the Royal Marechaussee, the Coastguard and the Quick Reaction Alert/Renegade assistance in the protection of the airspace.

Periodically, the Dutch military forms part of the stand-by forces of both NATO (NATO Response Force, NRF) and the EU (EU battlegroups). These rapidly deployable units are capable of operating across the entire spectrum of force and generally serve as an initial-entry capability. So far, NATO and the EU have made little or no use of these rapidly deployable units. Since the summer of 2014, however, the need for such units has increased. During the NATO summit in Wales, a decision was made to reinforce the existing NRF-Immediate Reaction Force (IRF) and to transform it into a spearhead force, the enhanced NRF, of which the Very High Readiness Joint Task Force (VJTF) is the land component. Together with Germany and Norway, the Netherlands is making a tangible contribution to the development of the VJTF and the Readiness Action Plan by supplying the interim capability for the VJTF in 2015.

The Toolbox of the Netherlands Armed Forces

The Netherlands armed forces are and will always be a full-spectrum-capable military force and thus have at their disposal a combination of basic and niche capabilities for various types of mission in all types of conflict — on land, at sea, in the air and, increasingly, in cyberspace. Basic capabilities are those the armed forces cannot do without to perform specific statutory tasks. These capabilities must therefore remain available nationally. Together they form the basic toolbox for the armed forces. Niche capabilities are capabilities that are scarce within NATO or the EU, in the sense that only a limited number of member states have them.

Basic Capabilities

Combat units such as frigates, fighter aircraft and infantry units make up the core of the basic capabilities. Usability is paramount here, from intervention to humanitarian missions, from prevention to stabilisation.

In order to be able to operate effectively, however, they must be supported by other capabilities, such as intelligence, fire support, logistics, protection (e.g. against IEDs), mobility (e.g. helicopters) and command and control (staff, communications equipment, operational ICT systems). The composite elements together form the complete basic capability from which a task-based unit can be formed for inclusion in an international coalition. It must be noted, however, that even if they are a part of a larger national or international cooperative context, basic capabilities must still be able to operate unaided at tactical level. It is essential to have well-oriented teams, with tried and tested procedures. Military personnel must be able to rely on each other unconditionally under any circumstances. Furthermore, basic capabilities must be able to hold their own in a deteriorating security situation (escalation dominance). These are lessons that the armed forces have learned over the course of many missions.

Niche Capabilities

In addition to basic capabilities, there are capabilities that not all armed forces have at their disposal. These are high-quality, specialist capabilities that are expensive and internationally scarce. Such niche capabilities are part of the NATO and EU toolboxes. Good allies share the burdens and the risks. The Netherlands, for instance, is showing itself to be a reliable partner by maintaining niche capabilities that are in short supply in other member states, and is willing to deploy those capabilities when the need arises. A recent example is the improvement of the intelligence chain for the MINUSMA mission, which is hugely important for the mission and the countries that are working together.

Required Capabilities in the Netherlands Armed Forces

The evaluation framework for the size and composition of the armed forces depends on international developments and the main tasks of the armed forces on the one hand and the setup requirements and budgetary constraints on the other. A future-proof and operationally relevant military force is sustainable in operational and financial terms. We need to match desirability with feasibility.

We also need to be mindful of the fact that the intensity of a conflict is difficult to predict. Even in what are regarded as peaceful conflicts, violence can erupt locally and temporarily. The input in a specific mission cannot therefore serve as a model for the way the armed forces are set up. It is the diversity of interests, strategic functions, types of mission, specific operational conditions and risks that determine in military terms what combination of capabilities is required.

Operationalisation of the Armed Forces of the Future with the Memorandum "In the Interest of the Netherlands"

In the 2012 coalition agreement "Building bridges", it was agreed that the Minister of Defence would develop a vision for the future of the armed forces on the basis of the available budget. To this end, the Minister announced measures in September 2013 in the policy memorandum entitled "In the interest of the Netherlands". The memorandum thus provides guidance for and clarification of the continued development of the armed forces. The resulting responsibilities for the Chief of Defence are translated into five focal points, which provide focus and direction for the many ongoing activities and programmes and contribute to the further enhancement of the primary process: the operational readiness and deployment of the armed forces. Support and simplification are major focal areas that are being considered in the elaboration of all focal points.

Focal Point 1: "Deployment that Distinguishes us from the Rest"

Deployment is the most tangible "product" of our armed forces. The military is a reliable and effective (inter)national partner that is working towards a better world and a safer country. The military wants to continue, and where possible strengthen, its high-quality and effective, expeditionary, operational deployment. It wants to continue to distinguish itself through socially and militarily relevant deployment. The Dutch armed forces will continue to apply the internationally valued 3D model in the future. Defence joins Diplomacy and Development on the basis that a military effort alone will not resolve a conflict. In this multidisciplinary approach, the military will in future place even more emphasis on seeking collaboration with industry with a view to improving local economic conditions in order to eradicate the breeding ground for conflict(s). What we do, we do well, and our military personnel need to be able to make the difference. Interoperability is crucial in that respect, as there are virtually no missions that we conduct on a national basis.

Focal Point 2: Personnel as the Main Asset

To be able to guarantee the realisation of the military deployment objectives of the military in the long term, we need sufficient, suitable and highly-motivated personnel, as the ability of the armed forces to adapt to change depends heavily on the knowledge and skills of the military and civilian personnel of the Defence organisation.

(Photo: defensie.nl)

The RNLAF's ageing F-16 will be replaced by the F-35.

With the focal point "Personnel", the Chief of Defence is giving priority to measures in response to the developments referred to previously, thus guaranteeing the realisation of the deployment objectives of the armed forces. The reliance on external parties requires more intensive cooperation with those parties in terms of personnel and training. In addition, our country's labour potential is fully exploited wherever possible by making more use of reservists. This requires the cooperation of both the public and commercial sectors.

Focal Point 3: Modernising the Operational Domain

When determining the operational relevance of capabilities and materiel, versatility and future-proofing are important considerations. The extent to which capabilities can be adapted to rapidly changing circumstances will determine the added value of (elements of) the armed forces. These aspects mean that the Defence toolbox (basic

and niche capabilities) needs to evolve, while remaining cost- and operationally effective. To stand still is to regress; technology can help us to lead the way in information-driven operations and to link task-based capabilities quickly. Technology can also help to minimise the logistic footprint. Over the coming years, digital resilience will be increased through offensive and defensive cyber operations and the spotlight will be on unmanned systems.

Focal Point 4: Collaboration in Capability Development

It must be possible to integrate the operational capabilities of the armed forces into larger coalitions, both civil and military and both nationally and internationally. The Dutch military is not on its own here, but is increasingly dependent on partners at home and abroad. The intensification of collaboration is intended to derive as great a return as possible from civil and military capabilities by, for example, pooling support services. By allocating tasks and exploiting economies of scale. Collaboration also allows use of the knowledge and expertise of third parties, and also makes the Defence organisation's knowledge base available to others.

Bilateral military cooperation focuses mainly on the strategic partners, namely Germany, Benelux, France, the United Kingdom, the United States, Norway and Denmark. NATO and the EU remain the fora for the coordination of multilateral activities, and member states of these fora are thus preferred partners for multilateral initiatives. Together we are stronger than the sum of the parts. A bottom-up approach with countries who share this conviction and who will also benefit from it forms the basis. Mutual trust and like-mindedness are crucial in this respect and are illustrated by the ties we have established with Germany; our collaboration is far-reaching and unique in the world. The German-Netherlands High Readiness Headquarters is a perfect example of a successful binational engine to which other countries are hitched.

Focal Point 5: Financial Sustainability

The "In the interest of the Netherlands" memorandum establishes a balance between ambition, objectives, activities and financial resources. The armed forces have to be structurally affordable, now and in the future. Structural affordability requires that the financial balance be constantly monitored, both in the planning and the implementation, thus guaranteeing financial sustainability. The multiyear insight into total expenditure (investment and exploitation) per weapon system needs to be built up over the coming years. This also applies to the insight into expenditure on infrastructure, information management/ICT, personnel and pensions. For the multiyear insight into lifecycle costs of materiel, the life cycle costing (LCC) system will be embedded in the planning and budgeting process. That way we can avoid draining ourselves of resources.

Choices and Measures

To be able to deploy the military for all kinds of security interests with the required self-sufficiency, the current diversity of basic capabilities needs to be maintained. An important principle here is that what we do and what we have is of excellent quality. Quality thus takes priority over quantity or, in other words, "Breite vor Tiefe". This is the best way to serve Dutch interests. Niche capabilities also need to be maintained wherever possible, as they limit specific shortfalls in NATO and the EU.

Additional choices had to be made to maintain quality standards within the financial parameters. In effect, Defence has chosen to limit not so much the composition but the sustainability of the armed forces, thus curbing the duration and scope of deployment rather than the type of mission in which the military could participate. In future, besides small missions and national tasks, the Dutch armed forces will in fact be able to conduct one more large-scale long-term mission simultaneously, either at sea, on land or in the air.

Royal Netherlands Navy

The direction in which the Royal Netherlands Navy has been evolving since the 2005 Navy Study will remain unchanged. Important elements include the integration of fleet units and marines, support of land operations, the introduction of patrol vessels and the Dutch-Belgian cooperation in BeNeSam. Here, both navies are heavily integrated in terms of mandated operations, education, training and maintenance.

In the future too, it will still be possible to conduct fast landings by boat. Also in the future, naval personnel will operate from both landing platform docks (LPDs). With both of those and the joint support ship (JSS), the Netherlands has strategic mobility. There is international interest in the shared use of the JSS: the possibilities of sharing the use of the JSS with other countries are therefore being investigated. The JSS will be brought into service with a reduced crew for the maritime supply function. By the end of 2015, there will be more certainty about the possibility of shared use and the international partner(s) required.

The navy's surface fleet will remain unchanged. The air defence and command frigates are among the most modern in the world. With their Smart-L radar, they also have an important niche capability at their disposal, which, after the scheduled modernisation, will be of great value to the allied defence against ballistic missiles. The modern ocean-going patrol vessels (OPVs) are ideally suited to coastguard tasks and counter-drugs operations in the Caribbean.

Due to their specific characteristics, the Walrus-class submarines will continue to be a relevant niche capability for NATO and the EU, as well as a basic capability for integrated operations with surface units. They are the underwater eyes and ears of the fleet, supply striking power, can be deployed strategically and are able to operate close to the coast without being detected, for instance

(Photo: Archive Frank Baunach)

Crossing the River Rhine in a FENNEK vehicle on an M3 amphibious bridging and ferrying system

(Photo: defensie.nl)

HNLMS ROTTERDAM off the Somali coast

in order to gather intelligence or enforce an arms embargo. Moreover, they are highly suitable as a platform for special operations. For the replacement, scheduled for 2025, the Netherlands is seeking collaboration with one or more partner nations for development, construction and exploitation.

Royal Netherlands Army

The RNLA is becoming a versatile, modular organisation. Units can be tailor-made for each mission, with command-and-control capabilities for network-enabled operations in national and international contexts. An important example of this is the German-Netherlands headquarters in Münster, which is currently being transformed into a rapidly deployable NATO joint task force headquarters. With its combat support and combat service support units, the RNLA also provides significant support for operations by the Royal Netherlands Navy and Air Force. This involves units for nuclear, biological and chemical warfare, for intelligence-gathering, observation and reconnaissance, for explosive ordnance disposal, for fire support and for logistics. In the new structure, the operational core of the RNLA is made up of three unique brigades, with which it can contribute in all deployment scenarios: An air assault brigade in the east (with two battalions in Schaarsbergen and one in Assen), a mechanised brigade in the north (with two battalions in Havelte) and a light brigade in the south (with two battalions in Oirschot). In long-term stabilisation operations, the battalions of the three brigades can provide sustainability for each other. The RNLA also has the Special Forces of the Commando Corps. This structure enhances operational durability and provides further possibilities for cooperation with Belgium and Germany. This year, the Dutch 11th Air Assault Brigade was fully integrated into the German Division Schnelle Kräfte, as a result of which the two countries are leading the way in terms of international military cooperation. In addition, 43 Mechanised Brigade in Havelte will also be integrated into the first German armoured division. Germany is also integrating a tank battalion into the Dutch brigade and the Netherlands is supplying the personnel for a company in this German tank battalion. As part of this collaboration, the Netherlands will contribute the last remaining 16 LEOPARD 2A6 tanks. This border-transcending style of collaboration means that the Netherlands and Germany will soon have a fully integrated operational combat brigade with armoured infantry, tanks and other capabilities. Moreover, both countries will also be able to deploy their own capabilities individually, if necessary.

13 Mechanised Brigade in Oirschot will be transformed into a light brigade, making it easier to deploy in all types of operation and mission. This means that the CV90s currently stationed there will be replaced by a combination of Defence's existing or incoming wheeled vehicles (BUSHMASTER, MERCEDES-BENZ, FENNEK and BOXER). The airmobile brigade is still the armed forces' main initial entry capability, with or without commando units.

The one-off deployment of a brigade with multiple battalions will still be possible in the future. This is important for allied operations in a variety of scenarios. The three brigade headquarters in Havelte, Oirschot and Schaarsbergen are capable of integrating separate modules in a Dutch-led combined joint task force (such as Task Force Uruzgan) and in an international context (such as a NATO response force or an EU battlegroup). Each and every one of them is also a headquarters that can be deployed independently at great distances from the Netherlands to lead multidisciplinary missions and operations. At home, the brigade headquarters play an increasingly important role in the context of national, regional and local civil-military cooperation.

Royal Netherlands Air Force

The air force is and will always be an indispensable element of the armed forces. With the F-35 as the successor to the F-16, Defence has made a well-considered choice for a high-tech and future-oriented air force. Compared to the present F-16 fleet, it will soon be possible to deploy fewer F-35s for a longer period of time. The 37 F-35s mean that, as well as the permanent deployment for protection of friendly and allied airspace, the long-term simultaneous deployment of four fighter aircraft will still be possible in support of Dutch ground troops, as was the case in Afghanistan and is currently the case in Iraq. Based on current planning, the F-35 will be introduced from 2019 to 2024 and, according to the planning, initial operational capability status will be achieved in 2021. Volkel and Leeuwarden will continue to be the two Dutch fighter aircraft bases. The Netherlands, Belgium and Luxembourg have signed a collaborative agreement that enables combined airspace control by the

(Photo: defensie.nl)

The 13th Mechanised Brigade is being converted into a light brigade; the AIFV in service will be replaced by wheeled vehicles.

(Photo: defensie.nl)

The C130 HERCULES is the standard airlift asset of the Royal Netherlands Air Force.

three countries. This agreement will come into force at the end of 2016.

Helicopters are the workhorses for the whole of the armed forces and therefore constitute a joint capability that is centralised in the Defence Helicopter Command. Because of so many missions, the deployability of the aircraft is under pressure, but this situation will be improved over the coming years by extra investment in materiel management to increase the number of flying hours and to purchase additional Ch-47 CHINOOK helicopters. Investment will also be made over the coming years in the expansion and improvement of the helicopter simulation capability. The simulator will be used to train personnel and keep their qualifications up to date. This investment will have a direct and structural effect on the level of operational training of personnel and the availability of helicopters. It will also benefit the level of training and deployability of other units.

Because of the growing importance of strategic and operational ISR capabilities, attention is being focused on the procurement and introduction of an operational remotely piloted aircraft system (RPAS). The armed forces' air transport capability consists of C-130 HERCULES and KCD-10 tanker-transport aircraft. Together with the transport aircraft of Belgium, Germany and France, they form part of a pool under the European Air Transport Command (EATC), which has been coordinating the effort from Eindhoven since November 2010. Defence is aiming to replace the present strategic air transport and tanker capability by 2020 with Airbus 330 MRTT aircraft and to embed it fully in the EATC in order to create the economies of scale required in the long term for efficient business management.

Because of the growing importance of space observation, the RNLAF recently took the first step towards a space awareness capability with the establishment of a Space Security Centre linked to civil organisations.

Royal Netherlands Marechaussee

The Royal Netherlands Marechaussee provides Defence with a unique unit which, as an inextricable part of the Defence organisation, can contribute on the basis of its own qualities to the overall striking power of that organisation. The Royal Marechaussee is a corps based on the Gendarmerie tradition. A police corps with military status, providing a unique bond between police qualities and military capabilities. Recent missions such as those in Afghanistan and Sudan show the importance of such qualities. Marechaussee personnel are perfectly placed to use their police knowledge and experience from a military basis to exercise stability policing and to shape police tasks within a wider programme of rule of law activities. As an integral part of the armed forces.

The Royal Marechaussee continues to evolve along three priority operational lines, namely the border control task, protection and security and in respect of international and military police tasks. A change to the method of operating is currently under way in the Royal Marechaussee, one of the biggest changes of recent years. This change involves the implementation of information-driven operations. As a result, the direction of the organisation will change fundamentally from area-based to information-driven. By virtue of its tasks, the Royal Marechaussee is located at strategic nodal interchanges, such as airports, seaports and national borders. Here, Marechaussee personnel look after the security of the Kingdom. It is precisely because of that that it is of the utmost importance to have information of the right quality available at the right time. As a result, a choice was made for operations not only to be information-driven but also to be directed nationally from a single location. This means that the territorial division of capabilities is no longer the overriding factor. Through information-driven operations, the aim is to achieve an optimum exchange of information with security chain partners. The acquisition, production and distribution of reliable information within the security chain will increasingly need to be seen as one of the primary processes within the Royal Marechaussee.

Over the past year, the demand for Marechaussee capacity has increased significantly. Developments in the security situation in Europe have meant, for example, that the Marechaussee is responsible for the security of a number of places with a high risk profile, such as ministries, the Lower House and a number of community organisations. For this, six additional platoons for Security and Protection have been set up to perform the extra task. The Royal Marechaussee is currently playing a major role in supporting the civil authorities by managing today's movement of refugees and asylum seekers.

Conclusion

2014 is the year in which threats and risks manifested themselves in no uncertain terms on the borders of Europe, the year in which it was confirmed that freedom and security are vulnerable and certainly not to be taken for granted. These threats and risks still prevail in 2015, and some have even worsened. The security and stability of Dutch society and the safety of Dutch citizens abroad are affected by these conflicts, directly or indirectly. Internal and external

(Photo: defensie.nl)

King Willem-Alexander of The Netherlands (3rd from left) visiting troops in Mali in mid-February 2015

security are undeniably ever more closely interconnected with each other. It is clear that the Netherlands Defence organisation is a fundamental investment in national and international security and stability, the protection of humanitarian and economic interests and the strengthening of bonds with our allies.

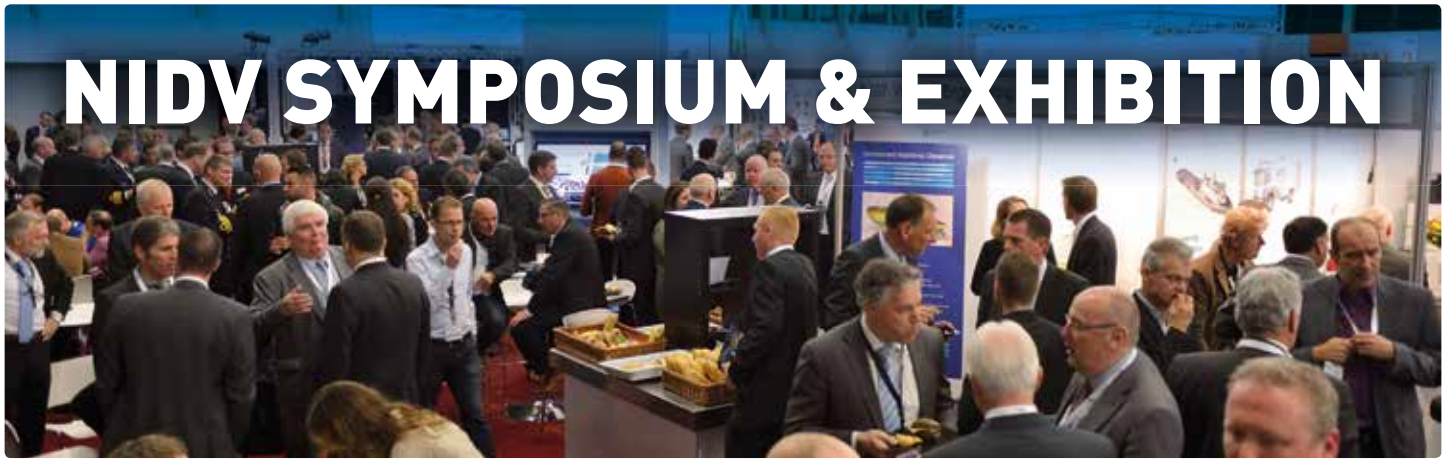
It is also clear to the present government that the period of cuts in the Defence budget is over. In the budgets for 2015 and onwards, the government has decided to release additional funds on a structural basis. For 2016, the budget will be stepped up by €220 million, increasing to €345 million in 2020. In addition, there will be another €60 million for military deployment in missions. The cabinet has declared its intention to continue to buck the trend wherever possible over the coming years in order to improve the striking power of the armed forces.

The Dutch parliament has also asked the government to indicate the required ambition level of the armed forces for the coming years, what international security strategy is associated with it, how Defence's striking power is to be increased, how this relates to national military deployment and how the Defence budget for the armed forces will be adjusted according to the required level of ambition. This is a clear endorsement of the deviation from the trend, which is receiving broad support among the Dutch public. The cabinet's actions are based on the International Security Strategy and the Strategy for National Security. For the adjustment of Defence's striking power, the focus is not so much on the desired input, but on the desired output (in terms of deployment and deployability of the military), and thus on the outcome (in terms of a safer Netherlands in a safer Europe). Furthermore, the cabinet will continue to elaborate on the system that was also used previously to produce the memorandum. The level of ambition of the armed forces is about the ability, usually in an international setting, to simultaneously conduct and sustain a wide variety of missions on an appropriate scale in different mission areas, and about the rapid deployability of the armed forces if circumstances so require. Together with like-minded countries and within NATO and the EU, the Netherlands will continue to come up with specific initiatives and to play a pioneering role. The armed forces also need to be able to perform national tasks in the Netherlands and in the Dutch Caribbean, all under the command of the civil authorities.

The Netherlands is currently far below the NATO norm of 2% of GNP. At 1.12% in 2015, the Netherlands is even below the average contribution from European NATO countries, which amounts to 1.56%. Structural and consistent policy will be needed to follow the course set by the memorandum "In the interest of the Netherlands" and by the 2015 Policy Memorandum, thus enabling further evolution towards a future-proof military force. A force that is versatile and can adapt to rapidly changing (operational) circumstances. But also a force that continues to seek forms of international cooperation, is financially sustainable and, last but not least, continues to possess sufficient, suitable and highly-motivated personnel. A force that is prepared for tomorrow's tasks in a rapidly changing, complex world with unpredictable threats and risks. Affordable and ready for deployment when the country needs it. ■

NIDV DEFENCE& SECURITY
THE NETHERLANDS INDUSTRIES FOR DEFENCE & SECURITY

NOVEMBER 19TH 2015



NIDV SYMPOSIUM & EXHIBITION

NUMBER ONE EXCLUSIVE DEFENCE AND SECURITY CONFERENCE & EXHIBITION IN THE NETHERLANDS

November 19TH 2015
Rotterdam, The Netherlands

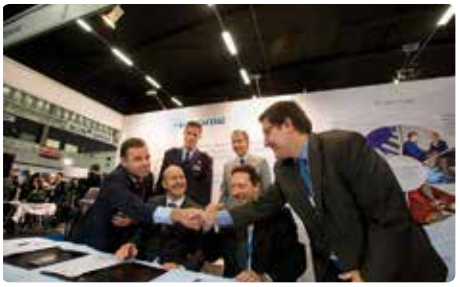
Opening hours
08:00 AM – 6:00 PM

(Non-public exhibition)

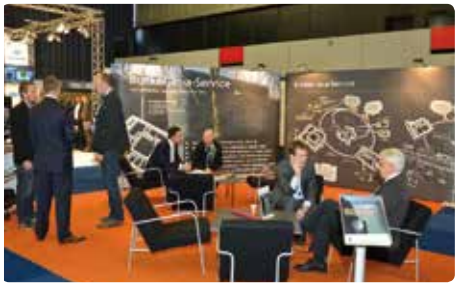
www.nidv.eu

Number of visitors
2,300 decision makers

Type of visitors
Recruiters from government agencies, companies, politics, knowledge institutes, international companies, Ministries of Defence, Economic Affairs, Foreign Affairs, Justice, Security Regions, National Police Corps, Coast Guard and military attaché



130 PARTICIPATING COMPANIES, 60 FOREIGN OEM'S, YEARLY INTERNATIONAL GROWTH



SPECIAL FOCUS ON OFFSET AND COOPERATION

The Dutch Triple Helix: Innovations for the Armed Forces

Ron Nulkes

The Dutch Defence and Security-related Industry (NL-DVI) is known for its innovative nature. During the 27th Symposium and Exhibition of the Netherlands Industries for Defence and Security (NIDV) in Ahoy Rotterdam on 19 November 2015, representatives of the armed forces, the police, the coast guard, fire service and emergency services will once again be able to see what is on offer.

There is a variety of participants in the NIDV, who have clients in the branches of the armed forces and various security services. Our association promotes the sustainable positioning of the NL-DVI for government and non-government contracts at national and international levels and with national and international supply chains. The NL-DVI stands for the highest quality and effectiveness of materiel, services and application-oriented knowledge. The NIDV is the government's strategic partner in the Netherlands in the field of defence and security and is a linchpin in the triple helix of government, research institutions and the business world. This triple helix is examined in detail below, on the European level playing field of the defence market and how that is shaped by the platforms within the NIDV.

Triple Helix in the Netherlands

The collaboration in the Netherlands between the Ministry of Defence, research institutes and the companies in the "Golden Triangle" is outstanding. The Ministry of Defence is working actively on modern and future-proof armed forces, a policy that has been made necessary by the situation in the east and south of Europe and the various trouble spots in the world. The trend in the Netherlands for further economising on defence is a thing of the past. Within the triple helix we are looking for collaboration, innovation, added value and win-win situations. The DVI can position itself, thanks to various launching customerships from the Ministry of Defence, in such a way that it can make a high-quality contribution to security in the Netherlands and can operate competitively in European and international markets. The DVI in the Netherlands is certainly not afraid of international competition.

No European Level Playing Field

The Netherlands is an exporting country, and with a share of €2 billion in an overall annual turnover of €3 billion the Dutch DVI depends very much on exports. Experience shows that Dutch products meet requirements exceedingly well at competitive prices. There is not a level playing field in Europe for organisations tendering in the military market, however, so European Directive 81 is intended to create a single transparent defence and security market with a level playing field for all national industries. Military purchase orders will have to be placed in Europe, which would open up the European defence market and strengthen international competitive power. In practice it turns out, however, that only 10% of all European military demand are placed in Europe, and of those only 10% (therefore just 1% in total) cross European internal borders (in the case of civil products and services, which also have to be published in Europe, this is only 3%!). The larger countries in particular ignore Directive 81, because their aim is to protect their national security and contracts are awarded to industries in their own countries. This is how they operate their industrial policy: the military market is highly qualified and has favourable effects on other industrial sectors. Smaller countries are forced to put much more out to tender outside their borders because they do not have

(Photos: defensie.nl))

The Dutch Ministry of Defence is working actively on modern and future-proof armed forces.

Author

Ron Nulkes is Director of the Netherlands Industries for Defence and Security Foundation.

large defence companies themselves. This puts the defence and security industries in the smaller European countries in a very difficult position

Discussion about Improving the Level Playing Field

Representatives of the NIDV in Brussels are active in bringing this situation to the attention of the Aerospace and Defence Industries Association of Europe (ASD) and the European Defence Agency (EDA). Partly thanks to the Dutch Minister of Defence Jeanine Hennis-Plasschaert, the European Commission has set up the expert Advisory group on cross-border access for SMEs to defence and security contracts, in which the NIDV participates. Its conclusions are expected in the middle of next year. Without anticipating those conclusions, a partial solution can be found by encouraging more joint R&D programmes and material collaboration between countries. In this way requirements can be drawn up for involving small and medium-sized enterprises from different countries.

The Dutch Underwater Knowledge Centre, a working group of the Dutch Naval Construction Cluster NMC, works on the upkeep programme for the WALRUS Class and on the future needs for replacing the Dutch submarine fleet.

The Role of the NIDV

The NIDV brings supply and demand together and encourages mutual collaboration on the basis of trust. Our aim is to build national and international links between governments and the business world, in order to achieve improved deployability of (weapon) systems, increased effectiveness, lower operational costs, deferring or saving investments and simplified conduct of business. Our efforts and involved approach have ensured that we too have become an important strategic partner for the Dutch Ministry of Security and Justice and its executive agencies. We have increasing added value with respect to the shaping of vision and policy in the field of national security and in engaging Dutch industry in security contracts.

In order to be seen as a substantive partner, the NIDV has nine special platforms on which companies have organised themselves around a specific theme in the fields of defence and security. The Dutch DVI companies work closely together and operate jointly with the NIDV, enabling the industry to occupy a strong competitive position with its knowledge, products and services.

Business Platforms

The business platforms bundle the strengths of the individual companies, by approaching the market together as much as possible. A collective of companies that complement and reinforce each other is in a better position to cater for the needs and wishes of national and international governments and large companies such as the Original Equipment Manufacturers (OEMs). These companies present themselves jointly at international fairs, offer total solutions and strengthen each other in providing products and services.

1. The aim of the **Nederlands Marinebouw Cluster (NMC)** [Dutch Naval Construction Cluster] is to strengthen Dutch naval construction as a creative and competitive industry. Developing and maintaining knowledge are current themes in the NMC, and close collaboration with the armed forces is a factor in achieving them. The activities of the companies concerned are directed at involvement in existing and new naval projects. Maintenance work on large and small ships is being increasingly outsourced. The companies on the NIDV platform contribute a great deal of added value for the Ministry of Defence. The companies work together in the Dutch Underwater Knowledge Centre, a working group of the NMC, on the upkeep programme for the Walrus Class and on the future needs for replacing the Dutch submarine fleet.
2. The **Netherlands Industrial F-35 Aircraft Platform (NIFARP)**, with support from the government, has been granted a major contract for Dutch aerospace companies for the development phase of the F-35. The production and maintenance of the F-35 are important topics at the moment. The NIFARP is making efforts to get as much work as possible done in the Netherlands. Our country has a unique location as a portal to Europe and has good logistics, and our industries have exceptional knowledge and know-how. The NIFARP represents collective interests in this area.
3. Companies and knowledge institutes are working together on land-based weapon systems in the **Netherlands Land Platform (NLP)**, which was set up recently. This involves a broad market with complex technologies. The members of the platform are working on innovations and on developing and retaining knowledge. There is close consultation with representatives of the Ministry of Defence, so that the Dutch business world can respond properly to operational needs. The members of the NLP reinforce each other and work closely together in the technical and logistic chains, in order to be involved to the maximum extent in new projects. Dutch Small and Medium sized Enterprises are often brought in when a land-based weapon system is purchased from a manufacturer (OEM) in another country. One of the reasons for this is that the Ministry of Defence wants to have a service supplier in the Netherlands, so that parts replacement, repairs, maintenance and upkeep can be carried out quickly. Dutch companies often perform these service tasks for the OEM. OEMs and Dutch companies come into contact with each other through the NLP.

4. Collaboration in the **Helicopter Companies Platform (HELI)** is directed specifically at the development, production, maintenance, upkeep, improvement and modernisation of helicopters. The members of this platform are involved with helicopters that are used for military purposes and for national security. There is continued attention in the platform for the maintenance of the entire fleet of NH90s, APACHEs and CHINOOKs. The members of the HELI work closely together and reinforce each other in collective international marketing efforts and export opportunities involving the entire life cycle of the helicopters. There is also close collaboration with the Dutch government. Supply and demand are brought together and the direction of the development of knowledge is discussed.

Technology Platforms

NIDV's **technology platforms** are directed at acquiring and increasing operational and technological knowledge. Innovating and developing technologies jointly enable companies to reap the rewards individually or as collaborative ventures.

1. Companies that manufacture and apply advanced materials bundle their efforts in the **NIDV Innovative Materials Platform (NIMA)**. The Netherlands is a strong world player in the field of advanced materials, which is why this particular sector is included in the Dutch top sector policy. The participants in the platform are companies and research institutes, and they work in the NIMA together with national and international manufacturers. The emphasis is on knowledge, application, innovation, needs and upkeep. Responding to the progressive use of materials is not restricted to the top sector policy, with the Ministry of Defence also being active in this field. New Materials is one of the six proactive technology areas that have been set down in the Defence Industry Strategy (DIS). This NIDV platform also promotes cross-pollination between the military and civil security sectors.

2. The **Command and Control Technology Platform (C2TP)** is mainly ICT-oriented and is directed at the defence and civil security markets. Participants in the platform supply products and services that make information-led action at and between the Ministry of Defence, civil security bodies and the emergency services possible. Communication, geo-information, the provision of information and information management are important elements in this. The C2TP creates opportunities for the participants by facilitating contact between representatives of the authorities, mutual collaboration, collaboration with knowledge institutes and universities, harmonising supply and demand, accumulating knowledge and innovation.

3. The C2TP uses the **NIDV Cyber Cluster**. The NIDV is the link between various national and international organisations in the fields of cyber security and cyber warfare, and is an important element in the cluster, because by definition these threats do not stop at our national borders. There are many stakeholders in the Netherlands that have to protect themselves actively against cyber attacks. These include, for example, the vital infrastructure in the Netherlands (including energy companies, drinking water companies, telecoms and Internet providers), the Ministry of Defence, the security services and other official bodies, as well as companies. Supply and demand can be found in both companies and official bodies. They need each other. Therefore the NIDV Cyber Cluster brings both these parties and roles together.

4. The Ministry of Defence, the Netherlands Aerospace Centre (NLR) and a number of companies work in the **Secure Collaboration Platform** on awareness and knowledge sharing in the field of secure electronic collaboration, which includes the Transglobal Secure Collaboration Program. A major theme is the secure and controlled ability to share digital information between companies and with official bodies. The government and the business world work closely together at making large national and international projects successful. A great deal of information is exchanged digitally and the participating parties grant each other access to major business systems. Security at a high level has to be guaranteed in this case. The collaborating parties can set up secure and controlled links between themselves through specific conditions and systems. The NIDV also has various working links with experts on specific subjects. Participants in the NIDV foster the joint accumulation of knowledge via expert groups. In this way the expert group for export permits discusses the state of affairs concerning the granting of export permits. An expert group for performance-based contracting is in its initial stages. In addition, courses are provided in the field of doing international business in a deliberate manner and master classes about the various implementing organisations are held. The NATO/Europe core group prepares points of view for the various forums in the EU, EDA and ASD. ■

NIDV Symposium and Exhibition

NIDV participants only want an honest place on the playing field. You can visit them yourself at the NIDV Symposium and Exhibition in Ahoy Rotterdam on 19 November 2015, where they can show you what they are worth. The programme can be found at www.nidv.eu. For more information about the Dutch DVI, please contact the Netherlands Industries for Defence and Security on +31 70 3644807 or at info@nidv.eu.

There is continued attention in NIDV's Helicopter Companies Platform for the maintenance of the entire fleet of NH90s (shown here), APACHEs and CHINOOKs.

NATO's Readiness Action Plan for Assurance and Deterrence

Progress and Challenges on the Road from Wales to Warsaw

Klaus Olshausen

Russia's open aggression against the Ukraine since late February 2014 and the new kind of "Blitzkrieg" with the annexation of Crimea – executed against all existing treaties signed by Russia – hit NATO and its member countries obviously by surprise.

The "Wake up Call"

NATO did not face up to Russia's attack in Ukraine but immediately realised the urgent need to reassure the Eastern Allies and citizens, especially in the Baltics, of the firm collective defence commitment under Article 5 of the Washington treaty. Immediate measures beyond declaratory statements and communiqués included reinforcing the permanent air policing over the Baltics and rotational Allied troop presence of land, air and naval forces in Baltic Sea to the Black Sea regions.

Early on, the idea of a capable and sizeable "spearhead" force of 5,000-6,000 soldiers for immediate deployment was born and – decided. The incidents in the East of Europe overturned the previous planning for the NATO summit in Wales in September 2014. Without going into detail of all preparatory and partly controversial debates and work, the Alliance decided that kind, scale and "spirit" of measures to enhance assurance and deterrence would be kept in line with the NATO-Russia Founding Act of 1997.

(Photo: NATO)

The incidents in the East of Europe were in the focus of attention of the Wales summit.

Decisions on the Readiness Action Plan at the Wales Summit in September 2014

While the nations on New Year's Eve 2014 were struggling to identify summit-worthy initiatives and projects other than the decision to end NATO's largest combat operation in Afghanistan and to enhance both NATO's exercise regime and partnerships, the discussions and decisions in Wales got their key topic a few weeks later from the obvious need to adequately respond to Russia's aggression against the sovereign Ukraine and, on the other hand, in the South the growing instability mainly through the dramatically worsening conflict in Syria and Iraq, especially by the brutal actions of the self declared Islamic State.

The main result of the Summit discussions was the consensual decision of a far reaching Readiness Action Plan (RAP). It comprised a package of short and longer term measures, mainly in two areas. First the assurance measures that had been in place since May 2014: An immediate increased military presence and activity for assurance and deterrence in the Eastern part of the Alliance. While the increased air-policing patrols over the Baltic States had a particular visibility, there were many maritime patrols in the Baltic and the Black Sea and different training and exercise activities of ground troops. All actions were executed by forces of Allied countries on a rotational basis.

The second area encompasses the adaption measures, which "include the components required to ensure that the Alliance can fully address the security challenges it might face". The Alliance decided to take essential steps to improve the NATO force structure (para. 8, Wales Declaration), the NATO command structure (para. 9), the NATO training, exercise and infrastructure programme in the east (para. 10) as well as defence spending (para. 14). A particular prominence was given to the quick reaction "Spearhead Force" with the administrative name "Very High Readiness Joint Task Force" (VJTF). It has become a core element of the enhanced NATO Response

Author

Prior to his retirement from military service **LtGen (ret.) Dr Klaus Olshausen** was the German Military Representative in the Military Committees of NATO and the EU. From 2006 to 2013 he was the President of the German Clausewitz Society.

Force (NRF) that will also be expanded to become more responsive and more capable. Besides the military structures it was decided to enhance and shorten the decision making process of NATO including a more detailed advance planning especially for collective defence, both based on enhanced intelligence, indications and warnings and situational awareness.

The Implementation of the "Wales Decisions"

The meeting of NATO defence ministers in early October 2015 – half way to the Warsaw Summit – can be used as an opportunity to take stock of progress achieved in implementing the RAP, but also identifying challenges and risks that have to be addressed.

Right after the Wales Summit, the "Interim Spearhead Force" (IVJTF) was to be launched as a test bed using the land component for the NRF 2015 as a core element commanded by the 1st GE/NL Corps Headquarters in Münster, Germany, and supported by the three framework nations Germany, the Netherlands and Norway. To consolidate the IVJTF as a relevant force, the overarching military concepts were tested in tabletop exercises in January and February 2015, followed by alert and deployment exercises in April, May and June 2015. With the exercise "Noble Jump" in June 2015, this test-bed IVJTF proved to be operational. A number of challenges remain, such as timely deployment over larger distances and the full and timely availability of qualified personnel, weapon systems and equipment.

During their meetings in February, June and October 2015 the NATO Defence Ministers took many decisions to further implement the Readiness Action Plan and increase the readiness and preparedness of NATO forces. Seven European Allies have signed up as framework nations of the VJTF land component until 2022. Germany will take on the responsibility for the fully-fledged VJTF in 2019.

The further increase of the strength (up to 40,000) and capabilities of the NRF beyond the land component with air, maritime and special operations components was agreed. The build up of the Headquarters Multinational Corps Northeast in Szczecin to a High Readiness Headquarters capable of command and control of the VJTF (Land) and the NRF in an Article 5 scenario as well as the newly established NATO Force Integration Units (NFIU) is under way. It is expected to achieve operational capability in this role by the time of the NATO summit in Warsaw. The first six of these NFIUs, small permanent NATO staffs set up in the eastern Allies from the Baltic States to Bulgaria, have already opened and are planned to be completed at the end of 2015. And two more will be established in Hungary and Slovakia as decided at the October meeting. They are designed to support planning, exercises and coordination with their host nations as well as facilitate potential reinforcements for deterrence and defence. In addition, a new standing "Joint Logistics Support Command Headquarters" as part of the NATO Command Structure, attached to the SHAPE Headquarters in Mons, has been decided. This capability is indispensable to improve NATO's ability to speed up the coordinated move of multinational forces across the whole territory of the Alliance in Europe with all necessary equipment, supplies and transportation.

(Photo: NATO)

With Exercise "Noble Jump" in June 2015 the "Interim Spearhead Force" (IVJTF) proved to be operational.

In the context of the changes in the military posture, Allies also agreed to considerably enhance the information and early warning system, to completely review the NATO Crisis Response System and to give SACEUR the authority to alert, prepare and stage the VJTF. Of note, they also agreed to a new concept of detailed advance planning, the Graduated Response Plans, for deterrence, rapid reinforcement and collective defence as well as to significantly speed up their political and military decision-making in a crisis, while keeping political control. Finally, the Alliance is working on a strategy on its role to counter Hybrid Warfare, be it conducted by Russia in the East or terrorist groups in the South like ISIL/DAESH, which behaves

(Photo: MNCNE)

Preparations for the exercise Compact Eagle 15 (COEE15) at the HQ Multinational Corps Northeast

like a state actor. Close coordination and cooperation will be a key building block of such a strategy.

Challenges to Be Tackled

While NATO and the nations rightly emphasise the accomplishments already reached and the progress of the implementation of the RAP in general, there are still many steps to follow and difficulties to be overcome.

The necessary force generation process for the NRF and VJTF still shows some gaps and obstacles. For example, the land forces suffer under the reality that many European units are lacking equipment, in particular in the areas of combat support and combat service support. Another issue relates to the high costs for enlarged field training exercises, in particular the deployment over large distances, which are mostly born by the contributing nations.

It was clear that the NRF could not remain a stand alone force in case of conflict or war. The new political guidance for NATO Defence Planning clearly states the requirement for NATO to be capable of conducting a "Major Joint Operation plus" (MJO +), including high-intensity armed conflicts. On the land side, this comprises three complete land corps with at least two structurally fully equipped divisions and a variety of considerable air, maritime and special force elements. As part of this effort, and even more urgent, NATO needs to be able to rapidly and effectively reinforce the VJTF and the NRF, if required. To this end, Allies agreed to re-establish a number of mechanised and armoured divisions in Europe at various readiness levels, but fully manned, equipped with combat support and combat service support forces and fully trained and exercised, including in particular for high-intensity operations. Those military formations should be established over the next years but require determined and continuous measures to be taken by Allies to combine abundant financial, personnel and industrial resources. With the refugee crisis erupting tremendously, economic stress in many nations and numerous competing objectives within different nations, one might be sceptical whether NATO will show the perseverance necessary to establish a credible deterrence and defence for all 28 members against any threats, be they conventional, hybrid, cyber or all together.

Achieving the necessary very rapid readiness of the VJTF and the enhanced NRF, but even more challenging, the very rapid deployment of these forces to the periphery of the Alliance requires not only a new approach to equipping, training and exercising the forces but also a huge logistic support effort. More importantly, the new security challenges require a sort of cultural change in decisions making and a change of mindset at all levels, including in particular in Allied governments and parliaments. If this is to be achieved for forces and HQs including the 48 hours plus responses with a "Spearhead Force", then the decision-making process has to meet this standard too. Despite the best of long term and actual intelligence, crisis or conflict might arise with little or no warning. Therefore, besides common intelligence efforts and the best of reconnaissance, the NAC and national authorities will have to be prepared to identify, recognise, analyse and asses the crisis situation immediately and to decide to take appropriate action maybe in as little time as one day! In case of an Article 5 threat or attack the common will of all members might be a given, but the prerequisites for quick consensual decision will have to be in place. Looking at today's processes this seems to be a herculean task.

The decision making in time-critical situations in less than 48 hours requires an increase of SACEUR's responsibility beyond his authority to alert, stage and prepare forces ready to go. Allies have agreed to a new granular concept of advance planning. But it remains to be seen whether and to what degree they will be ready to commit forces and other capabilities to these plans, be it in the East, South or North of the Alliance.

All of the above will depend on the commitment of all 28 nations to stick to, and accomplish, the real increase in their defence spending (para. 14 of the Wales Declaration). Even the VJTF, NRF, including an increase of exercises, fast deployment of heavy equipment and the complete outfit of those units will require a substantial increase of the defence budgets. Any build-up of the mentioned Follow-on Forces and more civil-military capabilities to counter hybrid warfare as well as effective action in the cyber domain cannot be tackled with the medium-term financial planning as of today. Despite the crisis and war in Ukraine since early 2014 and the continuous aggressive actions by Russia, the overall defence budgets of European nations in 2015 will still not increase, with the laudable exception of a number of nations, such as the Baltic States and Poland.

(Photo: NATO)

North Atlantic Council meeting in July 2015

Expectation of the Summit in Warsaw July 2016

The summit in Warsaw will face many topics and issues:

It will tackle the collective defence efforts in the East vis-à-vis Russia's offensive attitude and in the southern periphery, in North Africa and the Middle East region, in particular the conflict along the Turkish border. In this context, the VJTF has to be settled with its full operational capabilities. In addition, it requires to effectively exercise the NRF 2016 proving that the three land components of VJTF 2015 (stand-down), VJTF 2016 (stand-by) and VJTF 2017 (stand-up) and its air, maritime and special force elements can ensure credible deterrence as well as collective defence or crisis response operations. All NFIU in the East will be ready to support exercises and potential reinforcements.

To underline the readiness with interoperable national forces and joint and component HQs, NATO and the nations are

(Photo: NATO)

NATO's Baltic air-policing mission guards the air space over the three Baltic states.

preparing a considerable "Exercise Cluster" with NATO as well as national/multinational exercises. Thus, it is envisaged that NATO will prepare the NRF 2016 with "Trident Joust" in May 2016 and the deployment of the stand-by VJTF with "Brilliant Jump II" in June 2016. Among the multinational exercises, the field training exercises "ANAKONDA" with up to 30,000 troops in Poland and "SABER STRIKE" with about 6,000 troops in Lithuania and Poland are designed to contribute to reassurance of the Eastern Allies in the weeks before the Warsaw summit and to conveying a credible deterrence message towards Russia.

Beyond those considerations and the emphasis on the core mission of collective defence to protect and defend all 28 Allies, whether in the East or in the South, the Alliance will have to focus in Warsaw on some long-term issues:

How to combine the efforts especially of all European nations to re-build a considerable conventional follow-on-force and continue to rely on a nuclear element countering the Russian nuclear rhetoric and modernisation efforts.

The Alliance has agreed to re-balance the three core tasks. The new emphasis on deterrence and collective defence, thereby maintaining the capability to support crisis management, and enhanced cooperation with many partners, in particular in building their defence and related security capacities, require not only more resources (personnel, budget, equipment, including research & development) but also decisive efforts to prevent and ward off any hybrid as well as cyber attacks. That requires not only intelligence to identify the ingenious combination of military and many non-military means, but also vigorous implementation of the yet to be agreed strategy for countering hybrid warfare – with close cooperation with the EU – that makes pro-active use of the wide potential of civil, media, economic and military assets. Building resilience against hybrid campaigns by nations and NATO will have an important deterrent effect.

Last but not least, NATO has to work more comprehensively on all risks, threats and opportunities in and from the cyber domain. It will not be sufficient to concentrate only on protecting its own IT assets. In particular, any deployment of NATO and its member states in crisis response or collective defence missions requires to succeed in achieving information dominance and paralysing other instruments of adversaries through measures in the cyber domain where suitable.

Beyond the Warsaw Summit

Warsaw can solidify the approach and the activities decided in Wales 2014. It has to show that the road embarked on is irreversible. But in addition, it provides also the opportunity and the need to further develop the political strength of the Alliance. It needs to keep or re-establish the transatlantic bond not only in the security and military arena, but also in economics with global outreach. The diverse views and perspectives of European members in the East and the West, in the South and the North must not detract from NATO efforts. Powerful capabilities in all areas of security policy can only be achieved in cooperation of our community of Allies. Thus, while Warsaw can and has to corroborate the determination to effectively face the present threats in the East and the South it needs also to set a clear path, focussing on common interests and developing the commitment to effectively and efficiently prepare political, military, and civil instruments as an indispensable basis for the common willingness and political preparedness to act in collective defence and crisis response engagements when and where required. ■

Smart Energy Protects and Saves Money

Gerhard Heiming

Between 2003 to 2007 3,000 US soldiers were killed or seriously injured during fuel and water transports in Iraq and Afghanistan. For the transport of one tonne of fuel to the end consumer, four tonnes of diesel were consumed. Diesel generators only use about one third of their fuel for power generation. The other two thirds pollute the environment and make the plant an easily-detectable target.

With contracts from the NATO summits in Chicago (2012) and Wales (2014), NATO, with its Smart Energy initiative, has been investigating how the consumption of fossil energy for the operation of troop accommodation can be reduced in the field. After trying industrial solutions, NATO standards are to be elaborated and recommendations given for the planning of operational contingents and their camps.

(Photo: NATO)

The use of renewable energies and reduced energy requirements for accommodation purposes are important features of Smart Energy.

To this end, the NATO headquarters built up the NATO Smart Energy Team (SENT) within the NATO Emerging Security Challenges Division. Under the direction of Dr Susanne Michaelis, this team promotes the use of Smart Energy within the framework of the NATO Science for Peace and Security Programme. The objective is the optimisation of safe supply of electrical current, the expansion of the use of all available energy sources, and the reduction of energy demand. It is expected that this will contribute to an increased robustness of the armed forces, in particular under operating conditions. 1,725 soldiers from 32 countries took part in the "Capable Logistician" exercise in the Bakony Combat Training Centre near Veszprem/Hungary (CL15) in summer 2015. 14 technology centres from Germany, Greece, the UK, Italy, the Netherlands, Austria and the USA as well as the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) and the U.S. Army demonstrated Smart Energy for the operation of military camps. The focus was on microgrid systems for the operation of local energy supply networks with intelligent energy management. "For camps of any size, microgrids or hybrid energy systems using diesel generators, photovoltaic modules, rechargeable accumulators and an energy management can reduce the number of vehicles and soldiers for the protection of transport routes through and in dangerous environments", explains Michaelis.

Energy Supply in Microgrids

A fuel depot and further logistic infrastructure were connected to the Smart Energy Camp West.

There, Pfisterer/Germany operated a 25-kW microgrid with two ten-kW diesel generators, a wind power station with five kWp, photovoltaic modules with ten kWp (from Multicon Solar/Germany and smartflower Energy/Austria) and a Li-ion accumulator with a capacity of 60 kW.

The principal task of the diesel generators is recharging batteries if necessary, so they are operated in the optimal power output range. The Mobile Energy Management System (MEMS) – meanwhile

Microgrids

Microgrids are locally limited power networks with local energy conversion. The main components are electricity generator (power output range kW to MW), energy storage (in recent times increasingly Li-ion), and control devices that organise the energy supply in such a way that there is always enough energy available and the prioritised electricity generators are used as a matter of priority. If necessary, low-priority consumers can also be temporarily uncoupled from the supply.

Common combinations are solar cells, wind turbines, heating plants, and diesel generators. The latter cover the base load and act as emergency power suppliers.

When microgrids are included in larger (e.g. national) power networks (macrogrids) they can appear both as consumers and as providers depending on the local energy requirements. They protect local power consumers in case of failure of the main network. Large power plants and long-range current distribution are thus avoided.

(Photo: Pfisterer)

Photovoltaic modules, wind generator, and diesel generator build the core of a microgrid, as for example with the MEMS from Pfisterer.

renamed CrossPower energy management system – from Pfisterer combines any decentral conventional and renewable energy sources into an insulated energy network. Thus, the reliable and weather-independent use of regenerative energies is possible in remote regions, crises zones and refugee camps. For CL15, the CrossPower system from Pfisterer successfully, without notable disruptions, supplied central facilities like an operation centre, refrigerated rooms, IT systems and tents.

NATO and Pfisterer have concluded a contract according to which Pfisterer is to supply a CrossPower prototype with 150 kW that can supply a military camp for 125 soldiers with electrical power.

The temporary energy network with pluggable modular components, also including inter alia Multicon solar container components, can be promptly and safely installed without the need for specialised staff. The system is to be used by the logistics headquarters of the Lithuanian armed forces from the end of 2016. For this project, Canada provided the equivalent of €672,000.

Solar Power Plants

How the demand for electrical energy can be reliably covered in an island solution was demonstrated by the Multicon Solar Group from Duisburg, Germany. The mobile solar plants with an output range of one to 50 kW top output (kWp) consist of collapsible modules, a battery storage and an intelligent energy management. Plug-and-play systems are ready to use after a short time. For CL15, a mobile solar plant was used in a 20-feet container under real-life conditions. The solar container from Multicon, with a solar output of 18 kWp and a storage of 45 kWp, supplied the tents and the control room of the military police (air conditioning systems, LED lamps, computers and mobile phones) day and night with energy. With an average consumption of six kW, the solar container generated more energy than was used, so that the batteries were sufficiently charged for night operation. The 1.5 tonne trailer can be pulled by almost all military vehicles.

Mobile Energy Supply

Besides stationary operation, the plants also had to stand the test in changing operation sites. In the case of sudden power cuts, mobile systems (e.g. solar trailer from Multicon Solar and Solar Roll-Array from Renovagen/United Kingdom) had to bridge the temporary energy gap quickly. The Multicon solar trailer is equipped with 18 solar modules that are unfolded locally and can supply up to 5.4 kW electrical power.

Particularly designed for mobile use is the hybrid generator HG-10K-20 from INTRACOM Defense Electronics/Greece. The system has a diesel generator, storage and current converter as well as a control system for a stable power supply. As soon as it is in operation, e.g. solar or wind generators are connected, the manager reduces the output of the diesel generator and increases it again in the case of a higher demand.

Water Treatment

In the water pollution scenario, another aspect of Smart Energy was emphasised. Low energy requirements is a characteristic of the BWP 400 water-processing unit from Blücher/Germany. With a combination of ultrafiltration and an adsorption step from SARATECH high-performance adsorbants, drinking water according to the German Drinking Water Ordinance is produced with a low use of energy. With a cleaning output of 400 litres per hour, the plant uses less than one kW.

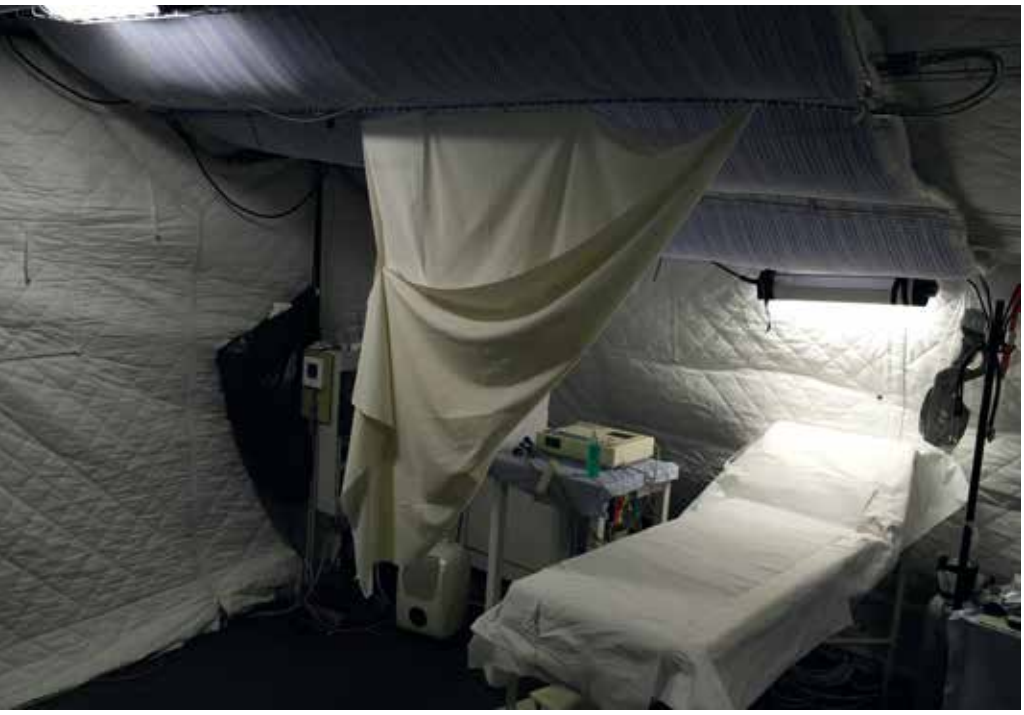
(Photo: Multicon)

Energy Power Pack in a half-height container

The necessary energy was supplied by Renovagen with the Solar Roll-Array and Multicon Solar both with the solar trailer and with the Energy Power Rack (EPR). The mobile EPR, which was developed in co-operation with FHF Flurfördergeräte, is installed turn-key ready in a half-height 20-feet container.

The BAAINBw had installed a container with 20 m2 solar thermal modules in the Smart Energy Camp West that supplied

hot water (70 degrees Celsius) for everyday use, for example in the shower or in the kitchen. The plant heated two m^3 of hot water daily, which were stockpiled in a container.
At the Smart Energy Camp East, the Deployable Power Module from ESTechnologies/The Netherlands was connected as power supply to the NATO military camp. The operator of the military camp was the NATO Support and Procurement Agency (NSPA). The EST plant, with 136 kW storage and a 80 kW diesel generator was continuously connected with a 120 m^2 solar surface (20 kWp). At times, further solar systems, e.g. from Multicon Solar and Renovagen, were switched on which the power manager had to integrate into the network.



(Photo: steep)

Energy-efficient air conditioning with the bionics capillary system from steep

Accommodation

In the tent areas, the focus was on reducing energy requirements. Besides, the standard tents widespread in the Bundeswehr, Schall/Germany had also installed airborne tents. The tents were protected against heat loss and/or undesirable energy input with various procedures. Particularly striking were the solar arrays, which as a second skin, efficiently dampened the sun's radiation and thus the temperature increase in the tents. As lighting, LED lights, for example from SETOLITE/Germany, were used which on the one hand consume little energy, and also hardly give off (heating) energy loss. For air conditioning, an air conditioning system with integrated power inverter was used, which besides the 24-kW cooling capacity, can also supply current for the operation of equipment.
Cost-effective air conditioning was demonstrated by steep/Germany together with Losberger RDS/France in a thermally insulated first aid tent. Walls and ceilings were clad with thin capillary modules in which a water cycle ensured heat transport. The tent can be heated and cooled through a heat exchanger in the technology container.
The mobile air conditioning system from Tiegel/Germany, which on the basis of a heating pump only consumes 5 kW power for a cooling performance of 15 kW, was connected to one of the accommodation tents of the military police.
G&G Partners/Italy provided an insulated double-wall tent as Smart Energy Head Office which was supplied with current from IDE and used LED lamps from Gruppo ROLD/Italy. Gruppo ROLD also equipped the entire VIP tent with LED.
LED lamps with high efficiency levels from SETOLITE were also used for the external lighting in Camp West and as mobile systems. Depending on the mast height, surface areas of several thousand square metres can be illuminated with the LED lamps with luminous fluxes of up to 100,000 lumens. The energy consumption is around 80 per cent of the consumption of conventional luminaires.

Batteries for Portable Devices

The top priority of the USA was the equipment of soldiers with rechargeable standard batteries that supply portable electronic devices. On average, soldiers today must carry seven different non-rechargeable batteries with a weight of around eight kilogrammes (without reserves). Here the hour of standard batteries and fuel cells has come. Thanks to this, the wide range of battery types and through energy management, especially the weight, can be reduced. With the Jenny fuel cell, much widespread in the Bundeswehr and other armed forces, and the SFC power manager, SFC Energy demonstrated the state of the art. An important marginal condition for the successful use of this technology is the standardisation of power interfaces.

Evaluation

During the CL15 exercise, over 50 technical elements that were part of Smart Energy were used, whereby the use of diesel could be significantly reduced.
Mobile solar plants have proved that they soon will play an important role in the military field. The testing for interoperability has led to a new way of thinking for the military, but also for the manufacturers. Flexibility and independence of diesel fuels make these systems valuable tools. The implementation of a Smart Energy Camp requires holistic planning taking into account the energy supply side and the consumer side.
The energy providers (microgrids, solar power plants) require energy-efficient solutions on the consumer side (insulated tents, LED lamps, air conditioning equipment, energy-saving water treatment, etc.) and energy-saving behaviour (through training).
The results of the exercise were already subjected to a first on-site evaluation by a group of experts of the NATO Energy Security Centre of Excellence. A particular area of focus was the question how the existing equipment can be integrated into a microgrid according to Smart Energy principles and how microgrids from different units can be connected to each other. The experts discussed their observations and conclusions and worked out recommendations for the improvement of the NATO standards, with a view to ensuring a smooth integration of Smart Energy solutions in field operations. ■

"Equipment commonality is a key success factor."

(Photo: OCCAR)

Tim Rowntree, a British citizen, has been the OCCAR Director since 1 March 2013.

Since we last spoke with OCCAR (Organisation Conjointe de Coopération en matière d'ARmement) in September 2013 the organisation has significantly extended the portfolio of defence procurement programmes under OCCAR's aegis. In this interview OCCAR Director Tim Rowntree reviews current activities and recent achievements and explains his organisation's working relationship with the NSPA, EDA and industry.

ESD: What have been OCCAR's major achievements over the last two years?

Rowntree: During the last two years we have expanded our portfolio from 8 to 12 active programmes including the integration of three new programmes during 2015: Maritime Mine Counter Measures (MMCM), the Logistic Support Ship (LSS) and the PPA Multipurpose Patrol Ship. We are also managing the acquisition of the MMF (Multinational Multi role tanker transport aircraft Fleet). The MMF was facilitated by the European Defence Agency (EDA) and its acquisition and initial support will be managed by OCCAR. Long term support will be managed through the NATO Support and Procurement Agency (NSPA).

In addition, we are preparing for the management of a definition study for a MALE UAS (Medium Altitude Long Endurance Unmanned Aircraft System). Our existing programmes are also advancing: On A400M, 20 aircraft have been delivered (including one of the export aircraft to Malaysia) and we are developing a long-term common in-service support solution. In the BOXER programme we have now delivered more than 300 vehicles and we are preparing the procurement of a second batch of vehicles for Germany. The In-Service Support for the COBRA radar is ongoing and the system has performed well under operational conditions. Deliveries of FSAF-PAAMs air defence systems are nearly finished and we are preparing a mid-life upgrade. Six FREMM frigates have been delivered to the French and Italian Navies and Italy has executed its option for another two ships. In the ESSOR (European Secure SOftware defined Radio) Programme, OCCAR is preparing the final stage of the development phase and in the MUSIS (MUltinational Space based Imaging System) we are about to finish the definition phase. Deliveries of the combat proven TIGER helicopters, to the latest capability standards, are ongoing and we have placed a first study for a midlife upgrade. We have also made significant advances in programme management and corporate capabilities, to enable us to further strengthen our already strong reputation for successful programme delivery. This has included a major review and reinforcement of our risk management and performance measurement systems and an optimisation of our organisation and key skills to meet current and future needs.

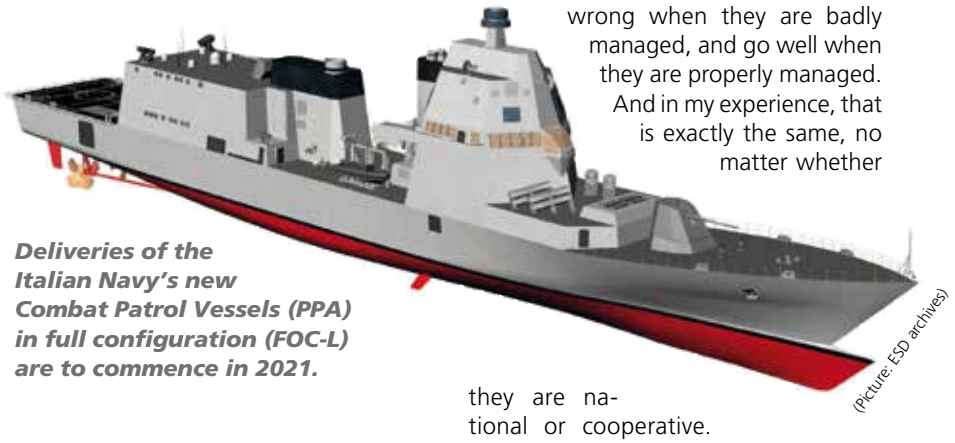
So, in summary, we are expanding our programme portfolio, maintaining a strong control on our existing programmes, which are already providing important military capabilities in our customer nations, and improving our organisation for the future.

(Photo: DCNS)

Six FREMM frigates have been delivered to the French and Italian Navies and Italy has executed its option for another two ships. Shown here is the French FoC AQUITAINE in New York.

ESD: What are the particular advantages of OCCAR's involvement in armament programmes as opposed to other agencies and procurement organisations?
Rowntree: Let me give you a number of advantages of the OCCAR model:
OCCAR was founded to provide a common governance and programme management framework, based on agreed rules, for all cooperative programmes and with the flexibility to include non-OCCAR member states on equal terms. So it is easy to add additional new programmes to this modular, multi-programme organisation without the need to agree new rules and procedures. The OCCAR Central Office acts as a service provider for the Programme Divisions and aligns best practice management methods as a knowledge pool throughout the organisation. The Programme Divisions are integrated teams including commercial, legal, technical and logistic expertise, led by a responsible and empowered Programme Manager to execute the programme, including protection of programme sensitive information. This multi-programme structure for cooperative armament procurement is probably unique.
An OCCAR key principle is the renunciation of the corrosive industrial "workshare equals national cost share", or "Juste Retour" approach, in favour of a principle called Global Balance under which we apply competition wherever possible and view work and cost share only on a multi-programme basis over the longer term.
The principle of competition also applies to the selection of OCCAR staff, where through fierce competition between candidates from all nations in a programme, we ensure a very high capability from our comparatively small teams.
OCCAR applies state-of-the-art programme management techniques, including rigorous risk management and a KPI based performance management system within an ISO 9001 certified quality management system. We also apply a programme through-life management approach, which ensures the seamless progression of the programme through its life cycle in order to deliver the required capability at minimum cost. We thus focus on the necessary decision points which influence the later programme, especially the in-service phase, at the appropriate time in the life cycle. With our programme portfolio, OCCAR has proven that it is capable to manage programmes throughout their life cycle.
Also, our strong legal framework for programme integration is adapted to cooperative armament programmes and protects the interests of participating states across a wide range of possible events.
We now can look back on an experience of more than 15 years in successfully managing cooperative armament programmes, with a business management system that has ISO certified for 10 years. On this basis, OCCAR delivers real capability.

ESD: How do you manage cooperation with industry and other agencies, above all with EDA and the NSPA? Which other defence procurement organisations do you currently cooperate with?
Rowntree: Cooperation with industry is mainly managed through the programme contracts with our prime contractors. But we also have an OCCAR Defence Industrial Group (ODIG) which was established by the defence industry associations of our member states in cooperation with OCCAR. We coordinate issues of common interest with ODIG, including our contract rules.
Our two main partners are, as you mentioned, the EDA and the NSPA.
We have a close relationship with the EDA, covered by an administrative arrangement. We consider each other as privileged partners which are mutually reinforcing. EDA generally works upstream in the programme life cycle, promoting cooperation to its member states, harmonising military requirements, providing supporting research & technology studies and initial programme planning, while OCCAR generally acts as the downstream management organisation for programmes.
We cooperate with the NSPA under an MoU dating from 2005 under which NSPA provides logistic services to OCCAR, currently for the COBRA, TIGER and A400M programmes. Since 2014 we have also had a Cooperation Agreement in place for the MFF acquisition by OCCAR.



Deliveries of the Italian Navy's new Combat Patrol Vessels (PPA) in full configuration (FOC-L) are to commence in 2021.

(Picture: ESD archives)

ESD: After 2.5 years as OCCAR Director – what do you regard as the success factors for cooperative armament programmes?
Rowntree: I know very well, that there are very differing views about the effectiveness of international cooperation. Many of us have been disappointed and frustrated by the long delays and the cost increases that have dogged many of our earlier European programmes. There is no doubt that cooperation can go badly wrong, and it is certainly true that it does require a particular level of camaraderie, strategic vision, flexibility, communication and discipline, that goes beyond what is needed in a national programme.
But ultimately, programmes go wrong when they are badly managed, and go well when they are properly managed. And in my experience, that is exactly the same, no matter whether they are national or cooperative.
The key is to establish a programme properly, with clarity over the intent, a clear delivery plan, a sound understanding of the risks and uncertainties, and contingency plans and resources to match.
That is why we retain such a strong focus on our professional programme management capability and our strong governance framework. With these in place, I believe that the OCCAR model provides the solutions to avoid many of the problems that beset earlier cooperative defence programmes. It provides a highly evolved and effective system and we continue to invest in further developing the very best in programme management capability.
Beyond that, equipment commonality is a key success factor in cooperative programmes – or avoiding national variants. Clearly, there will be times when a nation, through foreign policy or national geography, for example, has a genuine need for unique national requirements. In these cases we should do all we can to embody these needs into the common configuration. But the vast number of national variants of cooperative systems

today goes well beyond these genuine needs, and this really undermines the value of cooperation. I hear lots of people expressing frustration about all the national variants of equipment. But I never hear anybody say, in hindsight, that they wished they had had their own national variant! Everybody celebrates commonality when they get it – which is not surprising, because it brings:

- Significantly lower acquisition cost;
- Interoperability, both at a technical and at an operational level;
- Reduced cost and risk of obsolescence;
- The opportunity to develop common in-service support solutions;
- Lower cost of through-life development and upgrade;
- Lower training and infrastructure costs;
- Reduced industry costs, and higher export potential.

It is of course right that our nations should develop their own independent views on the threats to their peace and security. At the equipment level though, these assessments need to be carefully merged to find common solutions to the maximum extent possible because in the end, whoever is right, the threats are more or less the same for all of us in Europe. We will be in broadly the same crisis or war together, so common, interoperable equipment is a must. Thus, in my view, a top-down strategic view, informed by a real knowledge of the huge cost and capability implications of national variants, is vital.

ESD: Since we spoke last OCCAR has been tasked with the management of the PPA and LSS programmes for the Italian Navy. Can you elaborate on these? Also, if we understand correctly, these are "Italian Navy only" programmes. How does that comply with OCCAR's objective to "manage collaborative European armament programmes"?

Rowntree: LSS and PPA are state-of-the-art ship programmes based on a modular design, adaptable to different kinds of missions. LSS is a Logistic Support Ship to support a naval group with around 23,000 tons displacement and PPA is a Multipurpose Patrol Ship with approximately 4,500 tons displacement. Both types of ship will be designed to accomplish traditional military tasks but also peace time operations such as support to humanitarian assistance and disaster relief operations.

The OCCAR Convention, the International Agreement establishing OCCAR, allows the organisation to manage current and future cooperative programmes and those national programmes of member states that are assigned to it.

So the Convention already considers such a national approach in order to comply with the requirements of the member states, if this is beneficial for them. Ten years ago we already managed purely national activities within the ROLAND programme. In the case of PPA and LSS, both programmes have some technical and managerial synergies with the Italian version of the FREMM frigate programme also managed by OCCAR since 2005. Furthermore, Italy is obviously satisfied by the management services provided by OCCAR.

ESD: Another new activity in OCCAR's portfolio is the Franco-British Maritime Mine Counter Measures programme (MMCM). What are the objectives of this programme and in what way does it differ from EDA's MMCM project?

Rowntree: The OCCAR MMCM programme will deliver for each participating state an operational prototype/demonstrator 'Primary System' containing unmanned surface and underwater systems, together with associated command, control and communication architecture, to detect and clear sea mines and underwater munitions. The demonstrator is being designed to achieve qualification against a defined set of operational scenarios. Following qualification the British and French navies will then begin a period of evaluation which will further inform a decision on whether a follow-on development and production phase will be undertaken. The OCCAR MMCM programme was initiated as a specific bi-national initiative within the overall context of an EDA project. Whereas the OCCAR MMCM programme is at a more mature stage in its life cycle than the EDA MMCM project, in terms of defining the requirement and engagement with industry, unlike the EDA project its scope does not include the host platform requirements. For OCCAR MMCM these remain in scope at the overarching national level. For now, EDA and OCCAR

(Photo: Airbus Defence & Space)

At the time of the interview a total of 20 new generation A400M air lifters had been delivered to the customers, including the first aircraft (shown here) for the Royal Malaysian Air Force as an A400M export customer.

(Photo: Bundeswehr)

The objectives of the TIGER Mk 3 study include to seek as far as possible a common configuration across all nations with improved operational capabilities.

keep each other informed in order to ensure consistency of the programme developments in EDA and OCCAR.

ESD: The A400M programme has suffered from significant delays. What is the current status from your point of view and what are the lessons learned?
Rowntree: In terms of the lessons learned, there is no single answer and, at present, no official OCCAR view. For me personally, I think that the challenges of delivering such a major high technology programme – the first heavy lift European aircraft in decades, in such a relatively short time, were not sufficiently well understood at programme launch. That is of course easy to say in hindsight, but I think that in absolute terms, the achievement today is at least reasonable for such a major programme launched only 12 years ago.
With 19 aircraft delivered to the A400M programme nations, the programme is now really gaining momentum. After a challenging start, production is now stabilising and our focus now is on delivering the many individual operational capabilities that our nations desperately need. However, as in any programme at this stage, there are some challenges here and this is keeping us very focused. We must always remember though, that our military equipment is there to deliver successful operations, so whilst such problems are frustrating, they are also a symptom of being on the edge of what is technically possible. For the longer term though, there is no doubt that this is a fantastic aircraft and the first to deliver both tactical and strategic airlift in one single aircraft type. It will be a great aircraft for decades to come.

ESD: We have learned that OCCAR has recently signed the TIGER Mk3 Architecture Study. What exactly are the objectives of this effort?
Rowntree: The TIGER helicopter needs to be fit for the challenges of the next decades and the Architecture Study is the first step. The focus of the TIGER Mk3 study is therefore on overall modernisation including the integration of new armament, survivability, interoperability, sight systems and improved maintainability. We will also seek to take benefit from emerging certification processes which should allow improved cooperation and sharing of products and services between the nations. Finally, we will of course be working with the nations to seek as far as possible a common configuration across all nations. These initiatives have huge potential to improve capability and reduce through-life costs.
A de-risking phase – if deemed necessary – will be the next step after the current 18 months Mk3 architecture study, then to be followed by the launch of Mk3 main development activities. This could lead to starting the upgrade of the current fleets to Mk3 standard during the next decade.

ESD: Which future developments do you expect for your organisation?
Rowntree: I expect the further growth in our current programmes in terms of enhanced capabilities and common support solutions, and I also expect further growth in the number of programmes that we manage. As I have outlined above, the major cost savings and interoperability gains offered by common configuration and common support are opportunities that we must grasp and we will continue to work in that direction.
To accommodate this expected growth, we will adapt our organisation in order to maintain our flat, lean, hierarchy and the quality of our management system. We are already working out how we will achieve this.
In summary, I see OCCAR as an important enabler for the improvement and rationalisation of Defence capabilities in Europe, and for the associated strengthening of the Europe's defence industrial base. Our formula continues to be successful and we will ensure that it continues to be so. ■

The questions were asked by Jürgen Hensel.

Key Aspects of the PUMA AIFV System Technology

Team of authors, PSM Projekt System & Management GmbH

The variety of tasks for the German Mechanised Infantry has increased considerably over the last few years. Responsibilities now encompass national defence, in which the mechanised infantry is deployed primarily in combined arms operations as part of the field army, right up to currently-dominating international missions, which include tasks such as conflict prevention and crisis management. The international missions require capabilities such as safeguarding and monitoring areas and objects. Recent experience has demonstrated time and again how quickly these peace-keeping and peace-enforcing missions can escalate.

The mechanised infantry is predestined for such a range of tasks. It is well trained, adequately equipped and able to switch between mounted and dismounted combat easily. There is a reason why the MARDER AIFV is the first and most important German tracked fighting vehicle – besides the self-propelled Panzerhaubitze 2000, which is currently deployed to and engaged in combat as part of the ISAF mission in North Afghanistan. The MARDER AIFV has previously been successfully deployed with KFOR to the Balkan.

It was a requirement of the German Bundeswehr that the PUMA AIFV must possess, as a successor to the MARDER AIFV the following core capabilities, derived from the wide range of roles and tasks for national defence and international missions:

- High survivability equivalent to other armoured combat troops,
- High tactical mobility and range comparable to other armoured combat troops also during enemy action,
- Mounted and time-limited dismounted fighting capability,
- Capability to negotiate barriers and obstacles,
- High sustainability,
- Highly capable of mission-appropriate enforcement,
- Rapid strategic and tactical transportability,
- Air defence capability,
- Capability of effective self-protection,
- Ability to demonstrate force, and
- Deployable worldwide and in nearly all climate zones including extreme climatic conditions.

Many new and contradictory requirements had to be incorporated into the PUMA AIFV. The requirements of the German Bundeswehr determined the current design concept of the PUMA AIFV. The interdependencies of components, requirements and construction realities are outlined below.

Platform Protection

One of the key criteria during the concept design definition phase for the PUMA AIFV was a weight limit of 31.45 tonnes to maintain air transportability in the Airbus A400M. The requirements for highest levels of survivability of the platform and highest possible protection of the crew created a conflict between the requirements for optimal transportability, platform size, protection and lethality.

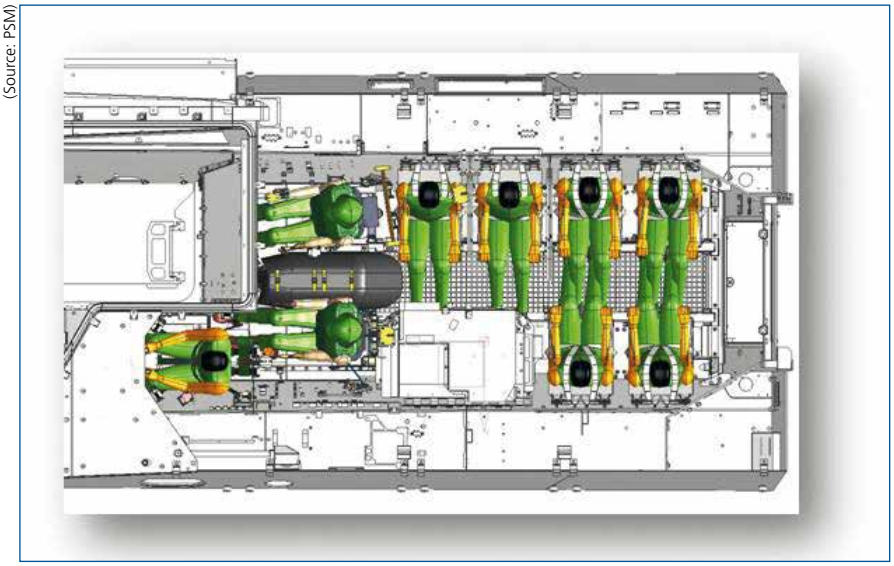
The dimensions and shape of the platform body are major factors in the overall weight. The platform body must accommodate on the one hand components such as propulsion, air conditioning, NBC protection, weapon systems including ammunition, crew and their equipment. On the other hand, the vehicle body design is critical for the loadbearing structural integrity of the turret, running gear and protection system.

A critical factor for the overall weight and body design is again the required protection level. The vehicle body, high mine, KE projectile, IED and shaped projectile pro-

(Photo: PSM)

PUMA AIFV summer test in the United Arab Emirates (UAE) in 2013

(Source: PSM)



Layout of crew accommodation

tection levels as well as additional adaptive bomblet protection were vital design criteria for the entire protection concept of the PUMA AIFV. This high level of protection can only be achieved by reducing the dimensions of the platform. Therefore, one of the design criteria was to reduce the areas that required protection in order to keep the overall weight low. Studies proved that the only way to achieve this result was to choose a design concept based on an unmanned remote controlled turret. In such a concept the length of the chassis was shorter than in the case of a conventional system with a manned turret. This concept allowed a more efficient usage of volume. It also allowed a focus on the protection of the crew instead of peripheral system components.

Two different configurations were defined resulting from two key requirements, air transportability in the Airbus A400M and modular protection based on needs:

- Configuration level A, optimised for air transportability (platform weight 31.45 tonnes) and
- Configuration level C, optimised for combat with maximum protection at a gross vehicle weight of 43 tonnes.

The modular protection concept allows the integration of future protection requirements or technologies for the sides, turret and roof protection without having to modify the core level A configuration. Some equipment, parts of the chassis and turret protection have to be mounted to change to protection level C. Countermine, frontal and some interior protection components are permanent features and remain mounted at configuration level A.

The Multifunctional Soft Kill System (MUSS) enhances the protection concept of the PUMA AIFV. MUSS is a defence system against guided missiles based on a combination of a jammer and multispectral smoke launcher. It is not the task of MUSS to destroy the guided missiles by direct fire but rather enforce self-destruction through targeted misdirection without harming the PUMA AIFV.

Further elements of PUMA AIFV's protection system are collective NBC protection, AC sensor and fire suppression and extinguishing system. Additionally, the PUMA AIFV has an air conditioning and heating system for the crew compartment to maintain the highest level of sustainability.

PUMA Technical Data	
Weight maximum	43.00 t
Weight configuration A (air transportable)	31.45 t
Crew	9 (3 + 6)
Length Width Height	7.6 m 3.9 m 3.6 m
Engine power	800 kW
Armament	MK 30-2/ABM (cal. 30 mm) MG 4 (cal. 5.56 mm) SPIKE LR grenade launcher (cal. 76 mm and 40 mm)

Layout of Turret and Weapons

The most obvious characteristic of the newly developed PUMA AIFV, next to the substantial armoured side protection, is the asymmetric arrangement of the turret on top of the chassis. This layout is only possible because the turret is unmanned and remote controlled. It provides several advantages:

- The location of the Commander's work station in the front right hand corner allows clear vision to the front and rear past the turret using hatch and driver's optic.
- Mounting and dismounting by the commander through the hatch is only possible because of this asymmetric lay-out. This hatch also functions in addition to the roof and rear hatch as emergency exit for the squad.
- Increased useable space in the crew compartment including the creation of two additional seats for crew members as the turret components, traversing drive, slip ring and fibre optic for the periscope do not reach centrally into the chassis.
- Space beneath the turret for additional centrally-located stowage rack. A large stowage rack has the advantage of a more efficient and flexible storage solution compared with several smaller stowage racks dispersed throughout the vehicle. Moreover, the space beneath the turret is efficiently used.
- The layout (turret and stowage rack left hand side in vehicle) allows the Commander uninterrupted vision to the rear and therefore to his squad. This allows outstanding direct communication between commander and squad with visual contact.

The lengthwise positioning of the turret on the chassis was determined by the requirement that the turret should generally rotate nx360° in azimuth with a maximum -10° depression. Another advantage of this chosen turret location was that a roof hatch could be fitted enabling mounted close combat. The infantry soldiers can stand in and operate from this roof hatch. The limits for a forward and lengthwise located turret also resulted from the space requirements for a sliding hatch for the Commander, location of the engine and driver workstation.

The elevation of the turret ranges between -10° and +45°. This elevation allows the PUMA AIFV to fight a wide range of targets from covert positions to helicopters. The distance between the far ends of the weapon system and the pivot point combined with the required elevation range determined the minimum height of the turret. Another parameter for the turret height was to avoid any protrusion of the weapon system into the crew compartment.

The location of the periscope with its fibre optic cable in the rotational axis of the turret was a further factor for the turret design. It would have been possible to position the weapon system in the centre of the turret but this location would have resulted in a larger and heavier turret housing.
There are two main reasons for storing the ammunition outside the chassis. Firstly, this design keeps the interface between chassis and turret to a minimum because no ammunition feeding occurs through the turret ring. Secondly, the volume of the highly protected crew compartment can be minimised as no ammunition has to be stored. The ammunition storage is located in the rear of the turret, similar to the LEOPARD 2 MBT. However, the automatic ammunition feeding system requires a minimum radius between the ammunition storage in the rear of the turret and the weapon. The turret would have had to be widened if a central position of the weapon within the turret had been chosen.
For these reasons, the decision was taken to position the main weapon on the right hand side of the turret. The main weapon is nearly centrally located on the chassis when the entire vehicle system design is taken into account. The positioning of the secondary weapon system is determined by the mounting of the MG4. Its ammunition feeding happens from the left side and its cartridge cases are discarded to the left. Therefore, the main and secondary weapons are located to the right of the turret ring. The launching platform for the multi-purpose light guided missile system (MELLS) will be adapted on the left external wall of the turret. This location allows the Commander to continue operating through the hatch while MELLS is mounted.

Assigned Vision Equipment

Commander
Fibre optic panorama periscope n×360° (primary assignment), monitor display of optronic day vision of periscope and weapon optics, Thermal image of panorama periscope and gunner's weapons optic, rear cameras, six optic periscopes, open hatch view, laser range finder.

Gunner
Optronic day vision of periscope and weapon optics, fibre optic panorama periscope (in turns with Commander), thermal image of weapons optic or panorama periscope, rear cameras, two optic periscopes, laser range finder.

Driver
Three optic periscopes, one image amplifier and monitor for rear vision camera, open hatch view.

Squad
Four optic periscopes and vision through glass block in rear ramp, two monitors for optronic sights, four rear camera and one rear vision camera, one image amplifier, vision via two-man hatch.

Vision Concept

A large quantity of optical and optronic equipment allows the entire crew to have an excellent 360° degree observation, detection and identification capability of targets by day and night under all climatic

conditions. Targets which are detected by the driver's optic can immediately be passed on to the Commander for further identification by using the tap visor. The independently stabilised nx360° degree rotatable panorama periscope is the main optical instrument for the Commander. This equipment allows the Commander to conduct turret-independent observation and reconnaissance tasks. The eye of the panorama periscope is mounted on top of the turret roof and can be turret-independently rotated so that the Commander has optimal vision with high reconnaissance capability and additional all round vision. The locations of the mounting points for the panorama periscope are specifically chosen so that the instrument is positioned co-axial within the azimuth of the turret's rotational point. The panorama periscope has maximum resolution fibre optic day vision, which can also be displayed on all monitors within the vehicle via a CCD camera.

The weapon optics of the gunner has optronic day vision and is also independently stabilised. Both Commander and gunner optics – with several sights and zooming levels – consist of identical thermal sights and a laser range finder each.

The Commander can instruct the gunner to fight the identified targets without delay. The Commander can continue with

(Photo: PSM)

Puma AIFV in Service

Official delivery of the PUMA AIFV from industry to the German armoured infantry forces at Rheinmetall's Unterlüß site at the end of June 2015 was the beginning of the programme's in-service phase. Service introduction is supported by a special organisation that the German Army has set up at the Munster training centre. This organisational element, which consists of experienced armoured infantry instructors, is to coordinate and execute the vehicle's service introduction as well as initial training of all personnel involved in the operation of the PUMA weapon system at battalion level.

Battalion by battalion the PUMA AIFV is to gradually replace the MARDER AIFV in the armoured infantry.

A total of 342 AIFV and eight driver training vehicles are to be delivered to the German land forces by 2020. The delivery schedule suggests one or two vehicles per week – as of today, more than 40 PUMAs have been delivered. Production is to be shared between Krauss-Maffei Wegmann's (KMW) Kassel site and the Unterlüß site of Rheinmetall Landsysteme (RLS). Modern training equipment, spare parts and ammunition is supplied along with the vehicles.

his reconnaissance tasks directly after having given his instructions. This process is based on the 'Hunter-Killer' principle.
PUMA's vision concept in combination with its innovative control and display concept on all monitors provides the entire crew with up-to-date and accurate situational awareness. The vision concept includes the choice of displaying either optronic sights or the actual situation.

Drive System and Running Gear

Development of the chassis components was also driven by the requirement for a compact design. The compact design principle is especially noticeable with the newly-developed drive system. The key component for the PUMA AIFV's drive system is the powertrain with flywheel generator and integrated cooling system. The choice to use the 10 cylinder High Power Density (HDP) diesel engine was made to meet the requirement of maximum output with minimum weight. This engine requires 50% less construction volume compared with other engines despite its comparable output.
This engine combined with the modern weight-optimised HSWL Gearbox (hydrostatic/hydrodynamic shifting, reversing and steering transmission) and the GABEL-System (generator, starter motor, electric on-board network and electric cooling system) define technologically leading-edge drive system technology. Therefore, the latest technology for tracked vehicles has been integrated in the PUMA AIFV.
It was decided to position the cooling system in the front of the vehicle. The main reason for this decision was again the requirement for a truly compact platform design. One of the advantages of a frontal cooling system is its direct connection with the engine block. This concept avoids using long and difficult-to-access pipes and also enables the quick change of the complete power pack. Another advantage is that the rear of the vehicle has space for stowage or other equipment and is more flexible to incorporate user specific requirements. Principally, this allows the development of further PUMA AIFV variants.
For the first time, a decoupled running gear has been used. This technology reduces the noise and vibration level significantly. Reduced vibration and noise levels considerably enhance the performance of the crew, allowing the crew to perform longer and more efficiently, and therefore extending the operational sustainability and endurance of the AIFV significantly.
A six wheel running gear with hydro-pneumatic suspension is used in the PUMA AIFV. The hydro-pneumatic suspension is more compact than the conventional torsion bar spring, requires no additional construction space in the chassis and has clear advantages for the protection of the vehicle system.

Conclusion

As described, the sometimes contradictory requirements have led to the design of an Armoured Infantry Fighting Vehicle that uses latest technologies to achieve an optimised solution including all the requested functional requirements. The use of modern electronic interfaces, an effective on-board electrical network, hardened against NEMP/LEMP/TREE (Nuclear Electromagnetic Pulse/Lightning Electromagnetic Pulse/Transient Radiation Effects on Electronics) and an adaptable ballistic protection which provides a growth path for future technologies for the next decades, has created the most modern and technologically advanced Armoured Infantry Fighting Vehicle in the world. ■

Training and Simulation Trends Today

William Carter and Stephen Barnard

General Petr Pavel, Chairman of the NATO Military Committee, at a recent conference addressed training challenges and said that what he called Virtual Training would not only assist in preparing for such challenges, but would at the same time reduce training costs.

In this context, Virtual Training is another term for the use of simulation technology for training rather than for design or research. The armed forces of smaller nations, he said, need to join up with others so that what he called "large formation training" can be carried out for Collective Defence rather than single-nation training. He said that training should be able to include civil agencies as well as military, because in many real situations they are involved. It therefore has to be recognised that if such training is to be realistic, any problems in sorting out security levels between data provided by military and civilian agencies must be solved. General Pavel pointed out that NATO has a more challenging group of threats than in the past and he mentioned the current situation in Afghanistan, Iraq, Syria and the Ukraine. Modern conflicts are becoming more complex, he said, with Hybrid Warfare mixing actions by conventional and irregular forces, with terrorism and cyber threats as well. In conclusion, he said that our training needs to be flexible so that the factors that he had mentioned can be taken into account.

The theme of "Going Virtual" was used in a recent US Government Business Council paper that pointed out that integration of simulation into training reduces costs. Perhaps more significant, it also said that simulation helps prepare for new situations, and this can include quick reaction to explore the best ways of countering threats that had not been anticipated before. Other points in the paper included a recommendation for multi-service training rather than single-service, and continued investment in simulation technology, particularly of the latest developments. Financial figures given in the paper include Air Force savings of $350 million per year by using simulation to replace some training that previously was conducted through live flying. On Naval aviation, the paper documented a saving of about $60 million per year per aircraft type as a result of increasing the proportion of training by simulation. Indeed, the US Navy strategic plan for 2015-2019 includes the use of live, virtual and constructive (LVC) training, and states that the aim is to achieve more realistic training at less cost.

(Photo: USAF)

Simulation training in the US Air Force Distributed Mission Operations (DMO) Centre in Albuquerque, New Mexico

Another recent paper is for a new Training Strategy for the Canadian Air Force. This points out that training using real aircraft is becoming difficult to afford in a country with a large land area but a small population and limited military resources. The paper acknowledged that training through simulation continues to improve in quality and reduce in cost, whereas the expense of real flying hours in complex modern aircraft has greatly increased. The Canadian Air Force will therefore introduce a "Networked Common Synthetic Environment" for future training. At the same time, there will be reductions in live training flying, which the paper suggests will make aircraft more available for operations and prolong their Service lives. The word "networking" appears to be crucial in future training systems, and builds on the original US Air Force Distributed Mission Operations (DMO) system of the late 1990s that expanded simulation training to include different aircraft types that would normally operate together. It is also possible to have network links that work over inter-continental distances, and for well-prepared training exercises real military vehicles can be networked in to the exercise as well. The principle started by DMO has now been expanded to multi-Service and multi-National networked training, and the Canadian Networked Common Synthetic Environment is following this trend. Turning now to the UK, a stated aim in its government's last Defence Review paper was in broad terms to transition to a 50:50 balance in training between Live and Simulation. The word "balance" is significant, because clearly live training is vital, but so is simulation. In terms of the morale and expectations of soldiers, sailors and airmen, they are now "digital natives". They have been brought up on computer games which have great visual fidelity, better than in simulators of the past and better than many still in service today. Indeed, game technology can be used by the military to achieve a balance (that word again!) between enjoyment and genuine training spin-off. This is used, for instance in some US Army

(Photo: Lockheed Martin)

Lockheed Martin F-35 Full Mission Simulator (FMS)

and Marine Corps training programmes, for instance in basic weapon handling in which both the right and wrong ways are shown using a humorous presentation that is not only enjoyable to see but motivates people to use the training aid. The other end of the training spectrum is the Full Mission Simulator (FMS) that aims to be as realistic a model as possible of the military vehicle concerned. The vehicle can be an Armoured Fighting Vehicle (AFV), an artillery piece; a ship's bridge, control room or weapon system; or a military aircraft. Such full mission simulations are expensive, but can be shown to be highly cost-effective. In FMS for large aircraft and heavy helicopters, the design follows that of the Level D Full Flight Simulator (FFS) that has been in use in world airline flying since the 1980s. Level D is currently the top standard and allows training on the simulator to replace that on the very expensive airliner. The Level D specification includes a 6-axis motion platform and a wide view visual for each pilot. Military equivalents have extra facilities such as defensive aids, detailed terrain data for low flying, and so forth. The effectiveness of the Level D design in military use is illustrated by the big C-17 Globemaster III strategic transport aircraft. Conversion of new pilots to this complex aircraft is done almost entirely on a simulator which has been described as "Level D Plus". Qualification to fly the aircraft itself on operational missions is generally after only two training air rides before the checkout test itself. Before this, over 20 simulator sorties will have been flown, and the alternative cost of flying the same number of training sorties on the aircraft can be imagined!

Cost Ratios – Simulation Compared with Real Equipment for Training

Talking about costs, when I have visited training units in the USA their presentations usually include a "cost ratio" of using the training aid compared to using the real vehicle or weapon for training. This ratio can be based on costs per hour of operation but generally (and better) it is based on long-term costs of the training aid and the real equipment and takes into account initial purchase, ongoing maintenance and operating costs, plus in-service updates. The training aid can be a simple laser attachment to a rifle, an instrumented replica training rifle, a desktop or laptop trainer, up to the Full Mission Simulator mentioned earlier. A figure that has been published is a cost ratio of no less than 1:32 for an Abrams Main Battle Tank, some expenses of live training being wearing out of components such as tank tracks and engines when used frequently on military ranges, also gun barrel replacement after firing numbers of rounds in training. We have not seen a figure comparing the cost of a ship's bridge simulator to training using the ship itself, but the ratio must be enormous and clearly awkward or hazardous situations cannot be deliberately set up for the ship itself. For aircraft, cost ratios vary from 1:10 for the simpler helicopters, up to 1:30 for large transport aircraft, with fighters somewhere in between, the ratio number depending on the complexity and expense of operating the real aircraft in a training mode. In the past, spending large amounts of money on mission simulators was unpopular in some quarters, particularly in senior officers who had been brought up in earlier times when simulators were somewhat crude and did not replicate the equipment particularly well. Technology has moved on and the modern simulator is a formidable training tool that in many ways is more versatile than the real equipment in terms of what is safe to train in conditions other than active combat.

(Photo: CAE)

CAE Australia has upgraded the Australian Army's S-70A Black Hawk full-flight and mission simulator with electronic warfare capabilities and the latest CAE Medallion 6000 image generator.

In sum, there is no doubt that the general trend in world military training is to use more simulation and less use of expensive military equipment in a training mode. There is also the recognition that the proper application of simulation technology can achieve more than training on the equipment itself, because Networking technology allows multi-Service and multi-National exercise. Simulation is not subject to the constraints of using the equipment and its weapons in a training mode, and a balance is required between the two.

European ITEC Exhibition and Conference

General Pavel's words quoted above were at the 2015 European International Training Equipment Conference (ITEC) at the PVA Expo Conference Centre in Prague, attended by over 4,000 people from 72 nations. Also at ITEC, Rear Admiral Simon Williams, Chairman of UK-based Clarion Defence, said that it had been estimated that about one billion US Dollars per year was currently being spent on military simulation. Brigadier Peter Gates from Australia said that his country would always operate with international partners, and needed to know what other countries and alliances such as NATO were doing in the training and simulation area. We need simulations for higher-level activities as well as routine training on equipment, he said. But systems must be interoperable with those of other nations so that we can learn from each other. This will allow us to run large multi-nation exercises without problems of interoperability and security classification of different data. Events such as the loss of Malaysian Airlines MH270 had resulted in Australia working with unusual partners such as China and other Asian nations and he suggested that we should prepare for future situations of this nature.

(Photo: ITEC)

General Petr Pavel, Chairman of the NATO Military Committee since 26 June 2015, visited the ITEC exhibition in Prague in May 2015.

The CEO of Bohemia Interactive Simulations, Peter Morrison, said that there were both advantages and pitfalls in the use of simulation. Problems can be avoided by understanding what simulation technology can do, and what it can not. Simulation costs were reducing and at the same time, capability was increasing. Technology is now available, he said, to fulfil most training requirements. He mentioned the Cloud and said that it had amazing potential for the military. He announced that worldwide three-dimensional terrain can now be downloaded in real time for use in simulations and other training systems. The use of common source data allows you to stay current, he said, but "you may be left behind if you go it alone" and there are limitations with proprietary systems that are not interoperable with others.

In the exhibition there were over 100 exhibitors from 22 countries. The UK and USA had over 20 exhibitors each, followed by Germany with 15. Looking at complete simulators, Buck Engineering of Reutlingen in Germany demonstrated an articulated hydraulic arm that moved a simulator cab in all six axes. WHR Devices of Australia demonstrated a square-shaped simulator box mounted on their small six-axis platform. The Avia company of the Ukraine showed a simulator for the Mil Mi-171 helicopter with a complete full-size cockpit mounted on a low-profile motion platform of their own design. Several complete domes were used to show wide view displays and some portable displays were demonstrated. Curved portable displays were shown by two UK companies Immersive Display and Simulation Displays. A company new to ITEC is Esterline of Seattle, USA, which has acquired some Barco product lines, and demonstrated an inflatable partial dome. Digital imagery is now of very high quality and was shown by a number of companies. These included Bagira and bDesign3D (Israel), Bohemia Interactive Simulations (Czech Republic), CAE (Canada), Helitraining (Ukraine), Rockwell Collins (USA), MetaVR (USA), Meggitt Training Systems (USA), Presagis (Canada), Terrasim (USA), Thales (France & UK), Triangraphics (Germany), and quite a few others. The vegetation and trees in the bDesign3D imagery were particularly realistic and it is understood that this uses technology from the Bionatics company in France. Night vision imagery was demonstrated by Babcock, Digital Projection, Helitraining, OLMOS, Reiser, Rheinmetall and Selt Systems.

On many booths, simulations of helicopters and drones were featured, and these are clearly two growth areas. In the ITEC Event Guide some 36 companies were listed as having a helicopter training capability, and 28 companies were listed for training for drones and remotely piloted aircraft. The ability to use wide-area network technology to connect simulations together for combined arms and multi-national training, has been said by many to be an essential part of the future. As well as the mainstream simulation providers, 22 other companies were listed in the Event Guide as specialising in Network Enabled Capabilities and Systems Integration.

In addition to the exhibition, conference papers were presented in a number of side-rooms, and nearly 70 papers and discussion panels were listed. These were grouped into some 30 themed sessions. Papers came from 15 different nations and several European and NATO agencies, and on the day before the event, there was a meeting of the international Simulation Interoperability Standards Organization (SISO), which looked at the future of international standards. A number of announcements were made at ITEC, taking the opportunity of an international gathering to gain extra publicity for new developments. In alphabetical order of company, some of these included Esterline of Seattle, which launched its TREALITY brand of display systems. These include a 360 degree rear projected system, various distant focus (collimated) displays, and a deployable display with a roll-up spherical screen. MASA Group, headquartered in Paris, announced Version 6 of their SWORD war game sys-

(Photo: ITEC)

RUAG small arms training at ITEC 2015

tem. Enhancements include a multi-view Graphical User Interface and improved After Action Review (AAR) with an Edit tool that can select sequences of interest. MASA also introduced SYNERGY, a version of SWORD designed for crisis and emergency management training. A really interesting development with wide implications for multi-national networking came from QinetiQ of Farnborough, UK, which announced their Architecture Independent Modelling Environment Secure system "AIME Secure". This allows data exchange between different simulations without compromising high-security data. The system de-sensitises high classification material so that the resulting data can be used with lower classification or even unclassified simulations or data in the network. This is particularly important in multi-national exercises and also where civilian agencies are taking part. Any system that enables non-sensitive data to be used in multi-national exercises and those involving civil agencies, is vital if such exercises are to be carried out at all. Returning to new systems revealed at ITEC, Presagis of Montreal announced M&S Suite 14, which enables system integrators to add 3D content to their simulations, and provides an open development framework. Finally, Rockwell Collins Simulation & Training Solutions launched its new EP-8100 image generator. This is able to use existing databases, and has software that allows industry-standard synthetic environments to run on EP-8100. All of the above illustrate the power of modern simulation technology, particularly its application to military training. Finally, it should be noted that the next ITEC will be at the ExCeL Centre in London from 17-19 May 2016.

US Training and Simulation Event – December – Keynotes by Two US Chiefs of Staff

In between European ITEC events, there is the regular Inter-service and Industry Training Equipment Conference and Exhibition (I/ITSEC) event with several times the number of attenders compared to ITEC. The next one is from 1-4 December 2015 in Orlando, Florida, Since developments in simulation technology allow you to save money as well as deliver training, these events show the way for cost-effective future training and often debut new equipment and training concepts. Hot news as we go to press is that the US Navy Chief of Naval Operations Admiral John Richardson and the Commandant of the US Marine Corps General Robert Neller are to be keynote speakers at I/ITSEC, together with senior officers from Army, Air Force and policymakers from the Pentagon. What greater endorsement could there be of the power of modern training and simulation technology? ■

Current Developments in the Sniper Community

Jan-Phillipp Weisswange

Snipers are screening, observing, reporting, possibly directing fires on, and ultimately eliminating high-value targets with their long-range precision rifles – particularly when the employment of different effectors might inflict "collateral" damage on non-combatants.

To fulfil their missions snipers require a comprehensive mix of weapons, optical sights, ammunition and accessories – and, of course, excellent training.
A sniper of today has attended intensive and multifaceted training courses, operates largely autonomously and uses a sniper rifle including high-end optical sights, optoelectronics and radio equipment. According to the mission profile he may be accompanied by at least one more qualified sniper, the "spotter", who acts as an observer. Depending on their armament such a sniper team may be effective at planned ranges of up to 1,800 metres. Even longer engagement ranges have been recorded: in November 2009, the British Corporal of Horse Craig Harrison successfully engaged two enemy machine gunners in the Afghan province of Helmand at a distance of 2,475 metres. In the Iraq War, U.S. Navy SEAL Chris Kyle, held in high esteem in his home country and well-known also in Germany owing to his autobiography and a Hollywood movie, fired his longest kill shot at a range of 1,920 metres.

(Photo: ISTC)

The sniper shoots, the spotter hits. A team practises during an alpine sniper course in the International Special Training Center

Author

Dr Jan-Phillipp Weisswange works as PR consultant in the defence technology industry and focuses as a freelance author on security policy and defence technology issues.

Semi-Automatic Sniper Rifles

Bolt-action rifles still dominate the sniper scene. However, due to lessons learned with the Designated Marksman (DM) in the infantry, semi-automatic rifles are increasingly gaining traction to enhance the sniper's capabilities. The U.S. forces introduced the"Semi-Automatic Sniper Systems (SASS)" in the early 1990s: the Knights Armament M110 SASS has been in-service since 2005. This semi-automatic auto-loading 7.62 x 51 mm rifle is used in addition to the M24 in the U.S. Army and the M40 in the U.S. Marine Corps – both weapons based on the Remington 700 bolt action rifle – and will replace older semi-automatic Enhanced Battle Rifles (EBRs).
In 2010 the UK started procuring a 7.62 x 51 mm semi-automatic rifle under an Urgent Operational Requirement (UOR) programme. The L129A1 with match barrel and two-stage trigger of the US-based Lewis Machine & Tool Company (LMT) has been in use in Afghanistan since May 2010.
Late in 2011, FN presented its SCAR-H Precision Rifle, featuring a two-stage match trigger module and a 508-mm, free-floating, chrome-plated, heavier match barrel with an extended continuous Picatinny rail on top of the receiver to enable the successive mounting of riflescope and night vision gear. FN guarantees a hit pattern not exceeding one minute of angle (MoA) at 100 metres, corresponding to a 29.08 mm dispersion. With the Heckler & Koch G28, the Bundeswehr may notionally have procured a Designated Marksman rifle after a short and turbulent tender process but, in fact, it is a true SASS considering its outstanding performance parameters and high-quality accessories. The G28 is based on the Heckler & Koch DMR762-MR and was used in the ISAF mission from May 2012 onwards. The G28 is supplied with an extensive package of accessories including a customised Schmidt & Bender 3-20x50 sniper scope and an Aimpoint MICRO T1 as "piggy back" solution for close quarters combat as well as for fast target acquisition at greater ranges. Specifically-developed 7.62 mm x 51 DMR ammunition significantly enhances the accuracy of the weapon: the objective is a hit pattern not exceeding 1.5 MoA which corresponds to a dispersion of some 45 mm at 100 metres. Head shots at 300 metres and body shots at 600 metres are clearly possible even with standard DM11 cartridges.
To reduce the weight of the G28 and ease its operation, the Bundeswehr has added a Patrol Add-on Kit ("Ergän-

(Photo: MoD Australia)

Australian sniper with a .338 Lapua Magnum Blaser TACTICAL 2, Schmidt & Bender riflescope and Vectronix VECTOR binocular laser rangefinder. Magazine capacity: 4 rounds; barrel length: 627 mm; overall length: 1,230 mm; weight: 9.140 kg (operational); effective range: 1,500 metres.

zungssatz Patrouille") to the accessory package, comprising a short hand-guard, a modified shoulder strap and a streamlined buttstock, and opted for the Kahles K16i riflescope. Other suppliers provide similar sights, such as Leupold's Mark8 1.1-8 x 24, the 1-8 x 24 PMII Short Dot of Schmidt & Bender, or the 1-5 x 24 of Steiner.

As the .338 Lapua Magnum, also known as 8.6 x 70 mm calibre, is becoming increasingly popular among snipers, handgun manufacturers have started to offer semi-automatic rifles also for this type of ammunition. Relevant examples include Albert Arms (ALR .338), Liemke Defence (Noreen .338) and S.W.O.R.D. International which are meanwhile supplied by Precision Technic Defense in Europe. After all, one of the most used "anti-materiel rifles" worldwide is semi-automatic: the .50 BMG (12.7 x 99 mm) Barrett M82. Barrett usually supplies this weapon with the Leupold 4.5–14 x 50 scope.

Bolt Action Rifles for Sniper Missions

As mentioned above, bolt action rifles continue to be the established standard in the sniper community. The British armed forces still use their L96 and L115 repeating rifles from the Accuracy International Arctic Warfare Magnum model series. The U.S. Army introduced the M24E1 Enhanced Sniper Rifle – which is generally referred to as the XM2010 – with .300 Winchester Magnum (7.62 x 67 mm) calibre. A Leupold ER/T 8.5-20 x 50 Mark 4 PSR II Lockable Adjustment scope is normally mounted.

The .338 Lapua Magnum is becoming the standard calibre for sniper rifles as it provides excellent accuracy and effectiveness at ranges of up to 1,600 metres. The British used the Accuracy International AW(S)M-F (referred to as L115A3) since 2008, the Australians rely on the Blaser TACTICAL 2, and the French and the GSG9 of the German Federal Police on the PGM338 in this calibre. The Bundeswehr has put out a tender for a medium-range .338 calibre "G29" sniper rifle for its special forces. C.G. Haenel with an RS9 variant and Unique Alpine with a TPG-3A5 were shortlisted but the tender process is currently being reviewed.

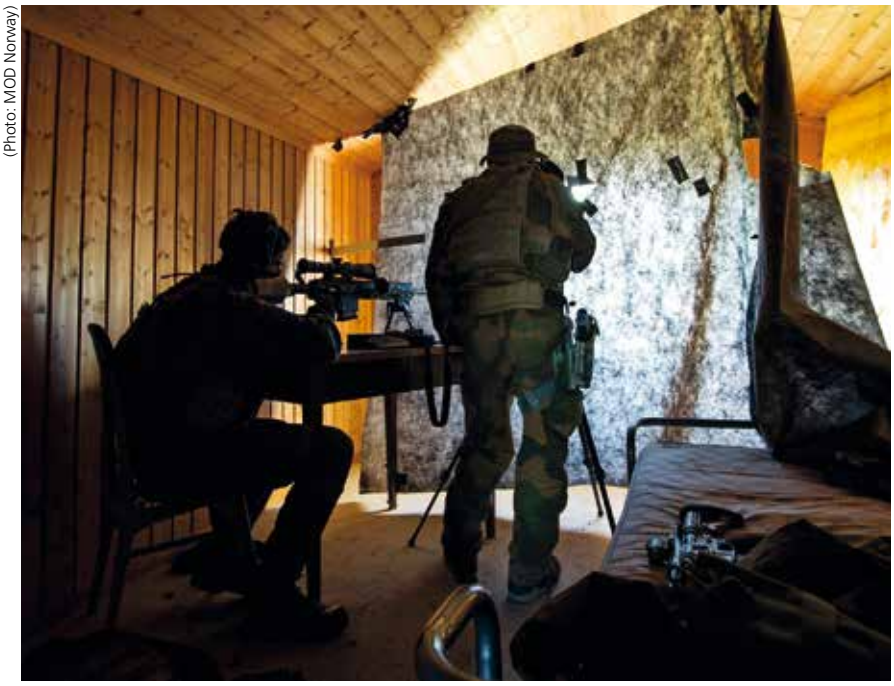
Semi-Automatic Sniper Rifles

	FN SCAR TPR	HK DMR762-MR (G28)	Knights Armament SR-25 (M110 SASS)
			
Function principle	Short-stroke gas piston system with rotating bolt	Short-stroke gas piston system with rotating bolt	Direct impingement gas system with rotating bolt
Calibre	7.62 x 51 mm	7.62 x 51 mm	7.62 x 51 mm
Ammunition feed	Steel plate magazine with 10 or 20 rounds	Transparent plastic magazine with 10 or 20 rounds	Steel plate magazine with 20 rounds
Selective-fire modes	O-1-F	0-1	0-1
Rate of fire	-	-	-
Muzzle velocity (v0)	789 m/s	789 m/s	789 m/s
Sighting system	Optional	Schmidt&Bender 3-20x50 PM II G28; Aimpoint MICRO-T1 reddotsight	ZF Leupold Mark 4 3.5-10 x 40
Barrel length	20" (510 mm)	420 mm	20" (510 mm)
Length (buttstock extended/collapsed)	1085/1040 mm	1050/970 mm	1029 mm
Weight	5,000 g (empty)	7,900 g (operational)	6,940 g (operational)

Bolt Action Sniper Rifles

	Accuracy International AXMC	Haenel RS9 (G29 candidate)	Remington MSR (PSR)	Sako TRG M10	Unique Alpine TPG-3A5 (G29 candidate)
					
Calibre	a) .338 Lapua Magnum (8.6 x 70 mm) b) .300 Winchester Magnum (7.62 x 67 mm) c) .308 Winchester (7.62 x 51 mm)	.338 Lapua Magnum (8.6 x 70 mm)	a) .338 Lapua Magnum (8.6 x 70 mm) b) .338 Norma Magnum (8.6 x 63 mm) c) .300 Winchester Magnum (7.62 x 67 mm) d) .308 Winchester (7.62 x 51 mm)	a) .338 Lapua Magnum (8.6 x 70 mm) b) .300 Winchester Magnum (7.62 x 67 mm) c) .308 Winchester (7.62 x 51 mm)	.338 Lapua Magnum (8.6 x 70 mm) (calibre conversion possible)
Magazine capacity	10	10	a+b)10 c)10/5 d)10/7/5	a)8 b)7 c)11	10
Effective range	1,500 metres (.338)	1,500 metres	1,500 metres (.338)	1,500 metres (.338)	1,500 metres
Barrel length	20" (508 mm) 24" (610 mm) 26" (660 mm) 27" (686 mm)	27" (686 mm)	20" (508 mm) 22" (559 mm) 24" (610 mm) 27" (686 mm)	16" (408.5 mm) 20" (508 mm) 23.5" (602.5 mm) 26" (660 mm) 27" (686 mm)	26" (660 mm)
Overall length (buttstock unfolded/folded)	1,125/965 mm (with 27" barrel)	1,300/990 mm	1,168/914 mm (with 22" barrel)	1,216/969.5 mm (with 27" barrel)	1,245/934 mm
Weight	6,600 g (empty)	8,000 g	7,710 g (operational)	6,310 g (empty)	6,200 g
Trigger	Match trigger	Match trigger	Match trigger	Match trigger	Match trigger

(Photo: MOD Norway)



Sniper operations in urban terrain require special skills – also when selecting the appropriate position and camouflage.

Similar state-of-the-art systems, some of which have already been fielded, are being offered by a great number of other renowned manufacturers, among them Accuracy International (AX338, which has replaced the phased out AWM.338 since September 2012), Armalite (AR-30), Ashbury (ASW338), McMillan (Tac-338), Orsis (T-5000), Steyr-Mannlicher (SSG08) and Voere.

The U.S. Special Operations Command pursued a different approach with its Precision Sniper Rifle (PSR) project. The requirement was that the new modular sniper repeating rifle should be convertible to the .308 Winchester, .300 Winchester Magnum and .338 Lapua Magnum calibres. Underlying this requirement were both mission-tactical and budgetary reasons. First, the operator should be able to convert his weapon from a long-range precision rifle into a shorter variant for close quarters combat. Second, the modularity of the weapon should allow use of the inexpensive .308

(Photo: MOD Norway)

Norwegian Skarpskytter approaching ("stalking") their position. HQG/ Lindnerhof-Taktik markets the Eberlestock backpacks in Germany

ammunition for training purposes while snipers on mission would fire the larger and more expensive rounds – even if they then needed, of course, different ballistic calculation tables. Remington eventually won the battle for the PSR project and, in September 2013, was awarded the contract for its Modular Sniper Rifle System which is now supplied as Precision Sniper Rifle (PSR) with the Schmidt & Bender 525x56 PM II PSR sniper scope. For the enhanced PSR II program, Leupold supplies the Mark 4 sniper scope. Suppliers of similar sniper rifle systems include, among others, Accuracy International (AXMC), Barrett (MRAD), Beretta (Sako TRG M10), Desert Tactical Arms (SRSA1), FNH USA (Ballista, a Unique Alpine TPG 3) and Voere (X3).

Still longer ranges are achievable with .50 Browning Machine Gun (BMG) cartridges. Bolt action rifles used in NATO include the Accuracy International AW50 (in the AI model portfolio replaced by the AX50) and the PGM Hecate.

Ammunition

Basically every renowned manufacturer – CBC, Fiocchi, Hornady, MEN ("Sniper Line"), Nammo, Lapua, Orbital ATK, RUAG Ammotech ("Swiss-P"), Winchester, to mention only a few – offers in-house developed ammunition especially designed for police marksmen and military sniper operations. Military ammunition has to meet more stringent requirements with respect to temperature stability and waterproofing. The prevailing opinion is still that the use of ammunition with defined kinetic energy transfer as well as deforming and expanding bullets should remain reserved for police operations that, generally, are mainly limited to shorter ranges of around 100 metres or less.

In addition to the .338 the .50BMG comes into play for achieving longer ranges and enhanced effectiveness. At the EnforceTac exhibition, MEN presented new high-precision ammunition, while RUAG Ammotec unveiled its new "Armour Piercing Incendiary SX" for the first time at DSEI 2015. The Nammo NM 140MP /Raufoss MK211 multi-purpose projectileis still among the most widespread types of ammunition. Nammo also supplies its RaufossNM185 (APS) und NM173 (API) cartridges to the Bundeswehr and other armed forces.

In the recent months some buzz was generated by reports about laser-guided precision projectiles based on the .50BMG calibre. DARPA's EXACTO (Extreme Ac-

curacy Tasked Ordnance) research project, with the involvement of Lockheed Martin and Teledyne, may be mentioned as an example. But it should be kept in mind that the effectiveness of such ammunition does not depend on high-performance optical sights and powerful multifunctional weapon-mounted laser modules like B.E. Meyers' ILZID-product family, the L3 Storm (AN/PSQ-23) or the Tac-Ray-2000 of Rheinmetall alone, but still imperatively requires the sniper's sound talent and expertise.

Optical Sights and Optroelectronics

And now another aspect has now been introduced that is increasingly significant: optical sights and optoelectronics. In the field of riflescopes the trend is towards shorter and more compact high-performance sights in order to facilitate the mounting of, for example, night vision devices.These devices are themselves getting lighter, more compact and more powerful as is demonstrated by the AIM HuntIR Mark 2 or the L3 CRATOS.
To what extent fire control sights will gain acceptance remains to be seen but they are already on the market as Hensoldt showed with its Sniper Auxiliary Module already some time ago. More recent examples include the Meprolight MES-LAS or the Trackingpoint XS1. Schmidt & Bender again focuses on riflescopes into which an external ballistics computer optically mirrors selected parameters. Yet it goes without saying in this context:

(Photo: Vectronix/SAGEM)

Handheld observation and location units like the Nyxus BIRD or here the MOSKITO TI of Vectronix/Sagem complement the equipment of sniper teams.

No optical system and no fire control computer is capable of supplanting the sniper's sound basic knowledge and armamentarium – yet.

Every Soldier an Accurate Shooter

On-target accuracy even at longer ranges is just a question of the appropriate mix of weapons, sights, ammunition, training and talent. This short overview has shown that several appropriate options exist. Accordingly, it is particularly the training that matters. Each soldier must learn the relevant basics at the earliest possible stage. However, the sheer excitement of the (albeit quite rightly trained) close range firing capability should not permit "classical" shooting skills like aimed single shots over long distances and other virtues such as fire discipline to fall into oblivion. Garrison firing ranges with 300 metre lanes afford an adequate opportunity to develop and maintain these skills, and while it holds true that not every soldier needs to be a sniper, every soldier should nevertheless be a good shooter who engages targets accurately at ranges of up to 500 metres with his or her issued service weapons. ■

High Performance Scopes (Selection)

	Airbus DS Optronics/ Hensoldt 3.5–26 x 56 FF	Kahles 624i	Leupold Mark 4 6.5-20 x 50 Extended Range/ Tactical	Schmidt & Bender 5-25x56PMII	Steiner Military 5-25x56
					
Intended purpose/ usage	Long-range sniper scope	Long-range sniper scope	Scope for semi-automatic sniper rifles	Long-range sniper scope	Long-range sniper scope
Magnification	3.5 – 26-fold	6 – 24-fold	6.5 – 20-fold	5 – 25-fold	5 – 25-fold
Entrance pupil	56 mm	56 mm	50 mm	56 mm	56 mm
Exit pupil	16 – 2.15 mm	n/s	7.7 – 2.5 mm	10.95 – 2.28 mm	9.8 – 2.24 mm
Angular field of view	10.09 – 1.38 m/100 m	6.8 – 1.7 m/100m	4.8 – 1.8 m/100m	5.3 – 1.5 m/100m	7.23 – 1.43 m/100 m
Length	370 mm	405 mm	368 mm	410 mm	422 mm
Weight	1,300 g	950 g	638 g	1,080 g	1,030 g

Handover of the First M109A7 PALADIN

Sidney E. Dean

The United States Army took delivery of its first M109A7 PALADIN Self-Propelled Howitzer (SPH) on 9 April 2015 with a formal ceremony at the BAE Systems assembly facility in Elgin, Oklahoma.

The M109A7 is the US Army's first new heavy artillery system since the introduction of the current M109A6 howitzer in 1994. According to an official Army statement it "provides primary indirect fire support to Armored Brigade Combat Teams and Field Artillery Battalions in order to destroy, neutralize, or suppress the enemy."

Despite the continuity of the name and numerical designator, the new PALADIN is more than a mere upgrade of the previous SPH. Unlike the current howitzer, it will be able to keep pace in the field with M1 ABRAMS main battle tanks (MBT) and M2 BRADLEY armoured fighting vehicles (AFV). "The improvements [ensure] crucial offensive and defensive fires in support of combined arms manoeuvre, wide area security and other full-spectrum operations," said Brigadier General David G. Bassett, the Army's Program Executive Officer for ground combat , during the 9 April ceremony.

The enhanced speed and manoeuvrability are made possible because the new "A7" version of the PALADIN uses the same chassis structure, tracks, engine, transmission, suspension, and steering system as the BRADLEY. Many of these components, including the engine and transmission, are actually upgrades of the systems used in the BRADLEY – upgrades which will eventually also flow into the armoured fighting vehicles.

The new SPH does use the cab structures and the gun and cannon assemblies of the current "A6" version. This is meant literally: for each M109A7 being built, one M109A6 is disassembled. The cab, turrets, gun mount and cannon are overhauled and enhanced with new technology before being re-mounted on the new, Bradley-equivalent chassis. These upgrades include: electric motors to replace the turret's hydraulic systems; a new automated loader and electric ramming system for the cannon; and a new electric gun-drive system for elevation and azimuth. Some of this new technology has been carried over from cancelled development programmes such as the XM2001 CRUSADER SPH and the Future Combat System (FCS) Non-Line-Of-Sight Cannon (NLOS-C).

Other features of the M109A7 include:

- the "A7" version weighs approximately 25 percent more than its predecessor, but the new engine generates 50 percent more horsepower, providing a significant performance boost;
- a new, 600-volt on-board power system capable of producing 70 kilowatts of power satisfies the increased energy requirements of today, for example in support of the battlefield network and for IED-jammers, and is designed to accommodate emerging technologies of the future. It generates nearly four times as much energy as is available on the current SPH;
- defensive/force protection equipment includes: a Crew Remotely Operated Weapon System (CROWS) mount for a .50 calibre machine gun; an Automatic Fire Extinguishing System (AFES); enhanced appliqué armour; and an underbelly armour add-on kit;
- An onboard computer with comprehensive diagnostics software monitors the condition of the vehicle and its subsystems to identify problems early and shorten the maintenance cycle;
- increased modularity enables the vehicle's crew to perform some maintenance themselves in the field via plug-and-play. For example, the power-system motors can be swapped out within fifteen minutes without the aid of a repair vehicle.

Overall the Army and BAE Systems both emphasize that the commonality of components with the BRADLEY AFV will not only enhance combat power and reliability, but also will reduce cost and simplify logistics and maintenance, both in the field and in depot.

(Photo: U.S. Army)

The U.S. Army took delivery of its first M109A7 PALADIN Self-Propelled Howitzer (SPH) on 9 April 2015.

Author

Sidney E. Dean is President of Transatlantic Euro-American Multimedia LLC.

Performance

According to PEO GCS data, the M109A7 SPH weighs 42 tons and carries a four-person crew.

It carries a 155mm cannon (designation: M284) on the M182A1 gun mount. The cannon has day-and-night, all-weather capability, and an automated loader. The magazine can accommodate a mix of 39 conventional, rocket-assisted, and precision munitions (EXCALIBUR, Precision Guidance Kit). Maximum range for over-the-horizon indirect fire is 22 kilometres with conventional rounds and 30 kilometres with rocket-assisted rounds. EXCALIBUR has a designated range of 40 kilometres. The vehicle's cruising range is approximately 320 kilometres.

The M109A7's sustained rate of fire is one round per minute; for short durations a maximum rate of four rounds per minute is possible. The moving howitzer can receive a fire order, compute the firing data, occupy a firing position, and fire for effect, all within sixty seconds. The gun barrel can be unlocked and aimed while the vehicle is still in motion. After firing, the vehicle can immediately relocate to avoid counter-battery fire. BAE Systems explained that this rapid engagement capability – sometimes referred to as "Shoot and Scoot" – is made possible through technology that includes an onboard positional navigation system and a digital fire control system capable of receiving input electronically and via secure voice commands.

The new M109A7 Self-Propelled Howitzer (SPH) is partnered with the new M992A3 Field Artillery Ammunition Support Vehicle (FAASV), generally referred to as the CAT (Carrier, Ammunition, Tracked). The new CAT replaces the current M992A2 FAASV. The munitions carrier is constructed on the same chassis as the self-propelled howitzer, weighs 37 tons and has a crew of five. Like the howitzer, it has a top speed of 61 kilometres per hour. It can carry 93 artillery rounds and replenish the howitzer's magazine in the field.

A PALADIN "set" consists of one SPH and one CAT. Eighteen sets equip one field artillery battalion.

M109A7 Programme

Although the development programme was initiated in 2007 during the height of US counterinsurgency operations in Iraq and Afghanistan, introduction of the M109A7 is an important contribution to the U.S. Army's return to focus more on conventional and hybrid threats by well-armed and "near-peer" opponents. During the Iraq and Afghanistan operations conventional field artillery played a secondary role after 2004, with aircraft conducting the majority of fire-support missions. Given the size of the operational theatre, terrain that (in Afghanistan) was frequently unsuited for heavy armoured vehicles, and tactics that relied on dispersed operations by small units, it was simply not practical to have self-propelled howitzers provide fire support. However, the Army expects field artillery and mobile armoured formations to play important roles in future conflicts. The recent effective use of Russian artillery systems in the Ukraine underscores the enduring value of this combat arm for land conflicts of varying intensity, and demonstrates the necessity for the United States to maintain and enhance its own capabilities.

The development contract for the modernised howitzers was awarded to BAE Systems in 2009; the resultant prototypes (five M109A7 SPH and two M992A3 CAT) were delivered in May 2011. Mark Sigonelli, BAE Systems Vice-President and General Manager of Combat Vehicles, explained that several upgrades and capabilities were added to improve the configuration since introduction and testing of the prototypes, including new armour designs for heightened protection as well as design changes around the gun drives and rammer. The changes took time and added testing qualifications, he said. Despite this, the programme has generally remained on time and on budget. Such delays as did occur were largely due to programme changes initiated by the Army, not to technical problems.

The low rate initial production (LRIP) contract was awarded to BAE Systems in October 2013, with an option to procure 66.5 vehicle sets. LRIP of the first 18.5 vehicle sets (19 howitzers and 18 ammunition carriers) began in May 2014. These will equip the first battalion, which is expected to achieve Initial Operational Capability (IOC) during the third quarter of Fiscal Year 2017. Full-scale operational testing of the new weapon system is scheduled for the second half of 2016. The final decision on full-rate production is expected in February 2017, after completion of operational testing and of qualification and reliability testing. Contingent on favourable results of these tests, full rate production is expected to begin in 2017. A total of 556 new howitzers will be procured for the US Army. They are expected to remain in service through 2050.

BAE Systems is also hoping for export opportunities. Twenty foreign nations including six NATO allies currently use older versions of the M109. With the exception of Iran all are considered potential customers for the "A7", or in some cases for the current "A6". No nation has formally expressed interest at this time, but the new PALADIN is considered a direct global market competitor to the German Panzerhaubitze 2000, the South Korean K9/K10, and the South African G6. ■

BAE Receives $245.3 M US Army Contract to Continue M109A7 Production

(Photo: BAE Systems)

The U.S. Army has awarded BAE Systems a contract option worth US$245.3 million to complete the low-rate initial production (LRIP) of the M109A7 self-propelled howitzer and M992A3 ammunition carrier.

"The success of this programme is directly attributable to the partnership between the Army and BAE Systems," said Adam Zarfoss, director of Artillery and Bradley programs at BAE Systems.

The M109A7 programme is a significant upgrade over the vehicle's predecessor, the M109A6 Paladin Self-Propelled Howitzer. It uses the existing main armament and cab structure of the M109A6, but replaces the vehicle's chassis structure with a new design that increases survivability and allows for the integration of Bradley common drive-train and suspension components. Additionally, the system leverages technologies developed under the Crusader and Non-Line-of-Sight Cannon programs such as a 600 volt on-board power generation, distribution and management system, coupled with high-voltage gun drive and projectile ramming systems.

The state-of-the-art "digital-backbone" and power generation capability provides significant growth potential for future payloads as well as accommodating existing battlefield network requirements.

BAE Systems was awarded a one-year base contract for the M109A7 in October 2013, and the first of two option year awards to produce an additional 18 vehicle sets in October 2014. The current exercise is for the second option year to produce an additional 30 sets. One set includes an M109A7 Paladin Self Propelled Howitzer (SPH) along with its battlefield companion, the M992A3 Carrier Ammunition, Tracked. With all two options exercised, BAE Systems will deliver a total of 66 vehicle sets plus one additional SPH and associated kits, spares, and technical documentation to complete the LRIP phase. The U.S. Army has a total acquisition objective of 580 vehicle sets.

The Danish Defence Procurement Plan 2015-2030 A Review and an Appetizer

J. Bo Leimand

Effective diplomacy requires that rhetoric be underpinned by military strength. "Diplomacy without arms," the Prussian King Frederick the Great stated, "is like music without instruments."

History shows that unless a credible military option exists, persuasion and compromise have little effect in dealing with hostile regimes. In other words, there is a close linkage between a nation's foreign policy and the strength of the nation's armed forces. In order to enhance and support this it is important that industry has a clear picture of planned defence procurement efforts.

At the Chicago Summit in 2012, the heads of state and government stressed that "Maintaining a strong defence industry in Europe and making fullest possible use of the potential of defence industrial cooperation across the Alliance remain an essential condition for delivering the capabilities needed for 2020 and beyond". Consequently, NATO, nations and industry have been considering how to improve the NATO-industry relationship. NATO, as an organisation that aspires to harmonise requirements, has an important role to play in communicating clear and detailed requirements to industry. Information to industry about the development of requirements must not impede or unfairly enhance their ability to compete for contracts at a later stage.[1] Cooperation can be considered as a possible option for capability development before pursuing unilateral programmes. Making the fullest possible use of the potential of industrial cooperation across the Alliance is to be promoted. From a Danish perspective this has been built into the "Open for Business" strategy. The intention of this strategy is to utilise the fact that Denmark has a fairly good reputation as an active player in international operations and this should be used to promote sales on export markets and thereby contribute to increased growth in Denmark.[2]

The Danish Defence Procurement Plan[3], in the following called the Procurement Plan, will be a reviewed hereunder considering the scope and objectives, and highlighting some of the plans for the operation and procurement of major weapon systems for the Army, Navy, Air Force and the Home Guard over the next 15 years.

It is a rolling plan amended every year and depending on the political situation both at home and abroad. The Danish defence industry has been asking for this since the Chief of Defence stopped issuing the Danish Defence Procurement Bulletin[4]. This happened when WEAG was disbanded and EDA was established, and as Denmark

(Photo: deviantart.com)

The CV90 AIFV is in service with seven armies. Sweden is the only nation operating the vehicle with a Bofors 40mm gun. Finland, Norway and Switzerland have decided on a 30 mm variant and Denmark, Estonia and The Netherlands rely on the 35 mm BUSHMASTER.

Masthead

European Security & Defence
Issue 6/2015
ISSN 1617-7983
www.euro-sd.com

Published by
Mittler Report Verlag GmbH
A company of the Tamm
Media Group

Editor-in-Chief: Dr. Peter Bossdorf (pb)
Deputy Editor-in-Chief: Henning Bartels (hb)
Managing Editor (Magazine): Stephen Barnard (sb)
Managing Editor (Newsletter): Dorothee Frank (df)
Industrial Editors: Jürgen Hensel (jh), Gerhard Heiming (gwh), Dieter Stockfisch (ds)
Correspondents: Rolf Hilmes (Army Technology), Peter Preylowski (Airborne Systems)
Regional Correspondents: Tamir Eshel (Israel), Tim Guest (UK), Beka Kiria (Georgia), Shinichi Kiyotani (Japan), Yury Laskin (Russia), J. Bo Leimand (Denmark), Chet Nagle (USA), Luca Peruzzi (Italy), David Saw (France)
Supported by the editorial team of "Europäische Sicherheit & Technik"
Publishers: Rainer Metzner, Henning Bartels

Layout:
davis creativ media GmbH, Bonn, Germany

Production:
DZA Druckerei zu Altenburg GmbH
04600 Altenburg, Germany

Office address:
Mittler Report Verlag GmbH
Baunscheidtstraße 11
53113 Bonn, Germany
Phone.: +49 228 3500870
Fax: +49 228 3500871
Email: info@mittler-report.de
www.mittler-report.de

Director of Marketing
Jürgen Hensel (jh)
Baunscheidtstraße 11, 53113 Bonn, Germany
Phone: +49 228 3500876, Fax: +49 228 3500871
Email: juergen.hensel@mittler-report.de

Advertising Representatives:

Dipl.-Betrw. Uwe Nemeyer, optiproject GmbH – Agentur für sicherheitspolitische und wehrtechnische Kommunikation
Von-Imhoff-Weg 5, 53359 Rheinbach, Germany
Phone: +49 2226 909637, Fax: +49 2226 909653
Email: uwenemeyer@optiproject.de, www.optiproject.de

UK/Ireland/Eastern Europe:
Stephen Barnard, c/o Mittler Report Verlag GmbH
Phone: +49 228 35 00 886
Email: stephen.barnard@mittler-report.de

USA/Canada:
Black Rock Media, Inc., Diane Obright,
810 Val Sereno Drive, Olivenhain, CA 92024, USA
Phone: +1 858-759-3557, Email: blackrockmediainc@icloud.com

Russia & CIS:
Laguk Co., Yury Laskin, General Director
Krasnokholmskaya Nab., 11/15, 132, RF-109172 Moskau, Russian Federation
Phone: 007-495-911-1340, Fax: 007-495-912-1260, Email: ylarm-lml@mtu-net.ru

Subscription/Reader Service:
PressUp GmbH, Postfach 70 13 11,
22013 Hamburg, Germany
Phone: +49 040 41448471
Fax: +49 040 41448499
Email: mittler-report@pressup.de

Cover Photos: Bundeswehr, NATO, ES&T Archive

Price per issue: € 5.90 (plus postage)
Annual subscription rate (6 issues): € 35.60 incl. postage

is not a member of this organisation the industry was in limbo in this context. But now the plan is available and should be a useful tool for industry to identify and follow tenders worthwhile to bid on and to position itself. The following is a more thorough description of the planning process and the plan itself.

Assumptions

As the Procurement Plan is tentative it does not oblige the Danish MoD or any agency in the subordinate structure of the Ministry to implement the planned investments laid out by the Procurement Plan.
The planning of stock investments and other stock tasks is a dynamic process which reflects the ongoing evolution of the armed forces' material and logistical needs. As a rule the planned material investments and stock-operational functions can be changed until a possible procurement programme commences. As a result of this dynamic process the published schedule can be regarded as a snapshot. Between the annual updates there will be a number of major or minor updates and changes thus modifying the list in the document because the list is only updated and published on an annual basis.
The planning can be changed as a result of ongoing changes in the defence arena or as a result of political agreements, including future agreements (the so called Defence Agreement). For example, the changes can include advancements, postponements, and changes of scope or prioritisation of new or existing capabilities. This can influence investments in the short, medium and long term. In addition, a number of projects require the approval from the Folketing (the Danish Parliament) and are as such dependent on the then current political situation.
The overview should thus only be used as a point for planning based on the stock capacity plan, which was in force at the time of the publication of the Procurement Plan.

The Stock Capacity Plan

The stock capacity plan includes the running costs and investments, financed via the respective main accounts in the Governmental Finance Bill. The Danish MoD seeks to ensure timely support and supplies for the armed forces' ongoing operations at home and abroad as well as to enhance the capabilities of the armed forces.
In this context the Ministry of Defence's materiel and procurement agency, the Defence Acquisition and Logistics Organisation (DALO), obtains, provides, maintains, develops and disposes equipment capabilities for all branches of the forces in accordance with the Danish MoD business model. This covers everything from tanks, ships and fighter jets through to boots, field rations, and pocket knives.
The stock capacity plan is drawn up by DALO in accordance with the political agreements on capacity development and, moreover, on the basis of the Chief of Defence and the Chief of the Home Guard's priorities.
The starting point of any major equipment acquisition is that the respective funds must be authorised by the Danish MoD. As a rule, the stock capacity plan undergoes major annual updates.

The Overview

The following overview of bigger stock investments and the running costs of larger equipment items is established on the basis of the above-mentioned stock capacity plan. The list is broken up into three periods; short, medium and long term. Short term means within the next five years, medium-term is from 6 to 10 years and the long term covers 11 to 15 years.

Royal Danish Army

Type of Equipment		Type of Investment	Investment Period		
Number	Description	Acquisition	Short term	Medium term	Long term
200150	**Tank LEOPARD 2 A5 DK**				
	M-934034 & M-938841 LEO 2 System Tasks	Investment			
200250	**Infantry Fighting Vehicle CV9035 DK**				
	M-936654 IKK System Tasks	Investment			
204150	**Weapon Systems**				
	M-932064 Acquisition of Weapon Station	Investment			
	M-934006 Acquisition of Ring Mount M/15	Investment			
206150	**Heavy Goods Vehicles**				
	M-981021 & M- 981022 Lorry (Road & Terrain)	Investment			
206300	**Trailers**				
	M-981027 Trailers	Investment			
208470	**MASTIFF III**				
	M-932062 MASTIFF III	Investment			
220100	**Fire Support, Land-Based**				
	M-931004 Artillery system postponed. A lease is being discussed.	Investment			
	M-931005 120 MM Mortar System	Investment			
220200	**Sensors, Land-Based**				
	M-932025 Night Vision Goggles	Investment			
	M-932026 Observation and Sensor Equipment	Investment			
	M-937473 Weapon Sights	Investment			
	M-937479 Laser Target Designator	Investment			
222100	**Containers**				
	M-931863 Containers	Investment			
	M-981028, Flatracks and Containers for Personnel	Investment			
224100	**ECM Systems**				
	M-934001 Acquisition of Vehicle-Mounted ECM-7	Investment			
228250	**Radio Stations, Land Based**				
	M-931020 Acquisition of Tactical Radios	Investment			

The list includes stock investments and running costs with a cumulative budget of 50 million Danish crowns or more within one or more of the periods; short, medium and long term.
From the outset the list does not include bigger stock investments and major equipment running costs already contracted. Contracting is an ongoing process. Therefore, after the publication of the Procurement Plan there could be acquisitions with signed contracts. In addition to this an acquisition may be included in multiple contracts. The planned acquisitions of new armoured personnel carriers and of new fighter aircraft[5] are not included in the Procurement Plan.

In addition, there may be bigger stock investments and major running costs, which are not covered in the list due to national security provisions.

Methodology

The list is divided in two parts:
A schematic statement of materiel capabilities, for which major investments are planned or are associated with significant operational running costs. The statement shows the expected investment period for an acquisition contract or a contract for running costs. After negotiations with the supplier the payment schedule in the investment period is finalised immediately and prior to the first contract award.
And a description of the bigger stock investments and greater equipment operational tasks.
The previous table shows examples of schematic statements and descriptions from the Army part of the Procurement Plan.
The schematic statement shows for which equipment capabilities major investments are planned (acquisition and upgrades) or major operational functions, as well as the expected investment periods.
In the following there is a brief description of the above-mentioned equipment capabilities. On the one hand the description in-

Royal Danish Navy

Type of Equipment		Type of Investment	Investment Period		
Number	Description	Acquisition	Short term	Medium term	Long term
300100	**Frigates**				
	M-941092 THETIS Class Replacement	Investment			■
304100	**Auxiliary Ships**				
	M-901002 Establishment of a Shallow Water Capacity	Investment	■		
	M-941108 New Naval Vessels for Environmental Use	Investment	■	■	
	M-941088 Smaller Naval Vessels	Investment	■		
	M-941118 Acquisition of Major Rubber Boats	Investment	■		
320100	**Coast Guard Vessels**				
	941102 Acquisition of Boats for the Coast Guard	Investment	■	■	
	M-941110 Replacement of three Coast Guard Boats	Investment	■		
324100	**Air Defence Missile Systems**				
	M-944011-162 ESSM Block 2 Production MoU	Investment		■	■
	M-946633 Replacement of Continuous Wave Illuminators (CWI)	Investment	■		
346100	**Mine Clearance Systems**				
	M-941109 Side Scan Sonar (SSS) Replacement	Investment	■		
	M-944005 MLU Maritime MCM Systems	Investment		■	
382100	**Artillery Systems, Maritime**				
	M-941041 Additional Acquisition of 35 mm Close-In Weapon Systems	Investment	■		
384100	**Sensor Systems, Maritime**				
	M-941116 Establishment of a BMD Sensor Capacity aboard the IVER HUITFELDT Class	Investment	■	■	
	M-944025 Sea FLIR Replacement	Investment	■		
385100	**Missile Deception Systems**				
	M-944008 New Missile Deception System	Investment		■	
400100	**RDN CCIS**				
	M-951115 Land based Electro-Optics Identification System	Investment	■		

(Photo: wikipedia)

The three frigates of the IVER HUITFELDT Class entered service in 2012 and 2013. Current plans are for an upgrade of their SMART-L long-range surveillance radars in support of an intended ballistic missile defence capability.

Army

Type of Equipment		Type of Investment	Investment Period		
Number	Description	(Acquisition, Operation, Upgrade)	Short Term	Medium Term	Long Term
200150	**LEOPARD 2 A5 DK MBT**				
	M-936094 LEO2 Operation	Operation			
	M-934034 & M-938841 LEO 2 System Tasks	Investment			
200200	**PMV PIRANHA III C**				
	M-936041 PIRANHA Operation	Operation			
200250	**CV9035 DK Infantry Fighting Vehicle**				
	M-936269 IKK Operation	Operation			
	M-936654 IKK System Task	Investment			
	M-938848 APC M113 G3/G4 Operation	Operation			

cludes a general portion, and on the other hand an overall description of the investment or operational task.

Descriptions

200150 – LEOPARD 2 A5 (LEO) DK Main Battle Tank

The LEOPARD 2 A5 DK MBT is the Army's heaviest and best protected weapon system. The vehicle is produced by Krauss-Maffei Wegmann, Germany, and has been in use with the Army since 2002. It is equipped with a high-tech fire control system, which enables it to engage targets under all light and weather conditions.

M-936094 LEO 2 Operation

The operation of the LEO2 A5 DK covers ongoing maintenance and procurement of a wide range of spare parts and various components that are needed to maintain operational readiness of the vehicle.

M-934034 & M-938841 LEO 2 A5 DK System Task

The LEO2 A5 DK is expected to be used by the Army until at least 2025. Modifications to the tank's fire control system and air conditioning system are foreseen.

Royal Danish Air Force

Type of Equipment		Type of Investment	Investment Period		
Number	Description	Acquisition	Short term	Medium term	Long term
402200	**Early Warning Radars, Stationary**				
	M-941095 Replacement of Coastal Radar Systems	Investment		■	
	M-951122 Replacement of Skagen and Bornholm EW Radar Systems	Investment	■	■	
402250	**Air Traffic Control Systems**				
	M-951117 Replacement of TMA on Aalborg, Karup and Skrydstrup Air Bases	Investment	■		
404150	**SATCOM Terminal Equipment**				
	M-932065 Acquisition of Mobile SATCOM Equipment	Investment	■		
420200	**EH101**				
	M-951153 Acquisition of EH101 Simulator for the Karup Air Base	Investment	■		
440200	**CL-604**				
	M-951025 CL-604 Replacement of Search Radars	Investment	■		
442100	**Fire and Rescue Equipment**				
	M-951152 Replacement of Crash tenders	Investment		■	

200200 – PIRANHA III C APC

The PIRANHA III C is a wheeled armoured personnel carrier in four different configurations. The vehicle is produced by the Swiss company Mowag and has been in service with the Army since 2004. It has yet to be decided how long the PIRANHA III C should be in the inventory. Among others, that depends on the forthcoming decision about the procurement of PIRANHA 5.

M-936041 PIRANHA Operation.

The operation of the PIRANHA III (C) covers ongoing maintenance and the purchase of a large number of spare parts and various components that are that are needed to maintain operational readiness of the vehicle.

200250 – CV9035 DK Infantry Fighting Vehicle (IKK)

The CV9035 infantry fighting vehicle is an armoured tracked and turreted vehicle able to transport seven combat-ready soldiers. The infantry fighting vehicle is produced by the BAE Systems-owned Swedish company Hägglunds and has been in service with the Army since 2006. Compared with the Army's other APCs the vehicle has increased protection and firepower and is equipped with a high-tech fire control system which enables it to engage targets under all light and weather conditions.

M-936269 CV9035 DK IKK Operation

The operation of the CV9035 DK IKK covers ongoing maintenance and procurement of a wide range of spare parts and various components that are needed to maintain operational readiness of the vehicle.

M936654 CV9035 IKK System Tasks

The modification of the vehicle is expected to include the improvement of the optics and the level of protection, including protection against rocket-propelled grenades.

That the same methodology is used for the materiel requirements of the Navy and the Air Force. ■

1 FRAMEWORK FOR NATO-INDUSTRY ENGAGEMENT, Chicago Summit, 20/21 May 2012.
2 "Open for Business", Danish MoD, March 23, 2015.
3 The Danish Defence Procurement Plan can be found at nytkampfly.dk, August 24, 2015 or at fad.di.dk, September 23, 2015. The plan is only available in the Danish language.
4 The Danish Defence Procurement Bulletin (on line) No. 3, August 2005.
5 The contenders are Boeing's F/A-18 SUPER HORNET, Lockheed Martin's F-35 Lightning II (Joint Strike Fighter) and the Eurofighter TYPHOON.

(Photos: wikipedia, ESD archives)

Although not covered by the Procurement Plan the combat aircraft requirement (F-16 replacement) constitutes the most significant procurement effort in the years to come. The contenders have been reported to be Lockheed Martin's F-35, Boeing's F/A-18 and the Eurofighter TYPHOON.

Greater Sense of Awareness

Andrew Drwiega

Sensors on airborne platforms are commonplace, but there is new impetus to expand real-time access to sensing capability as well as further increasing the detail that can be provided.

The gathering of intelligence and situational awareness through the use of airborne sensors is well established and is a major factor in battle management and increasingly in civil applications such as search and rescue.

Fixed-wing, rotary and unmanned aerial systems rarely fly without some type of electro-optical infra red (EO/IR) sensor with variations on complexity. How this information is managed, particularly in real-time and to many potential recipients, is being addressed, as is a requirement for wide area scanning and "object-of-interest" identification.

Multiple Access

Information is at its most useful when acted on quickly by those who really need it. Easy to say, but sharing information with the usual security caveats is not the easiest of tasks.

In October 2014, the United States Air Force, through the Information Directorate of the Air Force Research Laboratory (AFRL/RI), Rome Research Site, released a requirement that would allow a variety of military users to control airborne sensors, independently of the pilot.

The AFRL's pre-solicitation is for a new consolidated programme called Information Management (IM)-enabled Sensor Tasking and Ad hoc Control (ISTAC). In general terms this would allow third parties to control and task airborne tactical sensors to meet their own information needs without the pilot's involvement or deflecting the host aircraft from its primary mission.

The Air Force's view is that single operator controlled systems only serve to burden the pilot and do not give as much value to the overall force as they could otherwise do. According to the Air Force: "The result is suboptimal allocation of tactical sensors that have the opportunity to provide value to more than a single user at time."

ISTAC will develop information management software with user inferfaces that would lead to the automation of advanced targeting pod (ATP) sensor tasking depending on its availability and the requirements of other potential users. This would include the aircrew's mission objectives, navigation requirements, as well as other off-board requests.

Those organisations responding to the proposal would have access to three government-owned software technologies currently being developed under the Information Brokering for Embedded Platforms (IBEP) programme: Marti, Android Tactical Assault Kit (ATAK), and OpenPod.

According to the official requirement document: "Marti is an embedded information management software service that provides real-time situational awareness (SA) over tactical networks through publish, subscribe, and query (pub/sub/query). ISTAC will integrate tasking capabilities into Marti to enable pub/sub/query and generate."

ATAK is situational awareness software tool for Android mobile devices. It will allow third party tasking using existing subscription/query mechanisms, together with additional real-time sensor control plugins.

The OpenPod programme combines software development with hardware architecture to allow the integration of third party applications into the Litening ATP.

The technical challenges that need to be addressed by the ISTAC development include the reception and prioritisation of sensor tasking requests, and allocating authority for sensor use alongside those of the host platform whose primary mission should not be inhibited.

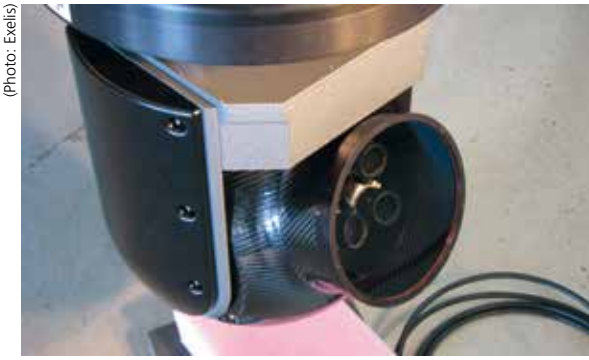
The Air Force states that ISTAC is addressing these challenges through the following methods:

1. "The need to conduct a capability analysis study where pilot ATP sensor utilisation will be analysed and on-board and off-board user requirements will be thoroughly reviewed.
2. Develop technologies to enable opportunistic task generation for an EO sensor.
3. Develop a mission-driven sensor task prioritisation prototype using the results of the capability analysis and opportunistic task generation task.
4. Develop technologies that allow the synchronous tasking of sensors as well as closed-loop control, and integrate them into the task prioritisation capability."

Author

Andrew Drwiega is Director/Editor of DefenceWorX Ltd, based in Amersham, UK.

(Photo: Exelis)



The Exelis wide area airborne surveillance system, CorvusEye 1500, can capture colour video from multiple views over a large area.

Funding for the programme has been set at $9.9 million which will be divided over the next four financial years accordingly: FY 15 – $1m; FY 16 – $2m; FY 17 – $2.5m; and FY 18 – $4.4m. This first solicitation is for white papers only

Eye Wide Open

CorvusEye 1500 is a wide area surveillance system that has been developed by Exelis. A persistent surveillance system, it can track movement over a wide area on a 24/7, day/night basis due to the introduction of an IR sensor in October 2014. This supplemented the existing colour electo-optical sensor which was launched in May last year. Capable of EO/IR coverage over a 3 km (1.86 miles) area from an altitude of around 15,000 feet, it also uses a analytical tool called CogniSense which rapidly processes the data from multiple sensors.

"Most traditional airborne imaging systems can zoom in to provide coverage of an area about the size of two football fields," explained Dwight Greenlee, Exelis director of regional surveillance. "CorvusEye covers an

area 200 times greater than most systems. It can generate up to 10 high-resolution views of different areas of interest simultaneously."

The sensor is around 38 cm (15 in) in diameter and weighs 43 kg (95 lbs). It will fit most mid-size unmanned and manned aircraft and uses standard interfaces to fit into the standard mounting location.

S. Danny Rajan, director of regional surveillance solutions at Exelis added: "CorvusEye can capture activity occurring simultaneously in multiple areas that might go unnoticed using traditional surveillance such as full-motion video."

Exelis' experience with wide area airborne persistent surveillance system includes the U.S. military Gorgon Stare programme which has already recorded over 10,000 operational hours. This system is a spherical array of nine cameras attached to an aerial drone used by the US Air Force on its MQ-9 Reaper UAS. It is a larger, heavier system at 24 inches and 400 pounds, and has the capability to monitor up to a 16-mile area.

(Photo: adcom)

UAE based manufacturer ADCOM remains one of the highly successful if low profile specialists in the airborne surveillance field.

New Software for Pinpoint Accuracy

One of the challenges in searching large areas of open water for small boats or even people, is the sheer difficulty of the task in identifying any object in such a seemingly empty expanse. Whether the mission is to detect small drug-running craft in the Caribbean, or people lost at sea – even objects that may be floating in the water from a plane crash (MH370) – there is still a reliance on standard electro-optical infra-red (EO/IR) sensors and the good old Mark 1 eyeball.

But one software-based solution may be about to make search routines much easier. The KESTREL Maritime ViDAR is an automated detection and ranging system that was launched by Australian company Sentient in February this year. Using ultra-high resolution sensors, the software uses advanced algorithms to detect objects across a wide field of view.

Simon Olsen, Sentient's director of business development, explained why better search techniques are needed: "A search and rescue operator can find a person in the water if they know where they are. But the challenge is finding people. It is a matter of coverage when we don't know where the object is in the water."

He said that current sensors usually have a six degree field-of-view because that is what a human operator can reliably process in terms of what is going on within the image.

The ViDAR system takes this forward through the software. It can be used via either a single sensor or in multiples to give a much wider viewing field. By using its automation technology, it can detect and present objects that it detects to an operator very quickly. The software conducts pixel-level analysis of the digital feed from electro-optical and infra-red sensors.

"It works by leaning about the environment," states Olsen. "At sea, it can delineate between distractions such as wave white-caps on the surface as well as distractions such as the sun's reflection, and focus on an actual object in the sea."

The company claims that the KESTREL Maritime ViDAR can provide between 20 to 80 times greater maritime search coverage than existing airborne EO/IR sensor operations.

"The software, over a period of 10-15 seconds learns about the operational environment and discards environmental effects such as waves. The system will give a real-time cue to people in the water, even one or two pixels in size," said Olsen.

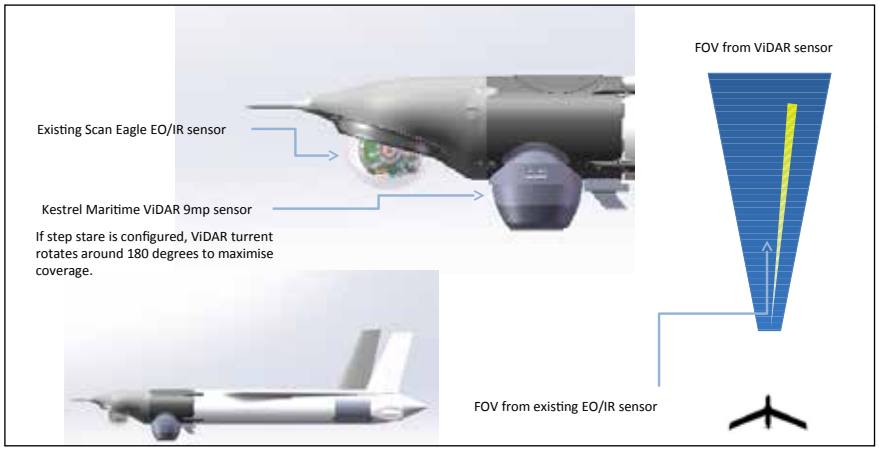
In March Sentient announced that it was providing the U.S. Naval Air Systems Command (NAVAIR) with its detection software (although not the ViDAR package) to be used in the mission control system package for the MQ-8C FIRE SCOUT, an unmanned rotorcraft based on a Bell 407 airframe.

NAVAIR has been developing the MQ-8 FIRE SCOUT series to provide the U.S. Navy with reconnaissance, situational awareness and aerial fire/precision targeting support. The onboard sensors are used to capture images and video and distribute that information to locations that can identify and coordinate action if required. The loiter time of the FIRE SCOUT allows it to passively maintain 'eyes on' the target while the KESTREL software increases the level of information leading to better identification.

"Automated video analysis tools like KESTREL help maximise the value of the EO/IR sensor package to the tactical operator," said Captain Jeff Dodge, Program Manager, NAVAIR. It will be used to detect small objects on land such as people moving or small vehicles as well as small boats at sea and individual people in the water.

Sentient states that its KESTREL system has already been employed on Royal Australian Air Force P-3 ORION aircraft and the Insitu ScanEagle UAV. It will also be used by the Australian Maritime Safety Authority's CHALLENGER 604 search and rescue aircraft when it enters service in 2016.

Tom Bleier, Sentient's director of business development said that the system had logged over 15,000 operational hours on both manned and unmanned platforms. ■



(Graphic: Sentient)

KESTREL ViDAR Configuration

Naval Auxiliary Ships
A Diverse Market for Diverse Missions

Bob Nugent

Auxiliary ships are an often overlooked but critical component of today's sea services around the world. Many service branches operate auxiliaries – navies of course, as well as coast guards and other government agencies – science, fisheries, interior – that have sea-going responsibilities.

Auxiliaries provide vital logistic support to the operational fleet – here replenishment and cargo ships make up the "fleet train" that provide critical fuel, foodstuff and other material that allow operational ships to perform their missions at sea for extended periods. It is not an exaggeration to state that without auxiliaries, naval combatant ships, aircraft and other resource-intensive "fighting" platforms would be tied to the shore and unable to sustain naval operations in distant waters.

At the same time, hundreds of other auxiliary platforms operate independently to maintain national maritime infrastructure, provide rescue and salvage capability, conduct oceanographic and hydrographic research, and execute other national missions such as intelligence and early warning. AMI's global naval data base lists over 900 auxiliary ships in active naval service today, operated by some 60 countries. A distinguishing characteristic of this fleet is its diversity in ship type, size and mission, ranging from yard craft under 10 tons to huge cargo, hospital and maritime prepositioning ships up to 80,000 full load tons.

AMI also shows 235 auxiliaries being built now or planned to be built over the next 20 years. This fleet will be equally varied, with some 45 countries expected to acquire a wide array of support ships. These range from simple general purpose tugs to large and complex mobile logistics bases.

The segment presents future market opportunities amounting to some US$59 billion. In aggregate, auxiliary ships make up about 6% of AMI's total forecasted global spend on new construction naval ships of all types to be built through 2035, and roughly the same percentage as measured by the number of new naval ships to be built over the same period. Currently over half of the world's naval auxiliaries now in service were commissioned before 1990, pointing to their likely retirement over the next 20 years. At this rate of replacement, the global auxiliary fleet now in service will likely grow smaller over the coming two decades as the oldest ships in the segment retire. To fill these gaps in auxiliary requirements, many nations are expected to lease or otherwise arrange for commercial ships to serve the fleet.

"Oilers" – fuel replenishment ships designated AO's and AORs still dominate the auxiliary ship segment, featuring the largest ships and highest cost programmes. These ships tend to be concentrated among the world's larger navies and/or those (like the UK's Royal Navy and the German Navy) with global commitments and global deployment support requirements. That said, over half of the world's navies with auxiliary ship acquisition programmes (27 of 45) include projects to build fuel and supply replenishment ships.

Countries with Arctic and Antarctic interests are increasing their investments in ice-capable auxiliaries. These ships are the foundation for sea services to exercise sovereignty and maintain interests. These interests include the security of growing ship traffic across the northern sea route of the Eurasian landmass, and increased economic activity (oil and gas, fisheries) in Polar regions. Most South American countries have national interests in Antarctica and waters of the far South latitudes, explaining their relatively high levels of planned investment in ice-capable ships over the next two decades.

Finally, many auxiliaries have less demanding naval build requirements because they generally will not find themselves in the midst of a battle. This relaxes some of the requirements in areas such as survivability and shock resistance that add to the cost of warships. Hence naval auxiliaries often prove to be an excellent return on investment when looking at how these ships contribute to the fleet and the larger national

(Photo: ES&T archives)

The Royal Canadian Navy has committed to the procurement of three joint support ships based on the design of the German Navy's BERLIN Class task group support ships (EGV). Shown here is the task group support ship BONN.

Author

Bob Nugent is an Independent defence strategy consultant, speaker and writer affiliated with AMI International.

The Global Auxiliaries Market: Top Spenders and Programmes

Country	Total planned Spend S$M 2015-2035	% of Total Aux Segment	Total New Hulls Planned 2015-2035	% of Total Aux Segment	Avg Ship Displacement (tons)
United States	23665	40%	46	20%	15,750
Canada	7694	13%	35	15%	8,017
India	3030	5%	16	7%	2,875
China	2450	4%	13	6%	19,467
United Kingdom	2095	4%	8	3%	38,500
Russia	1621	3%	14	6%	7,050
France	1500	3%	8	3%	12,000
Turkey	1500	3%	8	3%	8,833
Australia	1380	2%	5	2%	8,467
Italy	1262	2%	3	1%	17,000

maritime capability. Additionally, they are generally crewed by civilians – the US has many of its auxiliaries operated by the civilian crews of the Military Sealift Command.
As shown in the table above, the United States continues to lead the world's sea services in planned auxiliary ship buys – 40% of the global market share measured by planned spend through 2035. This US$ 23 billion in spending echoes a pattern seen in other US naval ship programmes—higher average acquisition costs per ship type and size compared to similar programmes elsewhere in the world. This is reflected by the smaller 20% US market share in the auxiliaries segment measuring the number of new ships to be bought.
Other NATO/European nations dominate the rest of the "Top Ten" table of future auxiliary ship acquisitions, with Canada, the UK, France, Turkey and Italy together making up 25% of planned new spending, and the same share of new hulls to be acquired. In particular, Canada has an ambitious investment plan for new auxiliaries, with nine programmes. Seven of these are planned for the Canadian Coast Guard and focussed on that country's vast coastline and unique Arctic security requirements.
The increasing range and size of navies in India and China require substantial auxiliary ship support, and that is seen in the planned spend and market share of these countries. They are 3rd and 4th respectively by spending, and place the same with respect to the number of new ships that will join their fleets in the next two decades.

Regional Markets

A regional assessment of the auxiliary market provides a slightly different perspective. As above, the US and NATO are regional leaders in planned investment. However, taken as a whole, the Asia-Pacific region makes up almost 20% of the future global spending on support ships.
And from a business perspective, the number of new auxiliary's ships in AMI's "planned" category above is significant. These are ship programmes that have yet to be awarded but will be over the next 5-7 years. Here some 77% of the future market is still available—and much of that addressable for shipbuilders seeking export opportunities.

US and NATO

As noted above, the United States still represents the largest single buyer of new naval auxiliaries. As shown in the table above, six of the ten largest programmes (measured by acquisition cost) come out of the US. Among

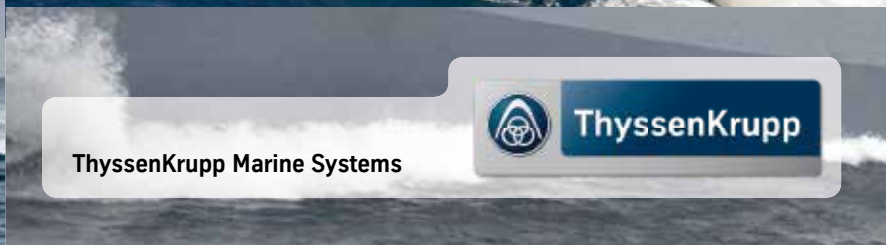
Notable Programmes

Top Ten New Build Auxiliary Ship Programmes			
Country	Programme	Planned New Hulls	Programme Value (US$ M)
US	TAO-X	17	10500
US	CG AGB	6	6096
Canada	JSS	3	3900
US	T-ARS (X)	4	2000
Canada	AGB	4	1780
India	AOR	5	1480
US	TAGOS	5	1250
UK	AOR	3	1200
US	AS-X	2	1200
US	MLB	3	1152
% of Total Auxiliary Market Segment		21%	52%

(Photo: USCG)

The two vessels of the U,.S. Coast Guard's POLAR Class (shown here is USCGC POLAR STAR) are believed to be the world's most powerful non-nuclear powered icebreakers. Six more units are planned in the scope of the AGB programme.

Ships. Systems. Solutions. Worldwide.



www.thyssenkrupp-marinesystems.com

ThyssenKrupp Marine Systems

ThyssenKrupp

these, the future Fleet Replenishment Ship (TAO-X) stands out in scope and timing. With a total programme of up to 17 hulls representing over US$10 billion in expenditure, and initial construction contracts expected in 2016, it is not surprising that this programme is a focus of effort for several US naval shipbuilders. In 2013 General Dynamics National Steel and Shipbuilding Company (NASSCO), Huntington Ingalls Industries (HII) and VT Halter Marine were awarded contracts to provide initial design studies for the TAO-X program and are considered the leading (only) candidates for future contract awards.

Another noteworthy programme is a new large icebreaker (AGB) for the US Coast Guard. As many in the US Congress voice increasing concern for maritime security in the Arctic region and deteriorating US capabilities in this domain, the new AGB programme – if funded – will respond to this issue. The six new AGBs would substantially increase the US Coast Guard's current operational inventory of two ice-capable ships.

Canada's Joint Support Ship (JSS) programme is the centrepiece among that country's nine new auxiliary ship building programmes. Three 21000 ton JSS will join the Canadian Maritime Forces from 2021. In the interim, Canada is seeking gap-fillers such as Chilean and Spanish ships and a commercial tanker that will support fleet replenishment needs.

The two variants of the UK's MARS class replenishment ship programme include a replenishment ship (AOR) and a "Solid Stores" support ship type (AOE). Taken together the programme envisions delivery of a single hull per year over eight years between 2016-2023. The MARS AOR programme is an example of a joint programme between the UK and South Korea, with construction taking place at a South Korean yard as a lower cost builder and material supplier, using a design from UK naval design and project firm BMT Defence. Additionally, BAE Systems will perform substantial customisation of the ship in the UK prior to final delivery to the Royal Fleet Auxiliary.

Turkey has six auxiliary ship programmes that are planned or building now. These programmes parallel the growth in Turkish naval reach and capability in combatant ship projects such as the 20,000 ton large air-capable amphibious ship (LPD), new indigenous frigates, and submarines. Among the more notable auxiliary projects building now are two classes of large ocean going rescue and salvage ships for submarines and surface ships: the ALEMDAR Class Submarine Rescue Ship (MOSHIP) of 4,000 tons, and the two ISIN Class Fleet Ocean Tugs (Rescue and Towing Ships) of 2,500 tons. Istanbul Shipyard is building both classes and initial deliveries are expected in the next 12-18 months.

(Picture: BMT Defence)

The vessels built in South Korea under the UK Royal Navy's Military Afloat Reach and Sustainability (MARS) programme are to be commissioned as TIDE Class.

Asia-Pacific

Australia, China and India are all investing in a variety of auxiliary ships over the next 5 years, including fleet replenishment, submarine rescue and hydrographic survey ships. Between now and 2020, AMI projects that 23 support ships of various classes will join the navies of these three countries.

Two Chinese auxiliary ships programmes are worthy of note as reflections of China's development as a naval power. The first, a class of two 15,000-ton polar icebreakers, are expected to become operational by the end of this decade. Such ships likely reflect requirements to support commercial shipping in Polar regions, as well as providing mobile platforms for scientific research.

The second is a class of six 20,000-ton mobile landing platforms. The MLPs are capable of transporting China's fleet of large air cushioned landing craft as well as other amphibious craft and may also provide seabasing capabilities along the lines of the larger (40,000t) US MONTFORD POINT Class MLPs.

Middle East and North Africa

An example of Turkey's more prominent position in the international naval market can be seen in Pakistan. There Turkish design and integration firm STM is leading the programme to build a 15,600 ton replenishment ship for the Pakistan Navy at Karachi Shipyard and Engineering Works. STM is providing material packages for assembly at KSEW in Pakistan. The AOR is based on the STM 155-Meter AOR design using international double-hull standards and will be capable of transferring cargo, ammunition, personnel and fuel. Pakistan awarded the programme for a 155M AOR to STM in 2013, with delivery schedule for 2017.

The geography of the Gulf region and navy structures there that tend to centered on smaller combatants does not generate the need for large replenishment and refueling ships to support distant operations. Here, regional new auxiliary ship programmes are focused on specific kinds of fleet support—such as Kuwait's naval and diving support ships (2,000 and 300 tons respectively) and Oman's 72M high speed troop transport support vessels building now at Australia's Austal yards, with deliveries expected in 2016.

South America

Seven South American countries plan to build ice-capable ships over the next five years. These ships range from 6,000-17,000 tons and will support national Antarctic research activities and interests in the region, as well as logistics support for sovereign territory in the far southern latitudes. While none of these planned ships are building now, and the first (from Chile and Peru) are not expected in service before 2018, these programmes highlight the ongoing requirements for ice-capable auxiliaries in the region. Other countries planning to add ice-capable ships to their naval fleets include: Argentina, Brazil, Columbia, Ecuador, and Uruguay. Most of these ships are expected to be built by local shipyards, although several of the programmes are export opportunities for international suppliers. ■

(Picture: STM)

Based on the Turkish 155 m AOR design from STM the Pakistan Navy will take delivery of a new replenishment ship in 2017.

"It's easy to win on price; it's more difficult to win on value. That's what we do."

During AUSA 2015 ESD had the opportunity to discuss Meggitt Training Systems' status following significant successes and the impending I/ITSEC exhibition. Among others, we spoke at length with Larry Raines, VP Virtual Systems.

ESD: In 2014 Meggitt Training Systems won some game-changing contracts. Please set the background for those successes…

Larry Raines: Headquartered in the United Kingdom, Meggitt PLC is an international group operating in North America, Europe and Asia, and is known for its specialized extreme environment engineering. Meggitt is a world leader in aerospace, defence and energy, employing nearly 11,000 people.

As a leader in virtual and live firearms training, Meggitt Training Systems (MTS) is uniquely positioned to bring full training solution systems to US and allied defence and law enforcement organisations around the world. Our innovations have set the standard for simulation training and include the superior realism of BlueFire® wireless "smart" weapons and the intelligent integration of enhanced visual game engines, 3D graphics and the FATS® M100 flexible and scaleable systems architecture. We provide customised training and combat readiness solutions in a flexible, immersive environment.

MTS is a leading supplier of integrated live-fire and virtual weapons training systems, and electronic scoring systems worldwide. Over 13,000 Meggitt live-fire ranges and 5,100 virtual systems are fielded internationally in more than 130 countries.

Meggitt Training Systems Inc. (MTSI) employs more than 400 people at its headquarters in Atlanta and around the world: we can deploy people anywhere in the world.

In 2003, Meggitt acquired Caswell International, and in 2006, Meggitt acquired Firearms Training Systems, Inc. (FATS®). FATS® was the first company to introduce wireless BlueFire® firearms simulators that utilise Bluetooth® technology to communicate with system hardware while maintaining accurate weight, balance, recoil and real-time diagnostics.

In 2008, Meggitt merged Caswell and FATS® to create Meggitt Training Systems. We sought to capitalise on synergies to provide both live fire and simulation training as an integrated product offering, which includes:

- Simulation solutions: FATS® M100, supporting the next generation of military training systems and Meggitt's own simulated weapons selection, incorporating marksmanship, judgmental videos, traditional computer generated imagery and third-party virtual simulation products; the M7 and L7 compact firearms training simulators; multi-screen small arms trainer; through-sight devices [FIST Thermal Sight (FTS), Commander's Target Locater (CTL), Sniper Scopes]; Indirect Fire Forward Air Control Trainer; indirect fire training; motion integrated training; crewed vehicle training; AFV training, convoy training – and more
- Live fire solutions: small arms range systems; armour range systems; range control systems; Shoot house/MOUT; mobile range solutions; Indoor & Outdoor Wireless Solutions; Range planning, design and installation – and more.

ESD: Please tell us more about the US Army contract.

Larry Raines: Meggitt Training Systems has kept innovation at the forefront of its mission and as a result was recently awarded multiple contracts, including the largest global simulation contract by the US Army, in June 2014, for the Engagement Skills Trainer II (EST II), a five-year $99M IDIQ contract by PEO STRI. The contract covers approximately 1,000 new and upgraded systems and simulated weapons for US Army facilities worldwide, and was solely awarded to Meggitt based on "Best Value". We are especially proud of the "Best Value" recognition that references our commitment to a high-quality, comprehensive solution resulting from innovative thinking and a constant focus on tomorrow's battlefield – and represents a significant step forward in technology and

(Photos: Meggitt)

With the latest CryENGINE® 3D marksmanship training environment even the crosswinds can be assessed, such is the detail available.

capability over the incumbent system. The current order is for delivery of four systems in April 2016 for customer requirement validation, with initial acceptance testing starting in February 2016. Our EST II solution delivers enhanced marksmanship engagement and shot assessment in a 3D virtual environment while providing detailed diagnostics for skill reinforcement and/or correction. Comprehensive shot analysis, automatic assessment and intelligent coaching capabilities are immediately available on an individual wireless tablet or handheld device for reference by the coach or trainee at the firing line. Highly detailed Crytek-based Marksmanship 3D graphics will represent actual training ranges from Initial Entry Training (IET) sites, fully immersing the trainee in the event, and the whole solution will leverage the US Army's investment in Virtual Battlespace 3 (VBS3), a flexible simulation training solution for scenario training, mission rehearsal and more, for squad level training. The intent is to enhance the visual realism of collective training and better prepare soldiers to make effective decisions within a safe, non-lethal immersive environment.

Individual tablets, wirelessly linked to sensors on the weapon, enable instructors to interface directly and immediately with trainees, increasing the effectiveness of training as well as the efficiency of the instructors.

ESD: You also won an important USMC contract…?

Larry Raines: Concurrent with the US Army award, we won a $31.7 million contract from the US Marine Corps Systems Command (MARCORSYSCOM) Program Manager for Training Systems (PM TRASYS) to develop and deliver the Indoor Simulated Marksmanship Trainers (ISMT) system for the US Marine Corps. This is a five-year IDIQ contract including system and weapon simulator development, plus installation and support of more than 670 systems. MTSI is developing new BlueFire® weapon simulators for the M27 Infantry Automatic Rifle, M32 Multi-Shot Grenade Launcher and M72 Light Anti-Tank Weapon.

The ISMT systems meet the current USMC training requirements and incorporate Meggitt's FATS® M100 architecture to ensure we can meet future growth and evolving training conditions. It provides realistic, state-of-the-art virtual small arms training for marksmanship, collective and judgmental scenarios.

MTSI has helped the USMC to prepare warfighters for combat situations since 1988, and values the successful 26-year partnership as the Program of Record. We continue to support the USMC 'Train As We Fight' doctrine, with excellent customer support and a high-performance simulation training solution provide a strong foundation for the contract award. BlueFire® wireless weapon simulators, virtual technological advancements and innovative engineering are superior virtual products that ensure combat readiness well into the future.

ESD: And other major awards?

Larry Raines: We have £10.2 million in 3 contracts from the UK MoD to upgrade British Army Dismounted Close Combat Trainers (DCCT) small arms trainers, continuing a relationship dating back to 1992. These contracts upgrade existing trainers with FATS® M100 system architecture, provide DCCT portable configurations, and add Future Integrated Soldier Technology (FIST) Phase 4 Fire Control System simulation training onto the DCCT platform as a complement to live-fire FIST equipment. This will be expanded across the balance of UKMoD small arms trainers and leverages existing DCCT and FATS® M100 architecture for long-term capability, growth and training sustainability. This DCCT growth path enables FIST training, system sustainment and capability growth for the future.

Also,we have a US$25 million three-year contract from Canada to provide in-service support for the Armed Forces' small arms trainer and indirect fire trainer, incorporating onsite support for health, usage and equipment monitoring. The SAT simulator system supports individual and group training across the spectrum of military, paramilitary and security operations, and our IFTs are used to train soldiers in forward observer, fire direction centre and mortar crew skills proficiency.

ESD: Please elaborate on the "Best Value" approach.

Larry Raines: The "Best Value" selection of Meggitt by the US Army validated our previous FATS M100 and ongoing R&D investments – at a cost of almost $30M. The US Army and USMC will be the first to receive the Crytek 3D Marksmanship Training environment, enhanced diagnostics with intelligent Automatic Coaching tools, and VBS3-based collective training fully integrated into a small arms training system – all enabled by the open architecture of the FATS M100.

The CryENGINE® 3D Marksmanship Training environment represents an innovative training advancement. The visual fidelity and target detail is stunning and readily supports required target detect, recognize and identify (DRI) requirements.

The after action review allows engagement and shot assessment in a 3D virtual environment with correct target perspectives, while providing detailed trainee diagnostics for skill reinforcement and/or correction

The MTSI BlueFire "smart" weapon simulators enable the Automatic Coaching tools to further enhance the effectiveness of the Marksmanship training; providing

very high levels of virtual realism while maintaining the same form, fit and function of live weapon counterparts. Operating via wireless Bluetooth technology, these innovative weapons provide the same accurate, real-time training diagnostics as tethered weapon simulators – including point-of-aim, weapon status, trigger pressure, butt pressure, and cant, as well as magazine reloading simulation and realistic weapon recoil, replicating that of a live weapon. In what the company calls Automatic Coaching the system tracks weapon sensor information – how the trainee manipulates the trigger, how much pressure is applied to the butt, how the weapon is canted – and shot results. It can also supply customer-specific video snippets and doctrinal references to correct basic faults in shooting technique. The intent is to multiply the effectiveness of the coach and create a common base line capability for training effectiveness that also leverages, for example, a customer's existing VBS3 investment.

ESD: What are the consequences of these wins as far as the primary current non-US customers are concerned?
Larry Raines: We see flexibility and breadth of capability as a key market differentiator allowing us to offer customised training solutions now and in the future for our non-US customers.
For example, the developed architecture allows customers to specify their own preference and leverage previous investments: using common terrain databases across multiple system platforms delivers significant cost savings: as does configuration of the same base system, providing training capabilities across several domains, from small arms and support weapon training to forward observer and forward air control training to vehicle and boat simulation. That a single system can fulfill a variety of training missions without the need for additional hardware or standalone infrastructure, provides substantial economic benefits.
Scaleability is highlighted by the concurrent use of multiple through-sight devices for both Marksmanship and Collective (CGI) training: our flexible architecture ensures maximum trainee throughput while offering a growth-path for the future, and maintains the system's performance and feedback essential for training.
The latest simulation architecture permits the use of commercial PC and imaging products and the advantage of their ongoing capability advancements – without a complete system replacement. This provides an economical system upgrade path that significantly extends the useful life of the system, and affords the customer an opportunity to provide these commercial components if desired. The system supports the addition of sophisticated simulated sensor devices such as laser range finders, target designators, and thermal imagers to provide a complete immersive training environment for concurrent training of the entire unit.

ESD: What should we be looking for at I/ITSEC?
Larry Raines: At I/ITSEC 2015, we are showcasing our new FATS 100e product, leveraging the applications we have been developing, bringing new capabilities into the larger marketplace. These include Crytek-based 3D Marksmanship, Automatic Coaching tools, VBS3 Collective training, etc., giving value for existing customers, providing extra upgrade capabilities, and prospective opportunities for new customers looking for small arms training solutions. The potential for a wide range of soldier experience levels in pre-deployment training phases requires structuring and facilitating immersive and live training to develop resilience skills. Enhancing the capabilities of small arms engagement skills trainers, which combine improved high fidelity visuals with a greater sense of personal involvement for trainees, should be a must for every military. Immersing a soldier in a simulation creates stress that he/she has to cope with in actual operations.
With the increasing reliance on mobile devices and operator-guided instruction, significant focus will be on the intelligent training benefits afforded by iOS and Android handheld devices, which allows operators and coaches (instructors) to engage in a one-to-one mentoring environment.

ESD: Why Meggitt?
Larry Raines: MTSI is different from other training system manufacturers in that it is made up of collaboratively-focused, innovative engineers. Add to the mix current and former military subject matter experts (SMEs) with broad hands-on experience, firearms instructors, and some of the top programme managers in the industry, and the result is virtual and live fire training systems that are the industry standard around the world.
Meggitt Training Systems truly is the leading manufacturer of advanced simulation systems to support joint training and provide combat readiness solutions in the virtual, live, and constructive domain. ■

The system measures all the relevant parameters for accurate and correct marksmanship training and shooting errors can be identified and eliminated in real time.

The questions were asked by Stephen Barnard.

Oshkosh Wins JLTV Contract, Lockheed Challenges Award

Sidney E. Dean

The US Army on 25 August 2015 awarded Oshkosh Defense an initial contract to supply the Army and US Marine Corps with 16,900 Joint Light Tactical Vehicles (JLTV). The JLTV is intended to replace HMMWV tactical vehicles in front-line units. Low-rate production is expected to begin during the first quarter of 2016, with full-rate production commencing in 2018, the year JLTV is scheduled to enter service.

(Photo: U.S. Army)

The Light Combat Tactical All-Terrain Vehicle (L-ATV) is a derivative of Oshkosh's medium-weight M-ATV vehicle already in use by the US armed forces.

The initial contract is valued at $6.7 billion. Each JLTV costs circa $250,000 for the basic vehicle, and less than $399,000 when fully equipped. If Oshkosh receives the planned follow-on awards it could end up delivering a total of 50,000 JLTVs to the Army and 5,500 to the US Marine Corps through the year 2040. Including support contracts, the total value would reach $30 billion.

JLTV promises to afford better occupant protection than the original, unarmoured Humvee, while being more manoeuvrable than the armoured Humvee or the Mine-Resistant Ambush Protected (MRAP) armoured trucks introduced during the Afghanistan and Iraq wars, former programme manager Colonel John Cavedo said during a Pentagon media roundtable on 25 August. "This is going to allow us to operate in the way we envisioned our light tactical vehicles, being able to operate with greater flexibility and gaining back an expeditionary capability that we lost when we had to provide additional armament via a MRAP," said Cavedo. "We lost that expeditionary capability that we have with Humvees, now we've rebalanced that."

The JLTV design submitted by Oshkosh is called the Light Combat Tactical All-Terrain Vehicle or L-ATV. It is a derivative of the firm's medium-weight M-ATV vehicle, of which 9,000 are currently in use by US armed forces. Oshkosh states that the L-ATV is one-third smaller than the MRAP-class M-ATV, provides a comparable level of occupant protection, and is seventy percent faster over rough terrain. It can be airlifted via cargo sling by CH-47 and CH-53 helicopter. Ballistic and blast protection are provided through a modular system of fixed and add-on armour for all vehicle surfaces, and includes an automated fire suppression system.

The JLTV comes in two variants: the two-seat Combat Support Vehicle (CSV), configured as a utility transport with 5,100 pounds payload capacity; and the four seat Combat Tactical Vehicle (CTV) with a 3,500 pound payload capacity. The CTV can be configured through mission modules to function as a general purpose vehicle, a heavy-gun carrier or a close-combat weapon carrier. Armament can include all classes of machine gun as well as grenade launchers and anti-tank guided missiles. The vehicle is the first military truck to be specifically designed for networked operations, and is pre-configured for the Army's Warfighter Information Network – Tactical (WIN-T).

The JLTV will not replace the more than 160,000 Army and USMC Humvees on a one-for-one basis. The new vehicles will primarily replace the Humvees of front-line combat units, while units less likely to be exposed to hostile fire and other threats will continue to employ Humvees, said USMC Colonel Andrew Bianca, Deputy Programme Executive Officer for land systems.

Oshkosh Defense, located in Oshkosh, Wisconsin, won the contract after a 14 month prototype evaluation. Other contenders for the contract were AM General (manufacturer of the Humvee) and Lockheed Martin. On 8 September Lockheed Martin announced it was contesting the contract award, forcing the Army to freeze contract implementation until a ruling is reached. The Government Accountability Office has until 17 December to uphold the contract award or declare it invalid and re-open competition. Industry analysts generally describe the Army's selection process as rigorous and fair, and most expect Oshkosh's contract to be upheld. The fact that Oshkosh's design is based on an established product line also favours the company, say analysts. ■

"Meeting conventional demand without compromise"

Interview with İzzet Artunç, MKEK General Manager and Chairman of the Board

(Photos: MKEK)

ESD: Mr. Artunç, please tell us about some of the successful projects carried out by Makina ve Kimya Endüstrisi Kurumu under your management?
Artunç: Weapons and ammunition that MKE Corporation (MKEK) has supplied to the Turkish Armed Forces and other friendly and allied nations for years were mostly produced under license and with expertise from other manufacturers. In recent years, as a result of increased importance being attached to R&D and efforts made in these activities, we, initially for the requirements of the Turkish Armed Forces and under our own licenses and expertise, started some major, unique projects such as the MPT-76 National Infantry Rifle, Penetrating Bomb (NEB), Air Portable Howitzer, New Generation CBRN Gas Mask and Insensitive Explosive (DUPAT). This manufacturing capability drew considerable interest from international markets. During this period, as a consequence of intensive marketing strategies especially on the global market, MKE brand awareness all over the world significantly increased, ultimately leading to growth in export volumes. MKEK now not only exports finished products but is also skilled at establishing explosive facilities and providing training abroad, as well as offering transfer of technology, within the scope of its own capabilities.

ESD: As the General Manager of MKEK, could you please tell us some of the major projects for Turkey that will be launched in near future?
Artunç: The most significant project that will be realised soon is the new Steelworks Plant Construction Project in Kırıkkale that was contracted in April 2015. Furthermore I want to mention:

- Realising ALTAY National Tank and MPT-76 National Infantry Rifle projects in a way that meets all the requirements of the Army;
- Acquiring design infrastructure and capacity for Rocket Fuels and Explosives;
- Carrying out design and manufacturing activities for Smart Weapons and Ammunition Systems with domestic partners under MKEK.

ESD: What do you think about the current products manufactured for the Turkish Armed Forces by Turkish engineers?
Artunç: We produce world-class quality products that are also highly demanded by international markets. In this respect, MKEK meets various demands of the Turkish Armed Forces and other law enforcement agencies by producing weapons, ammunition, rockets, explosives and pyrotechnics all to NATO standards. Moreover, we are exporting to more than 50 countries including the USA and EU countries. We expect growth in exports due to our novel products such as the National Infantry Rifle, Air Portable 105 mm Howitzer, Sniper Rifle and Penetrating Bomb, with the help of the valuable reference of the Turkish Armed Forces.

ESD: What are the latest notable contributions of MKEK into the Turkish Armed Forces' inventories?
Artunç: Above all, MKEK, by means of concentrating all of its capabilities, dedicated itself in an uncompromising way to meet the conventional arms and ammunition demands and all other requirements of the Turkish Armed Forces and also other law enforcement agencies in Turkey. Many of our products, including but not limited to the following list, are designed and manufactured within our domestic and corporate capabilities:

- 155mm Towed Howitzer – PANTER;
- 155mm Self Propelled Howitzer – FIRTINA (Weapon System);
- 155mm Long-Range Ammunition Family;
- Penetrating Bomb.
- Insensitive Explosives;
- National Infantry Rifle (MPT-76);
- M60 Tank Modernisation;
- National Tank – ALTAY (Weapon System);
- 120mm Armour-Piercing Ammunition;
- 120mm Target Practice Ammunition;
- 25mm Armour-Piercing and Target Practice Ammunition

ESD: Could you please give some information about the international sales of MKEK?
Artunç: While prioritising meeting the requirements of the Turkish Armed Forces and Turkish Police Force, MKEK attaches particular importance to improving its international marketing activities

MKEK's National Infantry Rifle (MPT-76)

with an ultimate objective of keeping its factories working at full capacity. Accordingly, MKEK diversified its product range by taking into account domestic and international demand. In addition, access to international markets is facilitated through exhibition activities and boosting cooperation with foreign companies. The very fact that MKEK is nearly 6oo years old constitutes a mainstay for our struggle to establish an international presence. However, depending on the global political environment, our exports are prone to yearly fluctuations. Export sales of the Corporation make up roughly 15-20% of total sales and we constantly endeavour to increase this figure.

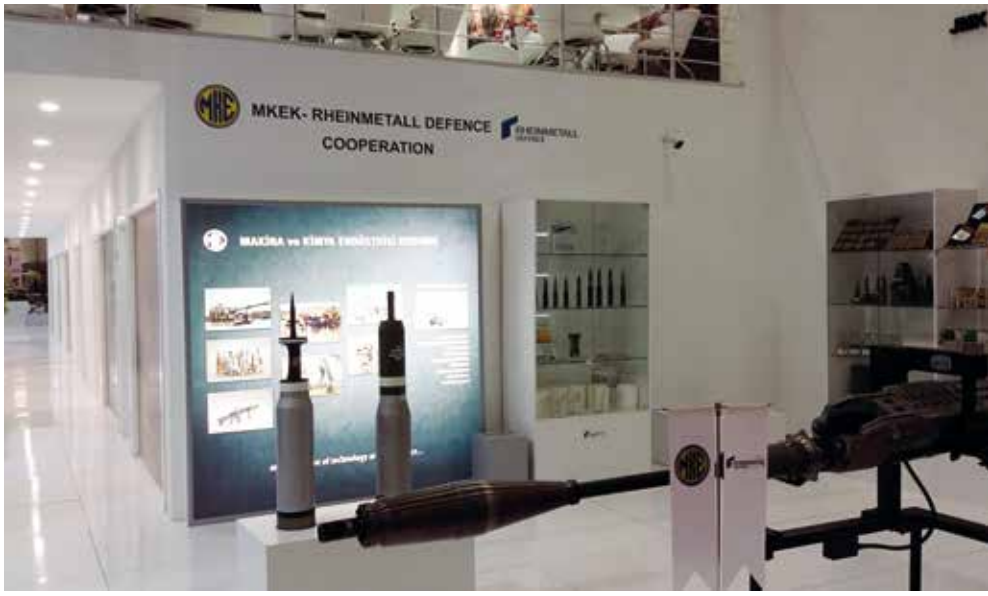
ESD: Could you please comment on R&D activities of MKEK?
Artunç: By virtue of being one of the indispensible elements of the future of our company, we attach great importance to R&D activities and thus we established active R&D units and doubled number of employees starting from 2005.
We have protocols signed with TÜBİTAK and 31 universities for R&D projects. Over 20 SAN-TEZ projects are supported by the Turkish Ministry of Science, Industry and Technology. Nearly 100 R&D projects have been carried out – either contractually concluded or in the process of finalisation or business development phases.
Since 1974 over 200 R&D projects have been completed with success. Products of most of these projects are now mass-produced and in-service with the Turkish Armed Forces.
Among the projects finalised with the Turkish Ministry of Defence in the last two years, supply contracts for 155 mm Long-Range Ammunition, Penetrating Bombs and National Infantry Rifles (MPT-76) have been signed and are now in the manufacturing phases.
Some of the important ongoing projects are:

- National Tank Project – ALTAY (Weapon System);
- Modern Machine Gun Project;
- Air-Portable 105 mm Light Howitzer Project;
- 35 mm Fragmenting Ammunition Project;
- 120 mm Laser-Guided Tank Weapon Ammunition;
- Explosive Train Design/Development and Fuse Integration Project;
- DUPAT I & II (Insensitive Explosive) Project;
- YEDDİM – High Energy Sensitive and Insensitive Detonating Agents Development Project;
- New Generation Gas Mask Project.

Furthermore, MKE Corporation, acting as the "Chairman entity" of the Turkish delegation for NATO Industrial Advisory Group – NIAG – triggered Turkish Defence Industry companies' participation in NIAG projects, as a result of our active contributions within the last 5 years.

ESD: Lastly, can you please elaborate on the international cooperation and business development activities of the MKEK?
Artunç: Being the pioneer company of Turkish Defence Industry, along with carrying out its activities first to meet the requirements of Turkish Army, MKEK continues its activities in a stronger and more efficient way by now embarking upon a new initiative that will drive Turkey Defence Industry further in the international arena.
In recent years MKEK has striven to enhance its global brand value. In line with attaining this objective, it places even more emphasis upon international collaboration. Now more specifically with the intent of presenting new and improved products to both domestic and foreign defence industry markets, the Corporation signed a Memorandum of Understanding (MOU) which was created in order to integrate the capacities of MKEK and one of the leading defence conglomerates, namely Rheinmetall Defence in a common innovation cent.
MKEK took the first step towards establishing an R&D Company with Rheinmetall Defence during the IDEF 2015 Exhibition. ■

The interview was conducted by Korhan Özkilinc.



MKEK took the first step towards establishing an R&D Company with Rheinmetall Defence during the IDEF 2015 Exhibition.

Dirk Hoke to Become CEO Airbus Defence and Space

(gwh) Airbus Group has appointed Dirk Hoke to succeed Bernhard Gerwert as CEO of Airbus Defence and Space (DS) as of April 1, 2016.


(Photo: Airbus DS)

Dirk Hoke, until recently CEO of the Large Drives business unit at Siemens AG, will join Airbus Group on January 1, 2016 as Deputy to Bernhard Gerwert. Between January and March next year, Hoke will familiarise himself with Airbus Group and the Defence and Space business in particular. During this time, Bernhard Gerwert will continue to lead Airbus DS as CEO. As of 1 April 2016, Hoke will take over the operational lead and become CEO of Airbus DS as well as member of the Group Executive Committee. Gerwert will then support Hoke and Airbus Group CEO Tom Enders as a Senior Advisor at least until June 2016.

With Siemens AG Hoke has been engaged in transportation systems in international assignments, a highlight was establishing the Maglev Train in Shanghai.

Airbus DS and Atos Sign Strategic Partnership

(df) Airbus Defence and Space (Airbus DS) and Atos have signed a strategic partnership agreement on research and development and the provision of a complementary range of products, services and solutions in the field of cyber security. Both companies will complement their portfolios with this agreement in order to provide a larger and more effective range of cybersecurity products, services and solutions.

By combining their respective expertise and research and development knowl-


(Photo: Airbus DS)

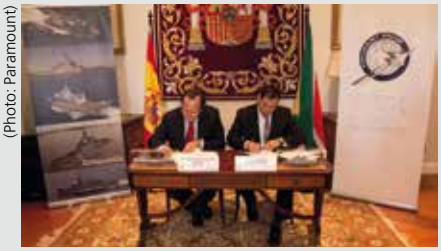
edge in Europe, the two partners will for example work on the development of security solutions for extended enterprises (group, subsidiaries and supply chain).

The partnership includes a worldwide distribution channel partner agreement. It addresses a broad range of businesses and industries including banking and insurance as well as the public sector, notably the defence market. Together, Atos and Airbus Defence and Space will have the opportunity to better benefit from the growing cyber security market estimated to be worth €75 billion by 2016.

Bell Helicopter Receives Russian CAA Certification

(df) Bell Helicopter announced that Bell Helicopter Prague, Customization and Delivery Center, has received Russian Civil Aviation Authority (CAA) certification to perform maintenance on Russian registered aircraft. "This is an important milestone for Bell Helicopter Prague," said Michael Reagan, director, global services at Bell Helicopter. "We are committed to enhance our customer offerings for our Russian customers. This new certification will provide them with easy access to Bell support and service in the region." Bell Helicopter Prague is the company's regional customisation, delivery and aftermarket service centre, and addresses the needs of Bell Helicopter's European and Russian customer base.

Navantia and Paramount Sign MoU for African Projects


(Photo: Paramount)

(df) Spanish Shipbuilder Navantia and South African defence and aerospace company Paramount Group have signed a Memorandum of Understanding (MoU) to jointly develop naval systems and vessels that will meet the increasing demand of South Africa and other African states for maritime solutions to bolster the security of their marine and coastal assets.

This MoU expands the cooperation from the previous agreement between the two companies, that was specifically signed for BIRO project.

The scope of the collaboration will be defined based on customer requirements in the Maritime Industry across five key areas namely Through Life Support Management, Combat Systems and Platform Systems Integration, Procurement Management of materials and equipment, Operational Maintenance Training and the Transfer of Technology. Several areas of collaboration have been identified, like transfer of technology, through life cycle support, combat systems and platform systems integration (including in land products), procurement management, and operational and maintenance training.

Meeting of the International COMINT Community

Since 1996 the PLATH symposium has been held as an established and professional forum within the international COMINT community. Facing the current threats and challenges this year's event focussed on how to gain and combine sensitive data in order to protect own networks and prevent critical conditions. During the conference 17 speakers reviewed current intelligence requirements and introduced new concepts of how to deal with them. During the accompanying exhibition the PLATH Group demonstrated new products and proven solutions enabling the user to obtain, handle and combine the intelligence data within the current complex communication environment.

On the last day of the event the PLATH Group invited all participants to visit the exhibition in the premises of PLATH GmbH. Here PLATH Group presented innovations from the broad product portfolio "from sensors to knowledge". One of the highlights was the launch of the new V/UHF interception receiver. The SIR 2110 extends the product family of SIR receivers for HF towards the VHF and UHF frequency range.

Furthermore PLATH presented the impressive and revolutionary performance of the DFP 5135 direction finder, covering the full HF range and providing flawless interception of even the weakest signals due to peerless dynamic range. The guests also had an exclusive access


(Photo: PLATH)

to a demonstration of different working positions of the Intelligence Control and Analysis Solution ICAS. With pre-con-

figured working positions for operator, analyst, evaluator and supervisor ICAS allows the standardisation of processes within a system. At the same time ICAS represents a broad collection of features, enabling the tailoring of workflows according to specific needs. All participants had the opportunity to experience the performance of ICAS hands-on.

Structural Adjustments at Saab

(gwh) Defence and security company Saab announced changes to its business area structure and within the Group Management to become effective from January 1, 2016. Business area Security and Defence Solutions is dissolved and its business units are moved to other business areas within Saab.

(Photo: Saab)

The business units within Security and Defence Solutions will be adjusted as follows:

- Traffic Management and Combat System and C4I Solutions become units within business area Electronic Defence Systems.
- Training and Simulation becomes a unit within business area Dynamics.
- Critical Systems & Communication Solutions becomes a unit within business area Support and Services.
- Business unit Saab Kockums will report to the CEO and is intended to report financially within corporate.

Due to the dissolution of Security and Defence Solutions, the head of that business area, Gunilla Fransson, chosed to leave Saab and the Group Management.

As of December 31, 2015, Saab's head of communications, Åsa Thegström, will leave Group Management to take a position as head of the business unit Training and Simulation.

The adjustments are intended to further increase efficiency and strengthen market position.

New Séléné Building for Thales Alenia Space

(df) Thales Alenia Space inaugurated the new Séléné building in Cannes, for which it started construction in October 2014. This production facility, intended for the integration and testing of optical observation instruments, complements the existing facilities in Cannes dedicated to optical observation programmes, especially for the export market.

Satellite export sales, especially optical observation models, are a strategic part of Thales Alenia Space's business development objectives. This fast-growing market is being driven by an increasing number of countries that want to acquire their own systems capable of independently providing them with high-precision intelligence photos.

Volga-Dnepr Increases Presence in Russia

(df) Volga-Dnepr has been consistently increasing its presence as a 3PL provider in the ground logistics market of Russia and CIS. As part of growing cooperation with a newly acquired customer – a project engineering company Telekom-Zapad – various shipments totaling 200 tones have already been successfully delivered as promised. The scope of logistics services provided to the client in the last seven months covered a total distance of 71,000 km.

VISIT US
AT MILIPOL PARIS 2015
FROM 17TH TILL 20TH NOVEMBER
AT BOOTH NO. 5M102

CZ P-07

CZ P-07 IS A COMPACT PISTOL, PRIMARILY DESIGNED FOR ARMED FORCES AND FOR CONCEALED CARRY.

- NEW, EXTREMELY DURABLE FINISH ON SLIDE, BARREL AND OTHER MAJOR PARTS.
- FIBERGLASS REINFORCED THERMOSTABLE POLYMER FRAME.
- INTERCHANGEABILITY OF SAFETY FEATURES – MANUAL SAFETY AND DECOCKING.
- THREE DOT ILLUMINATING SYSTEM STEEL SIGHTS.
- SERRATED FRONT FOR EASY HANDLING.
- BEST SELLER 2014 WITH MORE THAN 100,000 PISTOLS SOLD.

CALIBRE	MAGAZINE CAPACITY	FRAME	TRIGGER	SIGHTS	OVERALL LENGTH (MM)	BARREL LENGTH (MM)	HEIGHT (MM)	WIDTH (MM)	WEIGHT (G)
9x19 / 9x21 / .40 S&W / .380 ACP	15 / 15 / 12 / 15	POLY	SA/DA	LUMINESCENT TRITIUM	184	96,5	137	37,5	772

CZ

W WWW.CZUB.CZ e INFO@CZUB.CZ f FACEBOOK.COM/CESKAZBROJOVKA.CZ

FLEXIBILITY AND ENHANCED FUNCTIONALITY FOR THE FUTURE OF VIRTUAL TRAINING.

Innovative. Immersive. Intelligent.

If you think product innovation, immersive training and intelligent technology are important to have in a virtual training system, there's only one company you need to know. Meggitt Training Systems, the provider of simulation systems of record for defense forces around the world, introduces the most advanced virtual training system in the world – FATS® 100*e*.

The FATS® 100*e* features innovative BlueFire® weapons, immersive graphics incorporating 3D marksmanship lanes and third-party programs and intelligent wireless tablet coaching. The future of small arms virtual training systems has arrived.

Visit us at I/ITSEC Booth #1238

MEGGITT

meggitttrainingsystems.com