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– the Scandinavian Military Magazine –

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TIME FOR REASSESSMENT

Developments in Eastern Europe over the last few years are a cause of considerable concern, and the situation has already caused voices to be raised in favour of increased military presence in the eastern NATO countries.

Along with the Russian expansion, the Middle East is a region on the verge of collapse. Nations after nations have fallen out in civil wars and societal chaos, following the overturning of old dictatorship regimes under the so-called "Arabic Spring". Not least the expansion of the extremist group called the Islamic State (IS) all the way up to the regions bordering on the NATO nation of Turkey, has coerced NATO into entering military resources into a conflict that there was originally a strong wish to stay clear of.

The uprising of the IS and the Iraqi situation has also caused the planned withdrawal of Western forces from Afghanistan to be viewed from a new perspective. It is feared that the Afghan Armed Forces will be unable to maintain peace and stability in the country, and that the development will closely parallel what has happened in Iraq. Several NATO countries have as a result of this signalled that they will be keeping a larger contingent of military resources in Afghanistan that what was planned at the outset.

Looking to the other side of the globe, China is flexing its political muscles, not lest versus its neighbouring countries along the South China Sea. For Europeans, this may seem like a pretty distant state of affairs, while to the USA, it is a situation that is tying up military resources – and those are resources that accordingly cannot be allocated to Eastern European and Middle East problem areas.

All of these conflicts are also flaring up at the same time as most of the European countries and the United States are struggling with foreign debts, and alongside an economic crisis that has led to the use of tax revenues for defence spending having been de-prioritised to the bone.

In order to halt this development, the NATO countries in 2012 agreed on a target for all the member states to spend a minimum of 2 percent of the country's gross national product on defence. But even post-2012, the cuts in many countries' defence budgets have been considerable. And this is happening despite the increasingly threatening security situations around us.

Even though the desire and the goal of allocating more funds to defence purposes is clearly stated, history repeats itself: In peace-time, defence spending is a very burdensome exercise for the political powers-that-be. Defence budgets have to yield to other beneficial purposes that carry more popularity with large groups of the voting public. Nonetheless, a notable and rising number of people are now speaking out to the effect that cuts in European defence budgets have already gone too far. These pointed warnings come not least from military circles in many of the concerned countries.

The time of downscaling and disarmament through large cuts in European and NATO defence budgets is definitely over. Developments are coming to a head at such a rate that particularly the European NATO nations can no longer keep stalling on the subject of increased defence spending. It will cost significant amounts of money, and will require of politicians that they accept the burden of moving allocations from other good and popular causes. But at the rate of speed that the security-political situation is currently changing, the NATO countries really have no alternative.

Contents:

Coverphoto:
CARL GUSTAF M4
A soldier from the Swedish Army presents the new Carl Gustaf M4.
Photo: MilitærTeknikk

CARL GUSTAF, AGE 66 AND TRIMMED TO HALF ITS OWN SELF

When introduced in 1948, the Carl Gustaf 84mm recoilless rifle was soon named the world´s most efficient shoulder-launched anti-tank weapon. Since then, due to further development of the weapon and development of a broad spectre of ammunition types, it is today more accurate to refer to Carl Gustaf as a shoulder-launched multi-role weapon. In September this year, the Swedish manufacturer Saab Dynamics presented the M4, a new, light-weight version of the Carl Gustaf.

The M4 version has an empty weight of less than 7 kgs, but maintains the same operational capacity and can use the same ammunition as the older versions.

- We are naturally very proud that we have managed to reduce the weapon's weight by more than 30% compared to the previous version, says Görgen Johansson, CEO for Saab Dynamics. - The weight of the soldier's equipment in the field is a major concern today, in particular when the task calls for the soldier to move on foot over some distance. - Internationally, there is for example talk of extreme measures such as giving the soldiers water in the form of tablets in order to save

Combat proven. *More than 40 nations have Carl Gustaf in their armed forces inventory. The picture displays US soldiers firing a Carl Gustaf M3 in the desert outside Basra, Iraq.* *Photo: William Hatton / US Army*

A BROAD SPECTRE OF AMMUNITION TYPES (FROM LEFT):

- **HEAT 751 (High Explosive Anti-Tank)** is designed with a tandem warhead to be able to defeat targets equipped with ERA (Explosive Reactive Armour).
- **HEAT 551C RS** against armoured vehicles and optimized for high behind armour effect.
- **MT 756 (Multi Target)** uses a tandem charge and is designed for combat in built-up areas to incapacitate an enemy inside a building or some type of fortification.
- **ASM 509 (Anti Structure Munition)** is designed especially for destroying buildings and other types of urban constructions.
- **HE 441D (High Explosive)** can be set for impact or air burst for combating troops in the open, behind cover or in slit trenches as well as soft-skinned vehicles and similar types of targets.
- **HEAT 655 CS High Explosive Anti-tank** with Confined Space Capability.
- **HEDP 502 (High Explosive Dual Purpose)** can be fired in Impact or Delay mode and is effective against light armoured vehicles, concrete and brick walls and bunkers.
- **ADM 401 (Area Defence Munition)** is designed for close-in protection, for example in the tight conditions of jungle or urban warfare.
- **SMOKE 469C** instantly develops an effective smoke cloud for screening, blinding, and spotting targets.
- **ILLUM 545C** round enables fighting units to supply their own battlefield illumination.
- **TP552** is a target practice projectile with the same ballistics HEAT projectiles.
- **TPT 141** is a training round for reducing training cost but still retaining the right weapon “feel” and live firing experience.

The Carl Gustaf M4 can be carried safely loaded to enable the user to act faster. The weapon can be fitted with different kind of sights, including with intelligent sight systems. *The M4 has an improved overall ergonomics including an adjustable shoulder rest and front grip. Please also notice the long carrying handle compared to earlier versions. The soldier can balance the weight of the weapon by moving the hand along the carrying handle. This is an ergonomic advantage, as the weapon’s centre of gravity will change according to the ammunition type in use, and what sights are mounted on the weapon.* *Foto: Saab*

weight. In this context, a weight saving of tree kilos in a hand-carried gun such as the Carl Gustaf can only be described as formidable. And Johansson goes on to add that since the earlier versions of the Carl Gustaf is in current use with more than 40 nations all over the world, it should be no surprise to note that we have already seen a lot of interest generated by the news of our new M4 version. In the early stages, Saab Dynamics considers that the M4 will be of particular relevance to special forces around the globe, while the more ordinary military units will eventually get around to uprating to the M4 version in due course.

The M4 can use all the earlier versions of ammunition. Thereby, the M4 can easily be a supplement to countries that are already using earlier versions of the Carl Gustav, and have stockpiled older ammunition for these weapons.

- Just the fact that the M4 can operate alongside elder versions, being able to use the same ammo as these earlier versions, makes the implementation of the M4 version for our customers very easy, Johansson continues. - There is no need to get rid of existing Carl Gustaf versions and ageing ammunition, a feature that spells considerable savings if customers choose to procure the M4 as a supplement to their existing array of Carl Gustaf systems.

Counts number of rounds fired

In the new M4, we have incorporated a counter for number of rounds fired with the weapon.

-Saab Dynamics guarantees that the weapon will stand up to 1000 firings, says Johansson,but experience shows that it can be hard for the user to keep track at all times of how many shots the weapon has fired. - We have very often seen that weapons are set aside or taken out of service, while the number of rounds fired has been no more than 6-700, which is to say way before the guaranteed capacity of the weapon has been used to the full. Particularly in connection with sharp assignments, such as international operations, we have noted that many countries lack the full insight into the remaining capacity of their weapons, and choose to set aside fully usable guns as a result. This is of course expensive, and amounts to an extra strain on the logistics systems, says Johansson, adding that the new firing counter will record every fired round, and the user will know exactly how many more rounds can be fired before the weapon may need to be taken out of sharp duty.

NEXT GENERATION AMMUNITION

ULM AMMUNITION

- Today, work is also proceeding on the development of a very long range ammunition type for the Carl Gustav. Even if the ammunition type is not finalised in its development, it is being suggested that the ULM will show a practical firing range of 1500 to 2000 meters. With a firing reach like this, the Carl Gustav will add the ability to take out snipers effectively to its already high threat against armoured and attack vehicles.
- Ammunition with this kind of range potential will require an uprating to the sight equipment of the weapon.

THE DEVELOPMENT OF THE CARL-GUSTAF

Carl-Gustaf version	**M2**	**M3**	**M4**
Introduced year	1964	1991	2014
Weight	14.2 kg	10 kg	6.6kg
Length	1 130 mm	1 065 mm	Less than 1 000mm

FACTS AND FIGURES

- The Carl Gustav is the common name for the 84mm recoilless rifle anti-tank weapon from Saab Dynamics in Sweden. The Carl Gustav was first introduced in 1946, and while similar weapons of the era have generally disappeared, the Carl Gustav remains in widespread use today, and is even being introduced into new roles.
- The Carl Gustav was first introduced into Swedish service in 1948 as the 8,4 cm Granatgevär m/48 (Grg m/48), filling the same role as the US Army Bazooka, British PIAT and German Panzerschreck. Unlike these weapons, however, the Carl Gustav used a rifled barrel for spin-stabilising its rounds, as opposed to fins as used by the other systems.
- The use of the recoilless firing system allowed the Carl Gustav to contain considerably more propellant, firing its rounds at 290 m/s, as opposed to about 105 m/s for the Panzerschreck or Bazooka and about 135 m/s for the PIAT. The result was superior accuracy at longer ranges. The Carl Gustav could attack larger stationary targets at up to 700 meters, but the relatively slow speed of the projectile confined attacks on moving targets to a range of 400 meters or less.
- The Carl Gustav was soon being sold around the world, and became one of the primary squad-level anti-tank weapons for most of the Western European armies.
- In 1964 an improved version, known as the M2, was introduced and quickly replaced the original version. A newer M3 version was introduced in 1991, which used a thin steel liner containing the rifling, strengthened by a carbon fibre outer sleeve. External parts were replaced with aluminium alloys or plastics.
- Due to a broad spectre of ammunition types, the Carl Custaf weapon has in recent years found new life in a variety of roles such as bunker-busting, battlefield smoke and illumination, anti-vehicle roles in addition to the traditional use as an anti-tank weapon.
- **Magazine Capacity:** Nil; single-shot weapon
- **Rate of fire:** up to 6 Rpm (depending on Crew capability)
- **Effective range:** 150 meters against tanks, 700 meters against stationary targets, M3 also: 1000 meters against stationary targets with rocket-boosted ammunition
- **Muzzle Velocity:** 230-255 m/s Depending on Ammo

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NEW TRUCKS FOR NORWAY'S AND SWEDEN'S ARMED FORCES

This summer, Sweden and Norway entered into a joint frame agreement for the purchase of new logistics vehicles from the German supplier RMMV. The contract is a frame agreement covering up to a total of 2000 units, and will run until 2026.

The German RMMV is a Joint Venture between Rheinmetall, 51%, and MAN with 49%. RMMV won the contest against rivals such as Scania, Mercedes-Benz and IVECO. It may come as a surprise to some that the Norwegian, and not least the Swedish Defence chose a German supplier in preference to the Swedish Scania, not least because both the Norwegian and the Swedish armed forces both operate a huge fleet of Scania trucks. But the German supplier RMMV has proven itself to be highly competitive in the provision of military trucks over recent years. Except for the supply of trucks for the French defence, which was won by IVECO in 2010, RMMV has prevailed in all major bidding contests internationally, taking home wins like Australia (up to 2540 vehicles), New Zealand (up to 200 vehicles), Algeria, as well as one further Asian country that has yet to be made public.

Many types of vehicles

RMMV has developed a broad selection of trucks, for military purposes as well as for varied civilian uses. The basis for the military logistics vehicles is RMMV's so-called HX programme. Within the HX programme, RMMV can deliver a variety of classes of trucks, anything from a normal-issue 4x4 or 4x6 panel truck to massive tractor vehicles in 8x8 or 10x10 configurations. The HX vehicles are suited for purely civilian peacetime assignments, but can also be adapted or thoroughly modified for supply to combat zones. Additionally, the vehicles can be equipped to cover particular customer requirements, such as cold climate operations, forging rivers of five feet in depth, carrying NBC equipment et cetera.

Three varieties of cabin

RMMV offers a trio of cabin varieties with its military vehicles, in addition to the civilian versions. The most flexible solution consists of two modular cabins, where the one is without added protection, while the other, the Modular Armoured Cabin (MAC), is reinforced to medium protection level. Operators can change from the unprotected cabin to the MAC according to the type of assignment for which the vehicle will be used. The cabin switch normally occupies a period of two days.

Fully loaded, the HX 8x8 HET (Heavy Equipment Transporter) can reach a gross train weight of 130 tons. The HET version is targeted for road transport of army tanks and other heavy military materiel. With 8x8, that is eight wheels, all of them driven, the vehicle is also hugely capable when the going gets rough. Photo: MilitærTeknikk

RMMV

- The company of RMMV was formed in 2010 as a joint venture between the two companies Rheinmetall and MAN.
- Rheinmetall is already a major defence contractor, in addition to being an important subcontractor to the automobile industry.
- On the defence side, Rheinmetall is a supplier of e.g. cannons, ammunition, simulators, UAVs, in addition to a great spectrum of military vehicles such as the armoured attack vehicle PUMA and the BOXER 8x8 armoured personnel carrier.
- MAN is owned by the Volkswagen Group, and is a well-known manufacturer and supplier of civilian trucks, trailers and passenger buses. MAN also operates a manufacturing and development plant for special vehicles outside Austria's Vienna, where the company has for many years been developing military trucks, fire trucks and similar.
- The headquarters of RMMV is in Munich, while production is done at the plants in Vienna and the German city of Kassel.
- RMMV can offer a broad variety of military logistics vehicles, from near civilian versions based on MAN's civilian vehicle series, to heavy military transport vehicles with armouring and integrated security systems.

Furthermore, the vehicles can be supplied with an Integrated Armoured Cabin (IAC), offering the crews a very high level of protection. These vehicles are intended for high-risk operations, where optimum protection of the crew is a top priority. The IAC cabin is rather weighty, and will normally only be an option on vehicles with tandem front axles. Vehicles with IAC cabins come supplied as such from the manufacturer, without a modular or exchange option.

The cabins can also be provided with extra passenger seats. This will typically be useful for tractors that will be pulling armoured vehicle trailers on the open road. The tank crew can ride in the tractor cabin together with the tractor truck crew.

Some customers have also asked for cabins with RPG protection (Rocket Propelled Grenade). In these cases, the solution may combine both active and passive protection, where passive protection will normally be less costly, while generating more weight. Both Norway and Sweden have asked for information into the possibilities of RPG protected cabins.

EMC requirements

In connection with the Norwegian-Swedish contract, namely the Norwegian defence has listed strict requirements for the vehicles' Electromagnetic Compatibility (EMC) standard. EMC encompasses the way the vehicles are protected against electrical or electronic influences on any part of the vehicle, such as windscreen wipers or engine management, and against these in turn influencing or disrupting other electronic components, such as communications or video equipment. The Norwegian Defence has laid down the requirement that the logistics vehicles should be EMC protected to the same standard as combat vehicles, such as for instance the FUCHS armoured personnel carrier vehicle. Norway operates a small number of FUCHS vehicles from Rheinmetall that are specially equipped for CBRN (Chemical, Biological, Radiological and Nuclear defence) assignments.

The first deliveries to the Swedish and Norwegian defence organisations

The Norwegian-Swedish contract that was signed recently is a frame agreement for up to 2000 vehicle units, to run for a term of 12 years. An additional service and support contract was entered into, with a term of 30 years. The contract has been entered into with the Norwegian Defence Logistics Organisation and the Swedish Defence Materiel Administration.

Modular Cabin. *HX 4x4 MAC cabin offering medium protection level.* *Photo: MilitærTeknikk*

For the Norwegian defence, the new vehicles will mostly serve as direct replacements for the current fleet Scania trucks, most of which were procured towards the end of the 1980's. Sweden is planning to replace the oldest units from the current fleet of Scania and Volvo trucks.

Under the terms of the frame agreement, the Norwegian Defence has placed orders for the delivery of 120 vehicles at a value of 120 million Euro. This initial part delivery of vehicles is planned to take place in the period of 2015 to 2018. The first Norwegian order includes 103 units of HX2 vehicles (of which 95 are 8x8 and 8 are 10x10). A full 35 of these vehicles will be supplied with the Rheinmetall Integrated Armoured Cabin (IAC). Further to this, the Norwegian defence has ordered a fleet of 17 TGS commercial vehicles, intended for use on the bases and airfields of the Air Force.

The Swedish Armed Forces have so far under the terms of the frame agreement placed orders for the delivery of 215 vehicles at a value of 99.5 million Euro.

The Swedish order calls for 62 units of HX2 vehicles, 139 units of TGS military vehicles and 14 TGS commercial vehicles. Planned delivery for these vehicles is the period of 2015 to 2017.

HX 6x6 with civilian cabin. *Photo: MilitærTeknikk*

Gripen for Brazil. *Going on for more than 10 years, the FX-2 program aims to replace the ageing Mirage 2000 fleet of the Brazilian air force. The importance of the contract in the international fighter aircraft market is not only in regards of the 36 unit as of today. Marked analysts expect this merely to be a first buy, and some commentators estimate a likely total number of up to 100 air craft, assuming the Brazilian air force likes what they are getting.* *Illustration: Saab*

SAAB AND BRAZIL SIGN CONTRACT FOR GRIPEN NG

Saab has signed a contract with the Brazilian Federal Government (Ministry of Defense through the Aeronautics Command, COMAER) covering the development and production of 36 Gripen NG fighter aircraft for the Brazilian Air Force. The total order value is approximately SEK 39.3 billion. Saab and COMAER have also signed an Industrial Co-operation contract to deliver substantial technology transfer from Saab to Brazilian industry.

On 18 December 2013 Brazil selected the Gripen NG to be its next-generation fighter aircraft, through the F-X2 evaluation programme. Since then all parties have negotiated to finalise a contract. Today's announcement marks the successful conclusion of that process.

Saab's Gripen NG won the FX-2 contract in competition with the Rafale made by France's Dassault Company and US aviation giant Boeing's F/A-18 fighter.

Saab and COMAER have signed a contract for the development and production of 36 Gripen NG fighter aircraft, plus related systems and equipment. The programme comprises 28 single-seat and eight two-seat Gripen NG. The total order value is approximately SEK 39.3 billion.

Saab and COMAER have also signed a contract for industrial co-operation projects, including technology transfer to Brazilian industry, to be performed over approximately ten years.

"We are proud to stand side-by-side with Brazil in this important programme. There is already a long and successful history of industrial co-operation between our two countries, and this historic agreement takes that partnership to a new level", says Marcus Wallenberg, Chairman of Saab's Board of Directors.

The contract with COMAER for Gripen NG and the associated Industrial Co-operation contract will come into effect once certain conditions have been fulfilled. These include, among others, the necessary export control-related authorisations. All of these conditions are expected to be fulfilled during the first half of 2015. Gripen NG deliveries to the Brazilian Air Force will be undertaken from 2019 to 2024.

"The contract with Brazil validates Gripen as the most capable and modern fighter system on the market. It solidifies Saab's position as a world-leading fighter aircraft producer and strengthens our platform for growth," says Håkan Buskhe, President and CEO of Saab.

The contract with Brazil strengthens the ties between Saab and Brazilian industry. Embraer will have a leading role as the strategic partner in the F-X2 programme. As part of the technology transfer plan, Brazilian industry will have an important role in the development of, and be responsible for, the production of the two-seat Gripen NG variant for the Brazilian Air Force.

Brazil joins Sweden in becoming the launch customer for the next-generation Gripen, which shares the same smart design and innovative technology as today's Gripen versions. Gripen aircraft are currently in operational service with the Swedish, Czech, Hungarian, South African and Royal Thai Air Forces, and also with the UK Empire Test Pilots' School (ETPS).

The next-generation Gripen meets the market's demand for a sophisticated and flexible combat aircraft with sustainable costs. The aircraft provides more thrust, extended range and endurance, expanded weapons capacity, new sensors including an advanced AESA radar, highly effective electronic warfare systems and multi-function communications.

The Gripen NG for Brazil and Gripen E for Sweden share all the attributes of the next-generation Gripen design, but are also tailored to each country's specific national requirements. The commitments by Sweden and Brazil secure Gripen's industrial and operational future into the 2050 timeframe. ■

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Norwegian Defence and Security Industries Association (FSi)

THE LEADING ASSOCIATION IN NORWAY ADVOCATING THE INTERESTS OF ITS SECTOR, AND THE PRIMARY INTERLOCUTOR FOR THE GOVERNMENT IN MATTERS OF IMPORTANCE TO THE INDUSTRY. AFFILIATED WITH THE CONFEDERATION OF NORWEGIAN ENTERPRISE (NHO) AND REPRESENTING MORE THAN 100 COMPANIES

Lederen har ordet:

FORUTSIGBARE RAMMEBETINGELSER – FORUTSETNING FOR EN NASJONAL FORSVARSINDUSTRI

Forsvarets investeringsportefølje har vært gjenstand for en omfattende omprioritering i løpet av sommeren. Resultatet er at mange anskaffelser er redusert i omfang, kansellert eller skjøvet ut i tid. Dette får store negative konsekvenser for flere norske forsvarsleverandører.

Norsk forsvarsindustri er en kritisk ressurs som sikrer Forsvaret operativ kapasitet til å løse sine oppgaver. Forsvarsindustrien forvalter kunnskap, kompetanse og teknologi som gjør det mulig for Forsvaret å løse sine oppdrag, når de operative kravene ikke kan møtes av ferdigutviklede løsninger. Derfor er Forsvaret er avhengig av en kompetent og konkurransedyktig norsk industri som evner å forstå den norske operative brukerens behov.

Stabile rammebetingelser og forutsigbarhet i forhold til gjennomføring av godkjente anskaffelser er en forutsetning for at industrien skal kunne investere i teknologi- og produktutvikling for å møte Forsvarets behov og for å lykkes internasjonalt. Forsvaret som en krevende, profesjonell og troverdig referansekunde er avgjørende for at andre lands forsvar skal velge norsk teknologi. Kansellering rett før kontraktsinngåelse av prosjekter som er etablert med utgangspunkt i langsiktig samarbeid mellom Forsvaret og industrien, og som også er helt vesentlige i de aktuelle bedriftenes strategi for fortsatt vekst og utvikling i det internasjonale markedet, er derfor alvorlig for bedriftene og det bidrar til å skape usikkerhet om forutsigbarheten i Forsvarets anskaffelsesvirksomhet.

FSi har forståelse for at det må være samsvar mellom anskaffelsesplaner og tilgjengelige investeringsmidler. Vi er også innforstått med at det alltid hefter usikkerhet ved planlagte prosjekter på midlere og lang sikt. Dette er normalt og industrien forholder seg til dette og tilpasser sin ressursbruk på slike prosjekter i forhold til risikoen som er knyttet til realisering og gjennomføring av planlagte prosjekter.

Hva gjelder godkjente prosjekter der gjennomføringsoppdrag er gitt anskaffelsesmyndigheten (FLO) og leverandør er valgt, er imidlertid bildet annerledes. Til nå har industrien kunnet legge til grunn at når gjennomføringsoppdrag er gitt og kontraktsforhandlinger iverksatt, så blir også anskaffelsen gjennomført. Dette har gitt forutsigbarhet som har vært helt avgjørende for bedriftenes vilje og muligheter til å investere i teknologi- og produktutvikling for å møte Forsvarets behov og for å posisjonere seg i det internasjonale forsvarsmarkedet.

Salg av forsvarsmateriell til kunder utenfor Norge er generelt betinget av at det norske forsvaret har anskaffet det aktuelle systemet/materiellet. Dette er etablert praksis og gjelder også når Norge anskaffer materiell fra utlandet. Norge har historisk vært forbilledlig i denne sammenheng da det eksisterer et trekantsamarbeid mellom Forsvaret, Forsvarets forskningsinstitutt og norsk forsvarsindustri som har gjort det mulig å ta frem løsninger og materiell som er utviklet spesielt for å dekke behov i det norske forsvaret som ikke kan dekkes på annen måte. Slike løsninger har også vist seg å ha et betydelig eksportpotensiale. Dette har kommet både Forsvaret og industrien til gode.

Vi merker oss at Forsvarsministeren er tydelig på at det som har skjedd er et unntak i et ellers godt og tett samarbeid med forsvarsindustrien og at regjeringen ønsker å bidra til å opprettholde og videreutvikle en internasjonalt konkurransedyktig norsk forsvarsindustri. Da forventer industrien at nødvendige tiltak blir iverksatt for å sikre forutsigbarhet om godkjente anskaffelser til Forsvaret. Dette er viktig for industriens muligheter til å satse på teknologi og utvikling av løsninger som møter Forsvarets behov, men det er også viktig dersom Norge skal forbli en attraktiv partner i flernasjonale samarbeidsprosjekter om utvikling og anskaffelse av forsvarsmateriell. Likeledes blir det viktig at det også i en tid med press på investeringsbudsjettet finnes rom til å investere i forskning og utvikling. Tempoet i den teknologiske utviklingen tilsier at uten kontinuerlig investering i FoU vil den nasjonale forsvarsteknologiske kompetansen både i Forsvaret og i industrien raskt foreldes og risikere å bli irrelevant.

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Trial shooting of a NASAMS HML mounted on a HUMVEE field vehicle. The missiles used in the trial shooting were of the type AMRAAM C-7. With the NASAMS HML version, it is possible to fire the missiles with the launcher mounted on the vehicle. This is in contrast to the NASAMS, where the launch platform must be lifted off the vehicle prior to firing. A result of this is that the HML version can be prepped for firing inside minutes as soon as the field vehicle is in position. *Photo: FMS*

NASAMS HML

This autumn, the Norwegian Defence made its first trial shootings from the NASAMS HML (High Mobility Launcher). The trials took place at the Vidsel shooting range in Northern Sweden.

Back in 2011, the Norwegian Defence Logistics Organisation (NDLO) contracted to purchase the new NASAMS HML, and the first system delivery was made last summer.

NASAMS was developed by the Norwegian supplier Kongsberg Defence & Aerospace in co-operation with the US Raytheon, and the first version of the NASAMS was operational in 1998. For Norway, the main role for NASAMS was air defence for airports. NASAMS (currently upgraded to NASAMS II) uses AMRAAM missiles from Raytheon. These are the same missiles as Norway and many other countries use in air-to-air combat with their fighter aircraft.

The original NASAMS launcher accommodates up to six missiles, each lodged in its separate canister. The launcher is relatively bulky, and will normally be transported on a truck or larger vehicle. Prior to blast-off, the launcher must be lifted off the vehicle.

The NASAMS HML launcher will accommodate up to four missiles. These missiles are lying in the open; the launcher is considerably lighter, and can be transported and operated from a light field vehicle.

The Norwegian Air Force is procuring the HML in order to enhance both the strategic and the tactical mobility. The term strategic mobility refers to the possibility of hauling the system across greater distances, for example om a C-130J Hercules transport aircraft for deployment in areas with a need for air defence, in Norway as well as at points abroad.

The tactical mobility refers to the capacity for simple and rapid movement within the operations area.

The procurement of the NASAMS HML will be complementing the existing NASAMS systems held by the Norwegian Air Force.

YOUR FUTURE

OUR AMMO

Through precision engineering, a dedicated workforce and careful design, Nammo offers ammunition solutions for any field of operation. Designed to meet any challenge, our munitions are created with incredible attention to detail, giving forces the edge.

Nammo

SECURING THE FUTURE

SWEDISH AND UK CBRN SPECIALISTS FORM PARTNERSHIP

CBRN ACADEMY/Swedish Rescue Training Centre AB and Lutra Associates Limited form partnership offering improved strategy, doctrine and equipment advice and realistic training for CBRNe, Hazmat, Civil and Disaster Relief.

A new CBRNe training partnership and facility is announced today which capitalises on the skills of the CBRN Academy (SCP)/Swedish Rescue Training Centre (SRTC) based in Skövde Sweden and Lutra Associates of Stalbridge Dorset. The partnership is designed to assist clients better understand, prepare and deal with the problems caused by CBRNe, Hazmat, Civil and Disaster Relief.

The new team will serve government, civilian emergency services, the military and private corporations and individuals alike. Physically centred on the highly qualified instructors and outstanding and extremely realistic SRTC's 313 acres training facilities near Skövde in Sweden and making use of Lutra's worldwide network of instructors, and subject matter experts the new partnership will be able to offer a single provider of these capabilities across the wide and diverse spectrum these subjects represent.

Specialists covering all aspects of CBRNe, Hazmat, and Civil Rescue ranging from national strategy to individual skills and drills and from protection of VIPs, the civil population and national infrastructure to dealing with medical issues to contamination and hazard management will be available to guide clients through the maze of issues involved with ensuring the equipment and professionalism of their armed forces and responders and safety of their populations and infrastructure meet the highest standards. The partnership's specialists include current and former members of government laboratories, armed forces, civil rescue services, academia, law enforcement organizations, procurement agencies and the medical profession as well as noted strategists and commentators on the subject.

The SRTC and SCP network creates a cluster of skills, resources and facilities that few, if any, can match. The cluster provides SRTC and CBRN Academy with an internationally recognised CBRNe education platform. The platform provides worldwide; consulting, education, training and products within CBRNe backed by a facility and training and testing regime which are second to none. ■

Live decon practice for a decontamination team ensures that even the data loggers and evidence recording personnel seated at the table get a chance to have their skills and the way they fit into the team tested in a live environment. Assessors and advisers from Lutra and SRTC and SCP advise and debrief. *Photo: SRTC/SCP*

Wreathed in CS a police SWAT team rehearse their procedures at the SRTC/SCP training center. *Photo: SRTC/SCP*

Set in 313 acres of Swedish countryside the SRTC/SCP's training ground offers extreme realism and high fidelity training in CBRNe/Hazmat using live agents to test drills and concepts from individual to national level. *Photo: SRTC/SCP*

THE DANISH LOOPHOLE

The necessity of having a competitive defence industry to be able to protect the country's essential security interests. That is the key to Denmark's new rules for offset obligations.

The Danish Ministry of Defence will demand 100 percent offset when replacing their old M113 armoured personnel carriers. Photo: Danish Army

By Andreas Krog

Denmark has just changed the country's rules regarding offset requirements related to the armed forces procurement of material from foreign suppliers after a more than three years long dispute with the EU Commission. With the new rules, the Danes hope to be able to continue to demand offset despite the commission's strong resistance.

The Danes have actually been successful in finding a loophole that makes it possible to maintain an extensive degree of offset obligations for foreign industry doing business with The Danish Armed Forces. If Denmark finds it necessary for the sake of the country´s essential security interests, foreign companies can still be met with offset obligations if the contract value exceeds DKK 50 million.

Job creation the main reason

It all started more than three years ago in May 2011, when the EU Commission first criticized Denmark's offset rules. The commission found that the Danish rules were more a general setup than they were a result of an evaluation of the specific acquisition. They also found that job creation was the main reason for demanding offset, and not the protection of Denmark's essential security interests. Finally, the rules did not take into account how offset obligations affect competition on the common market for products not specifically intended for military purposes.

The Danish Government did not want the EU Commission to start a case against Denmark for violation of the EU Treaty. On the other hand, the government wanted to keep some degree of offset obligations because the small Danish defence industry is relying heavily on offset. Both for specific orders and as a door opener paving the way for collaboration with large defence conglomerates like Boeing, Airbus, BAE Systems and Lockheed Martin within areas not related to a specific offset obligation.

Essential interests

The Danes found their loophole in Article 346 in the Treaty on the Functioning of the European Union (TFEU). This article's section b) allows EU countries to take measures they consider necessary for the protection of their essential security interests in connection with the production of or trade in arms, munitions and war material. Measures taken under Article 346 may not adversely affect competition on the common market for products not specifically intended for military purposes.

The key message in the new rules is therefore that it is necessary for the protection of Denmark's essential security interests to have a competitive defence industry within certain strategic areas. If other measures are not sufficient to provide for this, offset obligations can come into the picture. This has been outlined in a new Danish defence industry strategy.

Eight areas

The Ministry of Defence assesses the need for offset obligations on a case by case-basis. The Danish Business Authority thereafter assesses if the obligations will adversely affect the competition. Finally, the Defence Ministry decides if the foreign companies shall be obligated to deliver offset work orders equal to the whole value of the acquisition or only a minor share.

Future offset projects shall be within one of the eight specific strategic areas. *The areas are:*

- Advanced software and cyber security
- Communications and command control systems
- Surveillance and radar technology
- Protection of personnel and assets
- Critical parts of the vehicle production
- Critical parts of the maritime area
- Advanced material technology
- Energy and environmental optimization in relations to operational work

The offset projects shall be related to a specific acquisition or similar. It is however not yet known to the defence industry precisely what is meant by similar. Can offset projects related to a procurement of fighter jets only be technology used on other fighter jets, or what? The Danish Business Authority says that it will be case dependent.

Waited for new rules

The two ongoing major acquisitions of artillery and armoured personnel carriers for The Danish Army were put on hold while the Danish Business Authorities and the Ministry of Defence waited for the new rules to be agreed upon by the Danish politicians and the EU Commission.

In October the Ministry of Defence announced that Denmark would still demand 100 percent offset from the companies that are awarded the contracts for between nine and 21 artillery pieces and between 206 and 450 armoured personnel carriers. Down selection in both procurement competitions is expected in the first half of 2015.

WHY POLAND OPTED FOR THE HUGIN 1000

Geographical and hydrological conditions make the Baltic Sea particularly suitable for the use of sea mines. There are also huge numbers of mines, artillery grenades, bombs and other explosives resting on the Baltic seabed following both World Wars one and two. This is the backdrop for several of the states bordering the Baltic Sea (Germany, Denmark, Poland and Sweden) having significant naval resources assigned to controlling the danger from mines.

By Tor Husby

For the Polish navy, the mine hunter capacity has been a challenge for a long time, and it has been difficult to answer to allied obligations as a participant country in the NATO Response Force and the Standing NATO Mine Countermeasure Group, which also includes a group with its operational area in the Baltic Sea and the seas surrounding Denmark.

The Polish mine hunting vessels of the type 206FM were built during the last half of the 1960's. They are old and technically outdated, and able to operate only in the vicinity of their home bases. Over the coming years, the Polish Navy will also be gradually retiring their mine sweepers of the 207 type. These are built of fibreglass, and can no longer meet modern tactical/technical requirements. It has become evident that even these vessels cannot easily be modernised.

In order to raise the mine warfare capacity of the Polish Navy, a new mine hunting vessel called the Kormoran II is being built. This vessel is intended to be able to function autonomously in Polish waters, as well as taking a role in a tactical squadron in co-operation with other NATO naval forces.

One of the mine chasing systems on board the KORMORAN II is autonomous underwater vehicles, and the Polish Navy has after a tender competition opted for the Kongsberg HUGIN 1000.

HUGIN 1000 fulfilled the technical and operational requirements posed by the Polish Navy, while it can also be integrated to other submarine warfare systems and can be operated in collaboration with other NATO vessels. A further aspect for consideration was that Kongsberg will provide service and support for the system throughout the warranty period. ■

KOROMORAN II

- **Type:** Minehunter
- **Displacement:** 850 tons
- **Length:** 58.5 m

The new polish minesweeper, Koromoran II is currently being built by Remontowa Shipbuilding Gdansk, and is expected to enter service 2015-16. So far, Poland is building one vessel of this type, but two more ships are planned. *Ill.:Remotowa Shipbuilding*

– Bulletin Board for Defence, Industry and Trade –

XWIND 4000 concept ship design

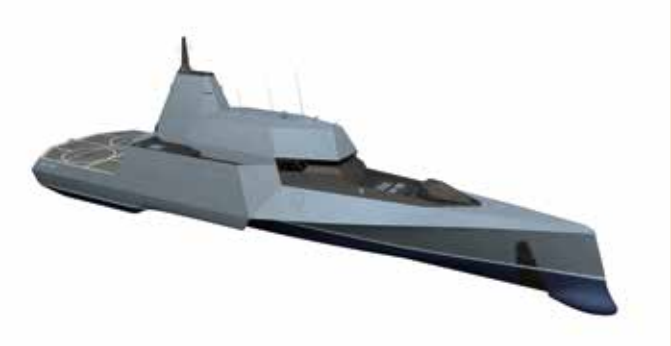
DCNS is presenting XWIND 4000, a concept ship combining all of the Group's main innovations for future naval surface systems.

"XWIND 4000 has been designed around the concept of an 'all-digital' ship," explains Marketing Manager Philippe Sathoud. "Flat-panel arrays for the combat system and other sensors are installed around the superstructure. This provides unprecedented hemispherical coverage and enables all the sensors to operate at the same time without generating interference between transmitters and receivers. With this configuration, shipboard systems can respond dynamically to evolving threats such as terrorism, piracy or sensor saturation attacks."

To enhance the platform's detection, identification and engagement capabilities, surveillance UAVs or armed UAVs are part of the combat system design. These offboard systems can deploy a broad range of optronic, radar or electronic warfare payloads as well as rockets or missiles.

The XWIND 4000's innovative all-digital design is also apparent in the intuitive human-systems interfaces for the ship's two nerve centres, touchscreens, voice commands and Kinect™ technology in the ops room, and 360° vision, augmented reality technology and user interfaces similar to smartphones on the bridge. All the digital systems run on a secure datacentre architecture hosting combat system and platform management applications in a virtual environment that allocates resources as operational requirements evolve.

The XWIND concept also includes a hybrid propulsion system that is innovative in two ways. First, the compact propulsion system (diesel engines, electric motor-generator and reduction gears) is housed in a single 'box' assembled and tested at the factory. Second, batteries store the excess electricity produced by the ship's alternators operating at optimum efficiency and can power the electric motor to offer a completely silent mode of propulsion when the ship is travelling at low speeds. The fuel saving is on the order of 10%, and maintenance costs are 40% lower since there is less wear on the diesels. At the same time, the system offers added discretion and a smaller environmental footprint.



The XWIND concept *Ill. DCNS*

A UK Royal Air Force GR4 Tornado carrying a triplet of Brimstone missiles (grey with golden "noses") *Photo: RAF/UK Mod*

UK MoD plans to accelerate Brimstone integration on Typhoon jets

The UK Ministry of Defence (MoD) is accelerating its plans to arm the Royal Air Force's (RAF) Typhoon jets with Brimstone air-to-surface missiles in the wake of the ongoing campaign against the Islamic State (IS) fighters in Iraq.

Undisclosed military sources were quoted by the Telegraph as saying that the UK's campaign against IS has exposed a shortage of ground attack aircraft, which would get worse with the retirement of RAF's ageing Tornado feet.

The Tornado GR4s are the only British fighters carrying Brimstone missile that can destroy moving vehicles with minimal collateral damage, but are scheduled to decommission in 2019.

Early this year, the MoD announced plans to integrate the missile into Typhoons by 2019 so as to enable them to take over ground attack duties from Tornados.

However, RAF chiefs are believed to have warned that the Iraqi mission is putting additional burden on its shrinking combat jets fleet and will soon interfere with their ability to deploy enough aircraft carrying the missiles.

While, the MoD is reportedly holding talks to streamline the installation, the defence analysts say Typhoon upgrade would still not be completed before 2017.

Even though the RAF took delivery of upgraded Typhoons that can drop Paveway IV guided bombs, the MoD is not considering their deployment to Iraq despite warnings that the seven or eight hour trip to bomb IS targets from RAF Akrotiri, Cyprus, will increase the wear and tear of the ageing Tornados.

A MoD spokesperson said: "We have already deployed a number of Tornado GR4s to support coalition operations against ISIL in Iraq.

Manufactured by MBDA, Brimstone fire-and-forget missile is capable of engaging tanks, armoured vehicles and other fast-moving vehicles, bunkers, and naval vessels in all weather conditions.

Two E-2D Advanced Hawkeye *Photo: Northrop Grumman Corp*

US Navy's E-2D Advanced Hawkeye set for operational deployment

The US Navy's Northrop Grumman-built E-2D Advanced Hawkeye aircraft has attained initial operational capability (IOC), making it eligible for active mission deployments.

Built as part of a $3.6bn contract for the delivery of 25 aircraft, the new E-2D Advanced Hawkeye is claimed to be the latest variant of the E-2 Hawkeye airborne early warning command and control (AEW&C) platform.

It can be used to perform airborne strikes, land force support and rescue operations, and can manage a reliable communications network between widely dispersed nodes, in addition to drug interdiction missions.

The aircraft's structural design, which integrates a rotating rotodome and four vertical stabiliser tail configurations, is claimed to offer 360-degree surveillance.

To date, Northrop has delivered 15 of the 75 aircraft to be delivered as part of the navy's E-2D Advanced Hawkeye programme.

The Vipère multifunction buoy

The Vipère multifunction buoy offers periscope performance without having to come up to periscope depth. Vipère enhances a submarine's intelligence-gathering capability while remaining deeply submerged and without compromising discretion. Data gathered by the sensor payload is relayed in real time to the host submarine. Depending on operational needs, the buoy's payload can also include communications equipment, a satellite positioning system to reset inertial platforms, electronic warfare systems such as a radar warning receiver, or an electro-optical package with a TV/IR camera to visually monitor an area of interest.

The Vipère multifunction buoy *Photo: DCNS*

C-27J Spartan aircraft for Slovak Republic

Finmeccanica - Alenia Aermacchi and the Slovak Defence Ministry have signed a contract for the supply of two C-27J Spartan aircraft including the relative initial logistic support and the training of pilots and maintenance personnel.

The acquisition of the C-27J by the Slovak Air Force is part of the Slovak Armed Forces' modernisation programme, of which the two new tactical transport aircraft are a first step.

The Slovak Armed Forces intend to increase their own contribution within NATO and the C-27J Spartan assures full interoperability with other bigger-size heavy airlifters used in international coalitions.

The C-27J is a twin-engine, turboprop, tactical transport aircraft with state-of-the-art technology in avionics, propulsion and other onboard systems. It provides high performance, operating flexibility and cost efficiency.

The aircraft has been ordered by the Air Forces of Italy, Greece, Bulgaria, Lithuania, Rumania, Morocco U.S.A., Mexico, Australia, and by an African Country, recently by Peru and yesterday by Slovak Republic, for a total of 78 airplanes.

C-27J heading for Slovak Republic Photo: Alenia

Final qualification firing of MdCN missile system

The French Direction Générale d'Armement (DGA) has successfully completed the final qualification firing of the Missile de Croisière Naval (MdCN) system, also called the naval cruise missile (NCM), from the DGA Missile Test Centre in Biscarrosse, France.

The launch, which was executed from a frigate, was mainly aimed at determining the missile's range performance, while satisfying overall flight objectives.

Built by MBDA as part of the DGA contract in 2006, the MdCN missile system will be installed on the French Navy's Frégate Européen multimission (FREMM) vessels and its Barracuda nuclear-powered attack submarines by 2015 and 2018, respectively.

Based on the naval version of the Storm Shadow / SCALP air-launched cruise missile system, the MdCN is intended to offer deep-strike capabilities within enemy territory.

The MdCN system during the final qualification firing Photo: DGA-EM

The MdCN will be offered in two variants, including a vertical launch from the FREMM frigates via the compact A70 vertical launcher and a submarine configuration, where the weapon is fired through torpedo tubes.

With a range of several hundred kilometres, the MdCN can be carried overtly or covertly on combat vessels, including frigates and submarines. It can be stationed at a safe stand-off distance for longer periods within international waters.

France launches second Mistral-class vessel

French shipbuilders have reportedly launched the second Mistral-class amphibious helicopter carrier, Sevastopol, from its dry dock in Saint-Nazaire, France.

Sevastopol is one of two vessels built as part of a $1.5bn deal signed by France and Russia in June 2011, Sputnik news agency reported.

The first carrier, Vladivostok, is expected to join the Russian Navy by the end of this year, followed by Sevastopol next year.

Deliveries were suspended in October, following criticism from the UK and US regarding Moscow's reported involvement in the Ukrainian crisis.

Russia has been under heavy criticism for allegedly supplying anti-aircraft systems to pro-Russia rebels, who then allegedly shot down Malaysia Airlines flight MH17, killing 298 individuals.

The 199m-long, 22,000t Mistral-class ships are equipped with MRR-3D NG surveillance radar and a high-performance communications suite for humanitarian missions and a range of other operations.

With a potential to cruise at a maximum speed of 19k, they are integrated with two Breda Mauser 30mm naval guns, four 12.7mm machine guns and two MBDA France Simbad launchers for the Mistral air defence missile.

The carriers can also launch helicopter, tank and missile attacks at sea.

300th CH-47F Chinook helicopter

The US Army has taken delivery of the 300th CH-47F Chinook multimission helicopter from Boeing.

The heavy-lift, high-altitude helicopter features an upgraded airframe, advanced cargo handling capabilities and a common avionics architecture system (CAAS) cockpit that improves crew situational awareness.

In addition, it is fitted with a BAE Systems-built digital automatic flight control system, which provides enhanced flight-control capabilities for the multitude of conditions in which the helicopter is used.

Powered by Honeywell T55-GA-714A engines, the CH-47F Chinook is an upgraded version of the D model, and is used for military, humanitarian, disaster relief, search and rescue, and fire-fighting operations.

The helicopter has an upgraded airframe, featuring greater single-piece construction for lower maintenance requirements. It can fly at speeds of more than 175mph, with a payload of more than 21,000lb.

Chinooks are also used by the UK and Australian armies, as well as the Royal Canadian Air Force.

Since the roll out of the first CH-47F Chinook in June 2006, the US Army has trained and equipped a total of 18 army and National Guard units with the aircraft.

A 300th CH-47F Chinook *Photo: Boeing*

F-35 academic training centre at Luke Air Force Base

The US Air Force (USAF) has opened the F-35 Lightning II Academic Training Centre (ATC) at Luke Air Force Base (AFB) in Arizona, US.

Built by Archer Western, the $47m architecturally and technological advanced facility will provide sophisticated training for the US and allied F-35 joint strike fighter pilots.

US Army Corps of Engineers 60th commander colonel Kimberly Colloton said: "At more than 145,000ft2, this facility was designed to house a dozen full mission simulators and classrooms to train US pilots and pilots from around the world."

Lockheed Martin, along with Luke AFB personnel has already started outfitting the inside of the building with furniture, phones and computers. He will follow this up with more advanced equipment, in the coming weeks, such as classified areas and simulators.

According to Lockheed, the pilots will train in full mission simulators that replicate all F-35 sensors and weapons employment and also provide half of the initial qualification flights.

In turn, the saved flight hours are expected to save money by reducing the wear and tear on aircraft and using less jet fuel, among other cost reductions.

The first batchof pilots are scheduled to begin training in the ATC in early May 2015.

Luke AFB has been named as an F-35A training site for ten foreign countries on three continents ranging from Canada to Turkey to South Korea and is set to receive 144 of the fifth-generation fighters. The base currently hosts an Australian representative and is awaiting the arrival of the country's pilots and aircraft by the beginning of 2015.

Meanwhile, Norway and Italy are expected to join the next US F-35 squadron at the base when it starts operations in spring 2015.

Navantia signs a contract with Australia for the study of new frigates

Navantia has signed a contract with DMO for the RRDS (Risk Reduction Design Study) regarding the SEA 5000 programme for the new frigates.

The contract, which will last approximately nine months, intends to analyze the impact of the installation of CEA Australian aerial radar. It will also examine the affect of the SAAB command and control system on Navantia's F-105 frigate, as well as the achievement of specific Australian requirements.

Is the first step of the programme which is based on the acquisition of future frigates for the Royal Australian Navy. This includes the construction of eight units in Australia.

The Australian Government will build the ships in Adelaide, where the Air Warfare Destroyer are being constrcuted. Navantia will aide with the design, which is based on the F-100 frigates and transfer of technology. It is very important to highlight the communality of systems and equipments with other ships of the Royal Australian Navy. This is great added value for Navantia when bidding in other programmes.

The programme is important for Navantia, due to its complexity and volume and means an important support from the Australian Government to the firm's capabilities. It will provide Navantia with a significant level of activity, as well as the opportunity to develop other internationally attractive designs based on the F-100 frigates.

Missile subsystems order

Saab has signed a contract comprising missile subsystems amounting to approximately MSEK 250. Deliveries will take place during 2015-2022.

Saab is a significant supplier of high-performing and cost-effective missile systems and components for air, land and naval operations. The strong product portfolio includes RBS 70, RBS 70 NG, NLAW and RBS15 missile systems. Furthermore, Saab also participates in a number of multinational cooperation missile development programmes.

The industry's nature is such that depending on circumstances concerning the product and customer, information regarding the customer will not be announced.

SEA RANGER, A Solution for Light Combat Vessels

With MBDA entering into active negotiations with various export prospects regarding CWSP (Compact Warfare System Package) systems, the company has decided to give the product a commercial name. As of now, CWSP will be included in MBDA's portfolio of products and marketed as SEA RANGER.

SEA RANGER is a combat system based on the most recent missile additions to MBDA's product range. It is aimed at vessels having responsibility for the safety and security of highly sensitive coastal zones or for providing logistics ships with an effective means of self defence. The system is provided as a turnkey solution, integrating the radar and optical sensors as well as a command, control and communication system (C3S) allowing for the optimal deployment of SEA RANGER's air defence and anti-ship missiles in complex environments.

Calling on its extensive experience in naval combat systems, MBDA is taking responsibility for the full integration of the system on board the relevant vessel and also for providing full customer support in assuring the effective carrying out of the project.

Based on a modular architecture, SEA RANGER can be configured in line with the missile systems to be integrated : for air defence, the MISTRAL system comprising one to four SIMBAD-RC automated turrets (first deliveries of SIMBAD-RC are scheduled for 2015); and for anti-surface warfare in the littoral, the short range anti-ship system, BRIMSTONE, for countering saturating attacks carried out by FIACs (Fast Inshore Attack Craft) or the medium range anti-ship system, MARTE Mk2/N, capable of dealing with intermediate sized vessels.

SEA RANGER *Ill: MBDA*

Innovations improve submarine capabilities

DCNS is unveiling major innovations in three key areas – improved submerged endurance, enhanced surface intelligence gathering, and deployment of unmanned underwater vehicles – to improve the performance and safety of conventional-propulsion submarines.

Three technologies to improve submerged endurance

To meet demand from customers for improved submerged endurance of conventional-propulsion submarines (SSKs), DCNS now offers dedicated hull sections known as Autonomy Boosting Sections.

Whereas SSKs typically have a submerged endurance of about three days, DCNS now proposes three new technologies to extend this critical parameter to three weeks.

The first is a hull plug equipped with new-generation high-capacity lithium-ion batteries. Easy to operate, the technology offers high submerged speeds on demand and improved response to power ramp-up and variations. Lithium-ion batteries can also be recharged at sea. The endurance of a Scorpene-type submarine is increased to seven days resulting in a significantly enhanced tactical capability.

The second solution, the Mesma air-independent propulsion (AIP) system, is packaged as a compact dedicated hull section. Mesma's steam turbine-based technology uses a fuel that is readily available in ports and is ideal for extending an SSK's endurance at patrol speeds. The sea-proven Mesma system increases the submerged endurance of a Scorpene-type submarine to two weeks.

The third solution, a second-generation fuel-cell AIP, represents a technological breakthrough compared to current-generation AIPs in terms of performance, safety, flexibility and maintenance.

This solution combines several key DCNS innovations in fuel cell technology. Hydrogen is produced from diesel fuel by hydrocarbon reforming as required, overcoming the need to store hydrogen on board the submarine.

This revolutionary technology increases submerged endurance to three weeks; a capability that confers a decisive advantage in certain theatres of operations.

Nammo one of the fastest growing companies in America

Inc. magazine has ranked Nammo Composite Solutions number 3,085 on its 33rd annual Inc. 500|5000 list, an exclusive ranking of the fastest growing companies in America.

The annual Inc. 500|5000 calculation is based on revenue growth between 2010 and 2013. The average company on the list achieved a three-year growth of 516%. This achievement places Nammo Composite Solutions among notable companies that over the years have included Microsoft, Vizio, Intuit, Chobani, and Oracle.

Based in Salt Lake City, Utah Nammo Composite Solutions has more than 20 years of experience in the design and manufacture of advanced composite structures for commercial, industrial, aerospace and military applications. The company's growth resulted from new defense products including missile cases, ammunition canisters, and UAV structures.

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The programme is important for Navantia, due to its complexity and volume and means an important support from the Australian Government to the firm's capabilities. It will provide Navantia with a significant level of activity, as well as the opportunity to develop other internationally attractive designs based on the F-100 frigates.

TANAN; ship-based UAS

Airbus Defence and Space and DCNS signed acooperation agreement develop a ship-based helicopter UAS capability. This technological partnership will help to speed up the market release of the TANAN vertical take-off and landing (VTOL) tactical helicopter UAS, as it takes into account the naval sector's requirements and the aircraft's efficient integration onto all types of armed vessels from the outset.

The work the two companies are doing will enable the TANAN UAS to be integrated into the ship's combat system. This includes the definition of its mission system and the improvement of situational assessment thanks to the data received from the various sensors on board TANAN. The work likewise encompasses the physical integration of TANAN onto the ship, including the positioning and compatibility of the antenna system, the landing deck, the harpoon and grid, the docking and securing of the UAS in the hangar, as well as the related support.

TANAN is a helicopter UAS with a maximum take-off weight of 350 kilogrammes, and is designed for maritime operations. Its characteristics, including extensive detection and identification capabilities, make it a considerable asset for surface vessels. It is thus suited to highly intense missions and combating asymmetrical threats alike. Flexible and versatile, with a powerful tried-and-tested diesel engine and state-of-the-art equipment, TANAN is a perfect addition to ship-based helicopters.

By integrating UAS onto combat ships, the latter's detection range and ability to accurately identify threats can be increased, while simultaneously ensuring operational availability.

Embraer rolls out KC-390 military airlift

Embraer has rolled out the first prototype of the KC-390 military transport from the production hangar at the industrial plant of Gavião Peixoto, Brazil. The event was attended by the Brazilian Minister of Defense, Celso Amorim, the Commander of the Brazilian Air Force, Lieutenant-Brigadier General Juniti Saito, and delegations and representatives from more than 30 countries. This milestone rollout will allow the Company to perform important ground tests prior to the aircraft's first flight, planned to take place by the end of this year.

"This significant milestone of the KC-390 Program demonstrates Embraer´s ability to manage such a complex and high-technology project and to perform it on track," said Jackson Schneider, President and CEO, Embraer Defense & Security. "It paves the way for the beginning of the ground tests to prepare for the first flight."

"The KC-390 will be the backbone of the Brazilian Air Force´s air transportation network. It will be able to operate in both the Amazon and Antarctica. The jet engines give the aircraft enormous agility in fulfilling all of its missions, faster and better," stated Aeronautics Commander, Lieutenant-Brigadier General Juniti Saito.

Following the rollout, the aircraft will continue with initial systems evaluations leading to the first engine run, and then to the ground vibration tests and the other planned ground tests. This aircraft is the first of two prototypes that will be used in the development, ground, flight and certification test campaigns.

The KC-390 is a joint project of the Brazilian Air Force with Embraer to develop and produce a tactical military transport and aerial refueling airplane that is a significant advance in terms of technology and innovation for the Brazilian aeronautics industry. The aircraft is designed to establish new standards in its category, with a lower operating cost and the flexibility to perform a variety of missions: cargo and troop transport, troop and cargo air delivery, aerial refueling, search and rescue, and combating forest fires, among others.

On May 20th, 2014, Embraer and the Brazilian Air Force signed the series production contract for the delivery of 28 KC-390 aircraft and associated initial logistic support. Besides the order by the Brazilian Air Force, there are currently intentions to purchase for additional 32 aircraft from other countries.

The Brazilian KC-390 transport aircraft *Photo: Brazilian MOD*

New underwater capability to the US

Defence and security company Saab has won a contract to deliver a Water Borne Improvised Explosive Device Remotely Operated Vehicle (WBIEDROV) in cooperation with the U.S. Underwater Hazardous Device Team's (UHDT), Technical Support Working Group (TSWG).

The aim of this project is to deliver to the UHDT an increased capability that will tackle the growing threat from Improvised Explosive Devices in the US domestic maritime domain. The WBIEDROV will tackle the challenging underwater environment of the ship's hull and jetty search and be able to defeat the IED in situations while maintaining station in a current.

Test-fires two SM-6 interceptors

The US Navy's Ticonderoga-class guided-missile cruiser, USS Chancellorsville (CG 62), has successfully test-fired two Raytheon Standard Missile-6 (SM-6) interceptors against anti-ship and cruise-missile targets in the Pacific.

As part of the navy's combat ship qualification trials, the first SM-6 successfully hit the low-altitude, short-range supersonic target (GQM-163A), while the second captured a low-altitude, medium-range subsonic target (BQM-74E).

Raytheon Standard Missile-6 senior programme director Mike Campisi said: "Advanced warning and cueing from another sensor or ship allows the US Navy to take full advantage of SM-6's over-the-horizon capability.

"Now the warfighter does not have to wait until the threat is knocking at the door to take it out. Targets are destroyed much sooner and one ship can defend a much larger area."

Integrating its own individualised radar system designed to trace the movement of target, the SM-6 is aimed at delivering extended range protection against fixed and rotary-wing aircraft, unmanned aerial vehicles and cruise missiles.

The missile, which is capable of providing over-the-horizon air defence capability, comes with advanced signal processing and the guidance control capabilities of the advanced medium-range air-to-air missile (AMRAAM).

Furthermore, the missile, which forms part of a major component in the US Navy's naval-integrated fire control-counter air (NIFC-CA), uses both active and semi-active guidance modes and advanced fusing techniques to defend against a range of air threats.

The US Navy has taken delivery of approximately 130 SM-6 interceptors from Raytheon.

The USS Chancellorsville *Photo: US Navy / Michael Feddersen*

More AH-64E Apache to Taiwanese Army

The US has delivered an additional batch of AH-64E Apache attack helicopters to the Taiwanese Army.

Comprising six Apaches, the consignment represents the fifth and final batch of a contract awarded by Taiwan's Ministry of National Defence to the US in 2008.

Valued at TWD$59.31bn ($2bn), the deal covered the delivery of 30 AH-64E Apaches to help supplement the Taiwanese Army's ageing AH-1W Super Cobra attack helicopter fleet.

Nicknamed Guardian, the Boeing AH-64E is a heavily armed helicopter featuring powerful, fuel-efficient T700-GE-701D engines, enhanced rotor blade technology and electronics, as well as improved aircraft handling, performance and agility at higher altitudes.

The helicopters are currently used by the US military and have been ordered by the Indonesian and South Korean armies.

The Boeing AH-64E Apache is designed to replace the existing AH-64D Longbow helicopters. *Photo: Boeing*

Navantia and Norway Agree Extension of Maintaining Contract

Navantia and Norwegian Defence Logistic Organization, NDLO have agreed the extension of the 'Follow on Technical Support', which covers the maintenance and life support works of the F-310 class frigates.

The decision was announced during the celebration of the Third Executive Meeting of the programme. During this meeting, both companies analyzed the evolution of the works covered by the contract.

Several works can be seen in document, which was signed on 26th June 2013. These include support, engineering, technical assistance, repairs etc. of the equipment provided by Navantia (Integrated Platform Management Systems, engines, propulsion, etc.). It also contains information on other platform equipment and systems.

The contract highlights that NDLO believes Navantia is doing an excellent job in developing its maintenance and improvement of the Nansen Class frigates (F-310) in Norway.

KNM Fridtjof Nansen *Photo: FMS*

EC725 for Thailand *Photo: Anthony Pecchi/ Eurocopter*

Helicopters for Thailand

The airborne capabilities of Thailand's navy and air force will be significantly enhanced with the acquisition of two mission-ready Airbus Helicopters rotorcraft types: the light-utility EC645 T2 and the 11-ton-class EC725.

The Royal Thai Navy signed for five EC645 T2s to be deployed on transport duties and other missions, with deliveries scheduled to begin in 2016. Its purchase represents the first export order of this militarized version of the EC145 T2, which is the newest and most powerful model in Airbus Helicopters' proven EC145 light twin-engine helicopter family.

In the Royal Thai Air Force's reorder of Airbus Helicopters' EC725, the military service is obtaining two of the tactical transport rotorcraft for SAR/CSAR (search and rescue/combat search and rescue) missions, operating from Wing 2 at Lop Buri Air Base in Thailand's Lop Buri Province. These aircraft will be provided in 2017, joining the four previously-ordered EC725s booked in 2012 for deliveries from 2015.

Upgraded XA-180 armoured personnel carrier to the Finnish Defence Forces

Patria handed over the first modernised XA-180 armoured personnel carrier to the Finnish Defence Forces. It is a pre-series vehicle, based on which the actual series of 70 vehicles will be modernised during 2015-2017. The contract also includes an option, whose implementation would extend to 2021, for the modernisation of 210 vehicles.

This modernisation project will secure the vehicle's lifecycle and usability long into the future. The changes made in the vehicles include seats providing improved road safety, electric systems with instrumentation, and new external surfacing. The key components of every vehicle, such as the engine, power transmission and axles will also be inspected and renovated or changed, if necessary. This will also enhance the vehicles' performance.

The modernisation project is related to the Finnish Defence Forces' Capability Development Programme, which aims at improving mobility of the troops. The vehicles going through a lifecycle update will be used for equipping regional and operative forces in particular.

The oldest XA-180 vehicles date back to the early 1980s. Thanks to the modernisation project, this successful Patria product will have its overall lifecycle extended well beyond 50 years. Patria is the original manufacturer of the vehicle.

XA-180 in ambulance version *Photo: Patria*

Adaptive zoom riflescope prototype for US military

Sandia National Laboratories has developed a new riflescope that can rapidly switch between magnification at the touch of a button, without changing the grip on the weapon or losing sight picture.

Called rapid adaptive zoom for assault rifles (RAZAR), the riflescope prototype has been developed by a Sandia optical engineer and former US Army Special Forces member optical engineer Brett Bagwell, to address the US military requirements.

Bagwell said: "The impetus behind the idea of push-button zoom is you can acquire what you're interested in at low magnification and, without getting lost, zoom in for more clarity."

RAZAR can zoom in milliseconds and perform 10,000 actuations on two AA batteries, and is also capable of enabling target engagement at diverse ranges and offers several distinct advantages, including speed and high resolution at varying distances.

Manufactured since 2006, the RAZAR prototype uses a patented active optical zoom system, called adaptive zoom, which was invented by another Sandia optical engineer, David Wick.

Wick said the adaptive zoom changes the focal lengths of two or more lenses by varying the curvature of their surfaces to provide optical zoom without changing their overall positions relative to one another. This enables the user to view either a wide-angle image or zoom in on an area of interest with a compact, low-power system.

In addition to military riflescopes, RAZAR is also being considered for other applications, including medical imaging, binoculars for the entire range of users from military to birdwatchers, hunter scopes and mobile phone cameras.

A US Army Special Forces member demonstrates the rapid adaptive zoom prototype *Photo: Sandia National Laboratories*

UUV deployment and recovery

A pioneer in the field, DCNS achieved a world first in July 2014 when it tested a unmanned underwater vehicle (UUV) launch and recovery system using a platform specially designed to simulate the forces acting on a moving submarine.

The test campaign with an Ifremer-designed Aster X UUV was the culmination of an R&D project lasting close to two years. The UUV solution offers the key advantage of never compromising the submarine's discretion. It uses acoustic signals for long-range guidance then switches automatically to an optical system when the host comes within visual range. The UUV then docks with a docking structure on the submarine.

Pakistan signs bilateral defence co-operation agreement with Russia

Pakistan has signed a bilateral cooperation agreement with Russia to improve military relations.

The agreement was signed by Pakistan Defence Minister Khawaja Asif and his Russian counterpart Sergei Shoigu, during the latter's visit to Islamabad.

Asif was quoted by Agence France Presse as saying: "The signing of the military cooperation agreement between the two significant countries of the region is a milestone.

The agreement is expected to include information sharing and a strengthening of mutual trust, international security and counterterrorist and arms-control activities.

Russia has recently lifted its ban on weapon supplies to Pakistan and was reportedly considering the sale of defence equipment, including combat helicopters, to the country.

Earlier this month, Russian Ambassador to Pakistan Alexey Dedov was quoted by Radio Pakistan as saying that a deal for Mi-35 aircraft deal has been 'politically approved'.

In the last few years, Russia and Pakistan have maintained regular inter-parliamentary ties and technical, economic and scientific cooperation.

Russian Army to receive fourth Iskander-M brigade set Iskander missile

The Russian Ministry of Defence (MoD) is reportedly set to receive an additional brigade set of Iskander-M tactical missile systems from the Kolomna Machine Building Design Bureau (KBM).

This would be the fourth set supplied in the past two years under a contract between the Defence Ministry and the Kolomna Machine Building Design Bureau.

A brigade set of Iskander-M missile systems features 51 vehicles, including 12 launchers, 12 transporter-loaders, 11 command vehicles, 14 support vehicles, one maintenance vehicle and one data processing post, as well as precision-guided missiles, ammunition and training equipment.

The Iskander-M is an upgraded version of the Russian Army's 9K720 Iskander mobile-theatre ballistic missile system, which is designed to engage a range of ground targets, including command posts and communications nodes, troops in concentration areas, air and missile defence facilities, and fixed and rotary-wing aircraft at airfields.

Also known as SS-26 Stone, the missile has an operational range of 400km with a potential for extension, and features inertial and optical-guidance systems for improved firing accuracy and an electro-optical seeker for self-homing capabilities.

Iskander missiles on a transport erector launcher *Photo: Russian MoD*

China flight tests J-31 stealth fighter

China has conducted the first demonstration flight of its new indigenously manufactured fourth-generation fighter aircraft at the ongoing China International Aviation & Aerospace Exhibition (Airshow China) in Zhuhai.

The J-31 is the second aircraft to be domestically built by Shenyang Aircraft after J-20 and has design features and equipment similar to those of the US F-35 Lightning II joint strike fighter, as reported by The Washington Free Beacon.

Reports emerged that China allegedly stole secrets from the fifth-generation F-35 through cyber attacks against a subcontractor for Lockheed Martin.

The flight test coincides with the US President Obama's visit to the country for the Asia-Pacific Economic Cooperation (APEC) summit in Beijing.

International Assessment and Strategy Center Chinese military specialist Rick Fisher said: "Shenyang has also displayed a large model of an advanced development of the J-31, that it calls the FC-31.

Aviation Industry Corporation of China general manager Li Yuhai was quoted by Global Times as saying that the J-31 is comparable with the F-35 fighter and will change the current scenario by taking a lead role in the aircraft export market.

However, US Air Force lieutenant general (retired) Tom McInerney said: "Neither the J-20 or the J-31 will match the F-22 or F-35 in stealth performance but their successors will and we should be concerned as China is a looming economic and military power."

Having performed its maiden test flight in October 2012, the twin-engine J-31 fighter has since completed at least six aerial tests, according to the publication.

The new Chinese J-31 fighter bears resemblance to the US F-35 Lightning II aircraft. *Ill. Chinese MOD*

Nammo acquires ammunition facility in Sastamala

Nammo Lapua Oy, a Finnish subsidiary of the Nammo Group, has signed an agreement with the Finnish aerospace and defense group, Patria to acquire the ammunition facility in Sastamala.

The facility in Sastamala is specialized in production of components for artillery -and mortar ammunition.

By acquiring the Sastamala facility Nammo secures continued activity of the production line and employs a large part of the employees who were already given notice by Patria.

Finland has always been one of the most important home markets for the Nammo Group. The partnership agreement signed between Nammo and the Finnish Defense Forces in January 2014 should strengthen Nammos position and relationship with the Finnish Defense Forces. The acquisition of the Sastamala facility proves Nammos seriousness with regards to its position in Finland. Nammo increases the security of supply for the Finnish Defense Forces and further strengthens the partnership agreement.

"The facility in Sastamala fits well into Nammos large caliber ammunition activities and at the same time we secure that the competence remains in Finland. With this acquisition Nammo will play an important role in Finland with regard to national security", says Erkki Mäkelä, Site Manager, Nammo Lapua Oy.

Design and integration order of healthcare capability for Norwegian support vessel

Saab has received an order from DSME, Daewoo Shipbuilding & Marine Engineering Co., Ltd. to design and integrate healthcare capability aboard a Norwegian support vessel.

The Norwegian Navy has ordered a support vessel from the South Korean shipyard DSME, Daewoo Shipbuilding & Marine Engineering Co., Ltd. The support vessel will provide fuel, supplies and medical care for the Norwegian Navy. Saab has received the order from DSME to design and integrate healthcare capability aboard the vessel.

The Norwegian vessel is an LSV, Logistic Support Vessel, and is the size of a tanker, approximately 180 metres long and 26 metres wide. The support vessel will assist the Norwegian Navy's fleet globally with supplies in the form of food, additional fuel, helicopters for e.g. MEDEVAC (Medical Evacuation) plus on-board healthcare capability, for life-saving surgery.

The healthcare department, which will be designed, integrated and verified aboard the vessel in 2016 by Saab's business area Support and Services will include an operating and trauma theatre, triage area, high and low dependency ward areas including isolation ward, as well as a CT-scanner room.

SMX-Océan, a new submarine with expanded capabilities

DCNS is unveiling the SMX-Océan conventionally powered attack submarine. The new vessel draws extensively on the design of a state-of-the-art nuclear-powered submarine, with a number of key innovations that give this diesel-electric adaptation truly outstanding performance.

This innovative concept ship promises submerged endurance and deployment capabilities that are unprecedented for a conventional-propulsion submarine. With up to three months' endurance, an SMX-Océan could cross the Atlantic six times without surfacing. Its transit speed is up to 14 knots.

To achieve this level of performance, DCNS teams have developed and combined a number of innovations including a high-performance air-independent propulsion (AIP) system using second-generation fuel cells for submerged endurance of up to three weeks.

The SMX-Océan features the same combat system, provisions for special forces' missions, masts and general layout as the Barracuda SSN.

With a total of 34 weapons including torpedoes, mines, anti-ship missiles, cruise missiles and anti-air missiles, the SMX-Océan's firepower will be unprecedented for an SSK.

The SMX-Océan concept ship design also includes vertical launchers, another major innovation in SSK design, to provide a salvo capability for cruise missile strikes on land targets.

SMX-Océan *Ill. DCNS*

LM Teams with Roketsan of Turkey on New Standoff Missile for the F-35

Roketsan and Lockheed Martin signed a teaming agreement today for collaboration on the SOM-J, a new generation air-to-surface Standoff Cruise Missile for the F-35 Lightning II.

The SOM system is an autonomous, long-range, low-observable, all-weather, precision air-to-surface cruise missile. The SOM-J variant is tailored for internal carriage on the F-35 aircraft. The companies will jointly develop, produce, market the missile.

New underwater capability to the US

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The aim of this project is to deliver to the UHDT an increased capability that will tackle the growing threat from Improvised Explosive Devices in the US domestic maritime domain. The WBIEDROV will tackle the challenging underwater environment of the ship's hull and jetty search and be able to defeat the IED in situations while maintaining station in a current.

Saab has extensive experience in the design and manufacture of underwater vehicles for both the military and commercial markets.

GD to upgrade Super Seasprite helicopters for Peruvian Navy

General Dynamics (GD) Canada has received a contract to modernise four SH-2G Super Seasprite helicopters for the Peruvian Navy, in a bid to bolster its surveillance and search and rescue capabilities.

All four helicopters will be equipped with GD's integrated mission system, which is aimed at improving the operational potential of the Peruvian Navy.

Missile warning capability for F-16

Exelis has partnered with Airbus Group to offer missile warning capabilities for the US and other F-16 Fighting Falcon aircraft operators worldwide.

Under the terms of teaming agreement, the companies will supply capabilities, including lightweight protection against short-range air defence missiles and man-portable air defence systems (MANPADS).

In particular, Exelis will serve as the lead US contractor for the AAR-60(V)2 missile launch detection system for fighters (MILDS F).

Manufactured by Airbus Defense and Space, MILDS F is a passive, true-imaging sensor device optimised to detect incoming missile threats, precisely indicate the direction of arrival and automatically release countermeasures with maximum warning time.

Equipped with six sensors, the lightweight system is claimed to be the only missile warning system that is cleared to fly aboard the F-16 fighter through the US Air Force's Seek Eagle aircraft stores certification process.

Optimised for installation on Terma's pylon integrated dispenser system plus (PIDS+), the system's commercial-off-the-shelf status presents an attractive and low-risk option for US F-16 operators, including the Air National Guard and Air Force Reserve.

Test fires large hybrid rocket motor

Nammo marks a new era in the evolution of hybrid rocket motors with the successful test firing of their large hybrid rocket motor and the inauguration of a new purpose-built test facility.

On Tuesday October 7th, Nammo passed a historical milestone by successfully firing the first of a series of large hybrid rocket motors it has been developing. This test also inaugurated Nammo's brand new test facility for Green Propulsion at its test center for rocket motors in Raufoss, Norway. This purpose-built test facility will accelerate Nammo's development of environmentally friendly rockets for atmospheric research and space applications. The facility is unique in Europe, both in terms of its size and its capabilities.

The design of the motor tested represents the latest in the evolution of hybrid rocket motor technology, and strengthens Nammo's leading position. Nammo's hybrid technology is based on a rocket propellant combination of hydrogen peroxide as the oxidizer and synthetic rubber as the fuel.

Hybrid rockets are a safe, controllable, low-cost and green alternative for rocket propulsion.

The test firing of the rocket was an unprecedented success. The firing lasted for a predefined 10 seconds, producing a maximum thrust of 30 kN (or 3 tons). The engine started instantly after ignition and the firing was terminated in a controlled manner by closing the main oxidizer valve. Normally a full burn would have lasted 25 seconds, but on this occasion the test was terminated after 10 seconds for a full inspection. Full integrity of the motor was conserved, meaning that the engine could have been started again to burn for the remaining 15 seconds, if so desired.

Nammo's work with hybrid technology has been supported by the European Space Agency (ESA) since 2010, notably under its Future Launchers Preparatory Programme (FLPP). Nammo's work fits perfectly with ESA's objective to foster new promising technologies for future European Launchers and to include green propulsion solutions in their existing systems.

The hybrid rocket motor tested on October 7th is not only interesting from a new technology development perspective; it is also the first building block for the North Star Rocket Family. This family of affordable sounding rockets and small launchers, is developed to launch small satellites into orbit from Andøya Space Center in Northern Norway. The same motor will also be used to power the Bloodhound supersonic car to achieve a new land speed record of 1000 mph in 2016.

WINDOW FILM FOR MORE THAN JUST PROTECTION

Window film can have many more functions than just protection against explosions. This is the point of 3M, who has just presented a new version of their safety and security film.

By Andreas Krog

One kilo of C4 plastic explosives went off on a Tuesday afternoon in September at the Danish Army's exercise area at Jægerspris. The blast was felt nearly 200 meters away. Two windows measuring 1x2 meters each were placed only three meters away from the explosion. The glass in one of the windows shattered totally and dispersed widely over the area. The other window also shattered. However, the glass stayed in the frame and not even glass splinters flew around.

The explanation for the difference? An almost invisible layer of film on the outside of the window.

When a window is shattered, the glass can seriously harm people standing nearby or passing by the broken window and the glass. It does not matter if the shattered window is caused by a bomb explosion or by civil unrest in the streets.

That is why the American technology company 3M has come up with the window film. It keeps the shattered glass in place and greatly minimizes the damages from crashing windows. The film was patented by 3M in 1966 and has been continuously improved over the years. 3M presented a new version of the window film at a seminar for partners in September. Representatives from Nordic law enforcement agencies, public institutions, banks, security companies and glaziers were among the 120 participants at the seminar.

Pretty obvious

The demonstration took place in Denmark at the Danish Army's military exercise area Jægerspris, northwest of Copenhagen on Sjaelland. This specific location was chosen carefully because what would normally be a set of Powerpoint presentations were followed by a real test explosion at the exercise area's blasting ground.

This way the participants could see the effect of the new 3M™ Safety and Security Ultra 800 Window Film with their own eyes.

It was pretty obvious for the bystander what a difference the window film made. But it can sometimes be hard for the security manager at an agency, an institution or a company to convince the management of investing money in security measures like the installation of window film.

Before and after the blast
One kilo of C4 plastic explosives were placed in the carton box only tree meters from the windows.

Both windows and the car glass were shattered, but with the 3M film, the glass stayed preventing glass splinters from hitting personnel behind the window. *Photo: 3M*

"Investments in energy efficiency saves money. Security is a cost that doesn't necessarily give a return. That is the most common conception," says David Cox, European Market Manager and responsible for the window film business at 3M.

"But if you combine the protection and safety issue with other things, you make it easier to implement and get funding approved," David Cox points out.

Glare reduction

He lists what he calls the seven wonders of window film.

- Appearance: It can make old buildings look smart and modern.
- Insulation: Keeps heat inside the building
- Fading control: Slowing down the fading process caused by the sunlight and provide better furniture protection
- Glare reduction: Reduces the glare from the sun while keeping the contact to the outside world through the windows
- Heat gain reduction: Reducing the heat in the rooms from the sun.
- Privacy: Provides one-way vision if the lighting is right
- Safety and security: Finally the ability to hold the shattered glass together.

"You get all of those functionalities with just one window film," says David Cox.

A company doesn't necessarily need to be a potential target for a bomb explosion to gain from having film on the windows. It might also be useful in the event of civil unrest, earthquakes and extreme weather or in the case of an accident happening or a burglary taking place.

A robust shield

The window film can be combined with 3M' Impact Protection Profile mounted along the window frame. It improves the overall performance of the 3M™ Safety and Security Window Films. The system attaches the filmed window to the window frame, creating a robust shield that significantly outperforms window film-only systems. It provides extra assurance against impact energy from severe weather, earthquakes and forced entry events—with enough strength to handle even bomb blasts.

3M is most widely known as the producers of the post-it notes. But the American technology company is also into things like ear protection, dust masks and glue.

SIMULATING THE DAMAGES

- 3M has developed what they call blast mitigation simulator software. With this they can calculate the effect on a window of different types of explosives and other things. How far from the explosion is the window located and at what height? What is the bomb made of and how large is it? How thick is the glass? All of this information goes into the blast simulator.
- The result is a detailed analysis of the potential damages with or without window film. The result can be analysed using the GSA standard. The standard's full name is "US General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings". It defines six protection levels and hazard levels and provides a description of the window's response (see chart below).
- "This way we can take any kind of charge and see the effect depending on the actual setup," says Christoph Zimmer, Senior Application Engineer at 3M.
- The simulator takes information from sources like Google Maps and uses in the analysis. This makes it easy and precise to analyse the effects of a bomb explosion in a certain place.

STUDY: BOEING-COLLABORATION COULD CREATE 10,000 JOBS

10,000 new jobs and significant growth in GDP. That is the potential in collaboration between Boeing and Danish defence industry, according to a new study.

By Andreas Krog

(COPENHAGEN) A new study shows that collaboration between the Danish defence industry and Boeing in areas of corresponding strengths could result in the creation of more than 10,000 jobs in Denmark and the addition of 6 billion DKK to Denmark's GDP over 20 years. It's made by the leading Danish economy consultancy Damvad for Boeing and quantitatively analyses the capabilities of Danish industry. The study also analyses Boeing's capabilities in comparison, and how Boeing and Danish industry's complementary strengths can be maximized for benefit to Denmark.

Additionally, Damvad analysed the potential of Boeing collaboration in Danish industrial strengths outside of the defence industry. Due to Boeing's emphasis on research, development and technology transfer, such collaboration could according to Damvad lead to long-term productivity gains ultimately resulting in a 400 million DKK permanent increase to the Danish economy each year.

New insights

Boeing commissioned Damvad to conduct the study in order to determine the theoretical potential to collaborate across Danish industry in preparation for building its industrial plan related to the F/A-18 Super Hornet offering to Denmark.

Damvad has used almost a year working on the study.

"This is the most in-depth research of industrial engagement in Danish industry conducted to date because of our approach, which involved identifying strongholds across all Danish sectors through research on patents, publications, export specialization and other factors," said Kristian Mørk Puggaard, CEO, Damvad.

The consultancy also looked in the other direction towards Boeing and Boeings strongholds.

"Through the same rigorous process, we identified matching Boeing strongholds and modelled the economic benefits in scenarios where the corresponding strongholds were maximized. The data-driven results give new insights in terms of future growth of our economy related to industrial engagement from a foreign company like Boeing."

BOEING STRENGTHENS DANISH TIES

Boeing signs MOU's with six Danish defence companies as part of the Super Hornet-offer to Denmark.

By Andreas Krog

(COPENHAGEN) Boeing and six Danish defence companies in October signed agreements to jointly pursue a range of business opportunities in defence and aerospace-related manufacturing, maintenance, software and simulation integration, and other areas.

The agreements with Danish Aerotech, Falck Schmidt Defence Systems, IFAD, Multicut, Systematic and Terma are key elements of Boeing's industrial plan related to its F/A-18 Super Hornet offering to Denmark. The agreements also offer these companies the prospect to expand their businesses and access broader markets through Boeing's diverse portfolio of products, services and technology.

"We want partners who see our member companies' potential to grow, not our potential to receive hand-outs. Boeing is offering knowledge, technology and supply chain opportunities that can help each of our companies, and the Danish defence industry as a whole, win work now and compete for much broader business in the future," said Jan Falck-Schmidt, chairman of the Danish Defence and Security Industries Association (FAD).

"The areas of cooperation identified in these agreements draw upon the specialized capabilities of Danish industry to build long-term, sustainable partnerships in both Boeing's commercial and defence businesses," said Debbie Rub, vice president and general manager of Boeing Defence, Space & Security's Global Strike division.

Debbie Rub, Vice President and General Manager of Global Strike, Boeing Defense, Space and Security. *Photo: Nils Lund Pedersen*

F-18 Super Hornet landing in Australia
The Australian Air Force is so far the only export customer for the Super Hornet, but by offering a comprehensive industrial package, Boeing hopes the Super Hornet will also be the winner of the Danish fighter competition.
Photo: Bidgee

In the pipeline

Damvad didn't just look at the potential for collaboration in relation to Boeings existing product portfolio. They also took a closer look at Boeing's patents to try to get an idea about what Boeing might have in the pipeline, and within what kinds of areas the company might do research and development work in the future.

The study has been made as part of Boeings Super Hornet-offering to Denmark.

"Competing for a country's business is about more than selling aircraft; it's about creating long-term partnerships across government, industry and the community. Damvad's study demonstrates the collaboration between Boeing and Danish industry to produce widespread mutual economic benefit and technological growth for decades to come," said Debbie Rub, vice president and general manager of Global Strike for Boeing Defence, Space & Security.

"We wanted a deeper understanding of the capabilities of Danish industry, and we wanted to consider all the ways that Boeing could align with that industry instead of limiting ourselves. We needed to go beyond traditional industrial surveys to do that. Damvad's data help inform a long-term and sustainable plan for doing business with Danish industry," said Gwen Kopsie, vice president of International Strategic Partnerships for Boeing Defence, Space & Security.

COMPANIES AND AREAS OF COLLABORATION:

- **DANISH AEROTECH:** Boeing and Danish Aerotech are exploring opportunities for Danish Aerotech to apply its maintenance, repair and overhaul (MRO) capabilities for a Danish Super Hornet fleet, as well as training its employees on Boeing-specific support and service applications. Additionally, the companies will continue to pursue work opportunities for Danish Aerotech on other Boeing platforms, such as the NATO Airborne Warning and Control System aircraft that Danish Aerotech already supports.

- **FALCK SCHMIDT DEFENCE SYSTEMS:** Boeing and FSDS are exploring opportunities to apply Falck Schmidt's expertise in composites to Boeing Space products, in addition to providing technology assistance related to power units and batteries to further certain areas of Falck Schmidt's business. The two companies are also identifying ways to support ongoing efforts to establish an unmanned systems training centre at the Odense airport.

- **IFAD:** Boeing and IFAD are exploring opportunities to network IFAD's simulation systems with Boeing's aviation training solutions, including IFAD's SIM Gateway and Forward Air Controller / Forward Observer Training elements.

- **MULTICUT:** Boeing and Multicut are exploring parts manufacturing opportunities for both defence and commercial applications. They include a variety of hard-metal machine parts that leverage Multicut's expertise. The opportunities are made possible in part by Boeing's assistance starting in 2010 that enabled Multicut to obtain a critical AS9100 aerospace manufacturing certification.

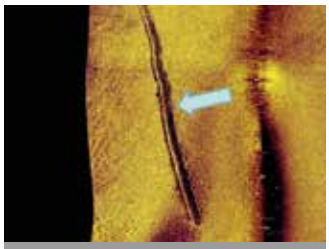
- **SYSTEMATIC:** Boeing and Systematic are exploring Systematic's leading software solutions and their application to aerospace and defence platforms and specialties. They include opportunities in the Networked Tactical-Intelligence, Surveillance & Reconnaissance field and unmanned systems opportunities for which Systematic's SitaWare product could be applicable.

- **TERMA:** Boeing and Terma are exploring applications of Terma's expertise in technology and manufacturing related to composites, components and electronic systems across a range of Boeing's commercial and defence platforms. Opportunities include commercial aerospace manufacturing work; application of Terma's pylons, pods and applied aerostructures to various platforms; and additional market opportunities for the company's Electronic Warfare Management System on future international sales of Boeing's CH-47 Chinook helicopter

CONFIRMED SUBMARINE IN THE STOCKHOLM ARCHIPELAGO

A picture taken by a member of the public shows an object moving at a speed of approximately 1 knot. The picture also shows the kind of spray that arises when water is pushed out of scuttles at the top of a submarine. The picture is one of several indications on foreign underwater activity in the Stockholm archipelago
Photo: Swedish Navy

The Swedish Armed Forces now confirms that a submarine has violated Swedish territorial integrity. Results from the analysis following the intelligence operation conducted in October are unambiguous.



A "sonar photo" of recently made traces on the bottom of sea
Photo: Swedish Navy

A sketch of the traces profile
Ill. Swedish Navy

-There is no doubt, we have excluded all other explanations. Swedish territory has been seriously and unacceptably violated by a foreign power, says Supreme Commander Sverker Göranson.

- The decisive observation is made by the Swedish Armed Forces' sensors. It is a result of a highly skilled operational conduct. The observation meets the requirements for the highest level of assessment grading, confirmed submarine, says Supreme Commander Sverker Göranson.

The Swedish Armed Forces will not account for details on this observation since it could disclose information on Swedish abilities and capacities. The analysis cannot determine the nationality of the intruder.

In addition to the decisive observation, a number of other observations have been analyzed and reach the second highest level of assessment grading.

A second observation was made by a naval corvette. Following strong indications on its sensors, a closer examination of the area was conducted and recently made traces were found on the bottom. Another observation was made by a resident in the archipelago, observing an underwater body with distinctive features. Sensors from the Swedish Armed Forces also confirmed echoes in the area. Similar observations were made by multiple credible sources.

- Each of these observations has a high credibility. Together with other observations, and a confirmed submarine, they generate a pattern. Thus, the intelligence operation confirms that a foreign power has violated Swedish territorial integrity. The gravity of this is obvious, says Supreme Commander Sverker Göranson.

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