

NATION SHIELD

**UAE takes giant leap
into space**

**Sheikh Mohamed
bin Zayed visits
military recruits**

**E-2D - The Eyes
and Ears of
Security and
Prosperity**

Issue File



**The UAE's Overall Strategy to
Counter Terrorism**

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National Service... and a Leader's Happiness

National Service has come to reflect in the clearest images the values of loyalty, belonging and positive national upbringing, and give the sons of Zayed the opportunity to bear responsibility and contribute positively to the glory of the nation. The national service helps to establish the concept of the service of the flag and self-sacrifice for its sake, which is an important step in building and deepening the spirit of citizenship. It also emphasizes the role of individuals as a key partner in the defense, service and making of the homeland.

The visit of His Highness General Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the Armed Forces, to the Centre for training of national service and reserve recruits in Manama in the Emirate of Ajman, has shown His keenness to meet the young men and women who joined the national service and reserve, and check their training programs, and look closely at the level of the preparation and field skills they have acquired at the beginning of this outstanding experience which has turned into an epic of valor and sacrifice. The national service has revealed an honest desire on the part of the citizens to express their devotion and love for their country and compete to win this honor, even those for whom the national service is optional.

This visit has also come to confirm that the UAE is heading steadily and resolutely towards more achievements, to build a promising and bright future with the help of Almighty God, thanks to the arms and limitless ambition of its sons to reach the highest echelons in various fields. It also confirms their willingness to protect the gains of the state and defend its security and capabilities with all their strength and determination.

His Highness has emphasized that "the youths of the nation have set the finest examples of dedication and devotion to serve their country and achieve its progress and prosperity, under a wise leadership that believes in the centrality of human resources in a comprehensive and sustainable development process." This has been confirmed by citizens on every occasion and in every possible way. They have been keen to demonstrate their feelings toward their homeland in concrete actions on the ground, not just spoken words.

His Highness said: "Today we take this opportunity to pay you tribute for your high national spirit and active response that were the pride of the nation, admired by the leadership of the country." The sons of the nation have proved that they are always worthy of this confidence.

He also said: "Today I am very happy to be with the sons of my country, the sons of Zayed, the sons of Khalifa, may God protect them. We are pleased with their discipline, high spirit and courage."

His Highness has been keen, as usual, to talk with those who were training in the shooting range. He commended them for their national service and high skills in the use of the various kinds of weapons, their outstanding competence in training and discipline, and their eagerness to gain combat experience reflecting their spirit of responsibility toward their homeland.

Sheikh Mohammed bin Zayed's visit to the young recruits who joined national service highlights the deep links and ties between the leadership and the people. Likewise, this visit has entrenched our conviction that we are all at a country whose leaders maintain a long and alert watch in the service of the nation and people.

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Triumphs again



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UAE takes giant leap
into space

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His Highness General Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, praised the efforts and commitment of National Service trainees during a visit to Al Manama camp.

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Sheikh Mohamed bin Zayed visits military

His Highness says there is no bigger honor than to serve one's country.



His Highness General Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, praised the efforts and commitment of National Service trainees during a visit to Al Manama camp.

Brigadier Faisal Mohamed Al Shehhi provided His Highness with a full brief on the National Service programme and the progress of the recruits, who are part of the first batch of Emirati candidates who joined the National Service two months ago. As part of the tour, His Highness attended military field exercises as well as physical training activities in the fitness center.

recruits at Al Manama camp

His Highness emphasized to the young recruits that there is no bigger honor than to serve one's country, and that they are a source of pride for the country and the leadership.

Sheikh Mohamed also stated that their commitment to the nation demonstrated their selflessness, discipline and sense of responsibility.

In June 2014, President His Highness Sheikh Khalifa bin Zayed Al Nahyan, issued Federal Law No. 6 for the Year 2014, on the national military service and reserve force.

The law is in accordance with the principles of the UAE Constitution, as referred to in Article No. 43, which states that defending the Union is a sacred duty of every citizen and national service is an honour for citizens as per the law.

On 31 August, the National and Reserve Authority welcomed the first batch of young Emiratis who began their national service, which is compulsory for all male citizens aged between 18 to 30 and optional

for women. Emiratis who have not completed secondary school serve for two years, while those with a secondary school certificate serve for nine months.

Al Manama camp is one of five locations used for National Service training.

UAE National Service

A law introducing mandatory military service for all Emiratis aged between 18 and 30 and setting up a new national defense and reserve force has been endorsed by President His Highness Shaikh Khalifa Bin Zayed Al Nahyan.

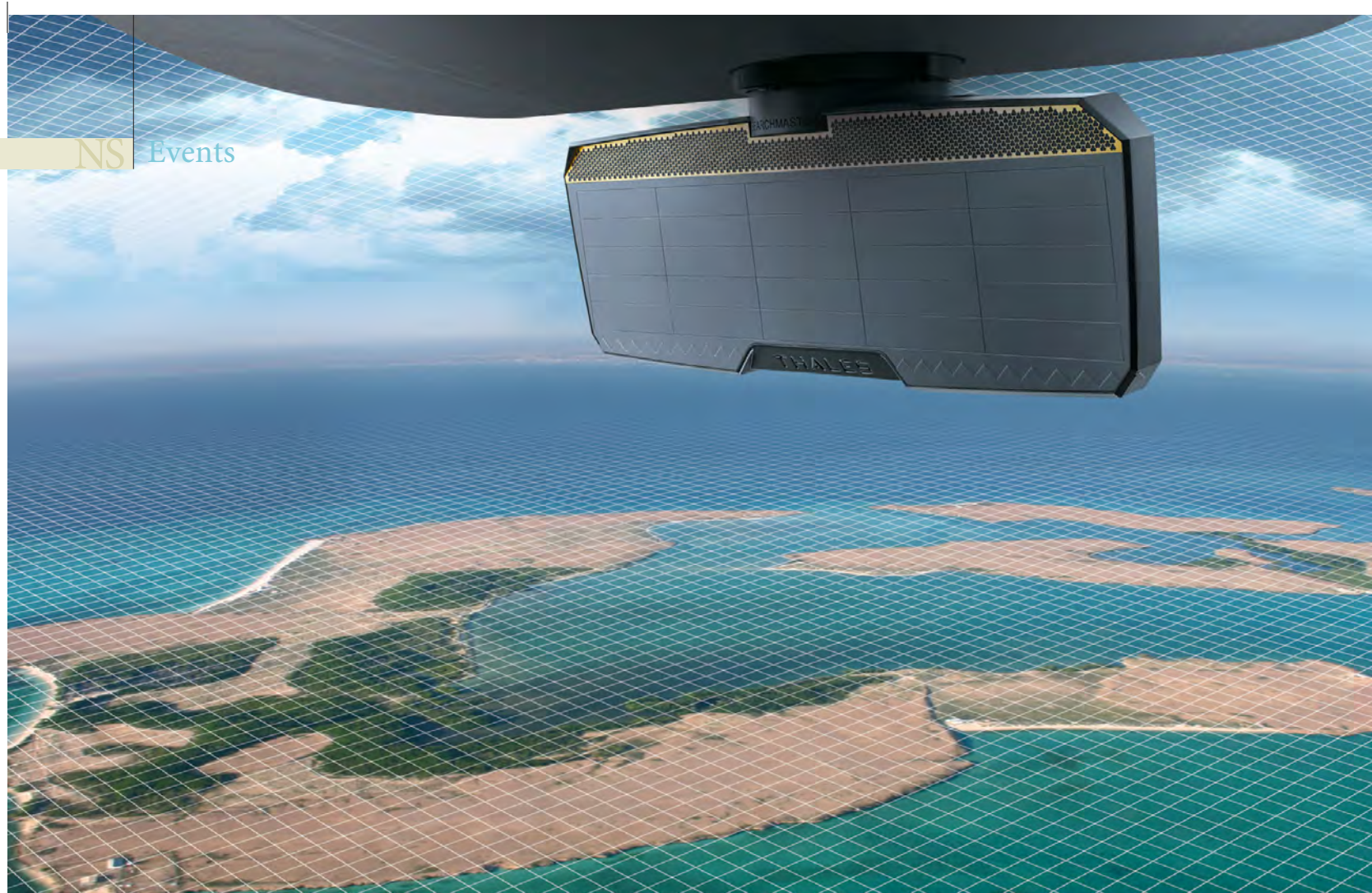
Emirati men who have finished secondary school or aged between 18-30 will have to serve nine months, while those who have not will serve two years. The law as proposed by the government set 90 per cent marks as a condition for delaying the duty until a student gets a higher degree. The service will be optional for women.

Working Emiratis will not be exempt and, while serving in the

“Citizens who complete the mandatory military service will enjoy a range of benefits, including priority for taking up jobs in government institutions and private businesses, marriage grants, housing plots and scholarships.”

military, time will be added to their end-of-service and pension benefits. Federal and local departments as well as private sector businesses will be obliged to allow their Emirati workers to enlist for military service. They also have to keep their jobs or similar jobs open for them once they complete the service.





EURONAVAL TRIUMPHS AGAIN

Euronaval has reaffirmed its position as world leader of exhibitions for naval defence, marine safety and security.

As the 24th edition of Euronaval closed its doors at Paris-Le-Bourget, feedback was overwhelmingly positive from the 30,000-plus people involved in the event - exhibitors, official delegations, leading international and European organisations and visitors.

Inaugurated by the Minister for Defence Jean-Yves Le Drian, this year the French biennial event covered a surface area of over 15,000 square metres.

"The marine sector is becoming increasingly important on the international stage, says Patrick Boissier, president of Euronaval. Taking into account the potential of the sea at a global level does

however carry in its wake as many promises for growth as potential conflicts.

"The sea of the 21st century promises to be turbulent. Piracy, pillaging, illicit trafficking, terrorism and territorial conflicts all jeopardize this future and compromise the success of 'blue growth'. Euronaval is an essential tool for providing responses to these threats".

Abu Dhabi participation

Abu Dhabi Ship Building (ADSB) took part in Euronaval. ADSB specializes in the construction of highly complex naval ships including the integration of weapon combat systems. These vessels are primarily designed for littoral warfare defence operations against air and surface threats as well as patrol tasks, coast guard, law enforcement, electronic search missions, and fishery protection.

Dr Khalid Al Mazroui, CEO of Abu Dhabi Ship Building, says: "The Euronaval Exhibition is an ideal platform for our company to discuss our various industrial strategies and business development with leading international industry experts, highlight the capabilities of ADSB, and creating new opportunities for future partnerships."

ADSB's range includes Corvette class vessels, missile strike craft and fast patrol boats, landing craft and logistic support ships as well as a variety of high speed troop carriers, interceptors and assault boats. Construction materials used in the building of these vessels include steel, marine grade aluminium alloy and composites.

As a showcase of international industrial excellence with sales figures of 40 billion Euros each year for military ves-



Amur-1650 from Rosoboronexport, a subsidiary of the Rostec State Corporation, Russia



Saab recently launched two new radars for increased situational awareness

sel construction and equipment alone, Euronaval is testimony to the rise in the importance of the maritime state in new international geo-strategic power balances in the 21st century.

Over the next 20 years the international market devoted to naval defence construction alone is close to 900 billion Euros. This is especially driven by new entrants and buyers but also by an increasing number of manufacturers, all present at Euronaval 2014. Close to 500 new construction programmes, with a total of more than 3,800 new surface vessels and submarines are currently under development.

These figures indicated that the naval defence sector is constantly developing and that the industrialists and exhibitors which were present at Euronaval at the heart of a particularly dynamic inter-

Abu Dhabi Ship Building specializes in the construction of highly complex naval ships

national market. For this 2014 edition, Euronaval welcomed two new national pavilions - Australia and India - as well as new exhibitors from Belgium, Korea, United Arab Emirates and Turkey.

This year, 90 high-level delegations from 78 countries covering the five continents responded positively to France's invitation.

High-performance skills

The 300 high-level political and military authorities who map out the structure of the future's international navies were able to meet the 350 exhibitors from 28 countries, who presented the most sophisticated, high-performance skills on the market.

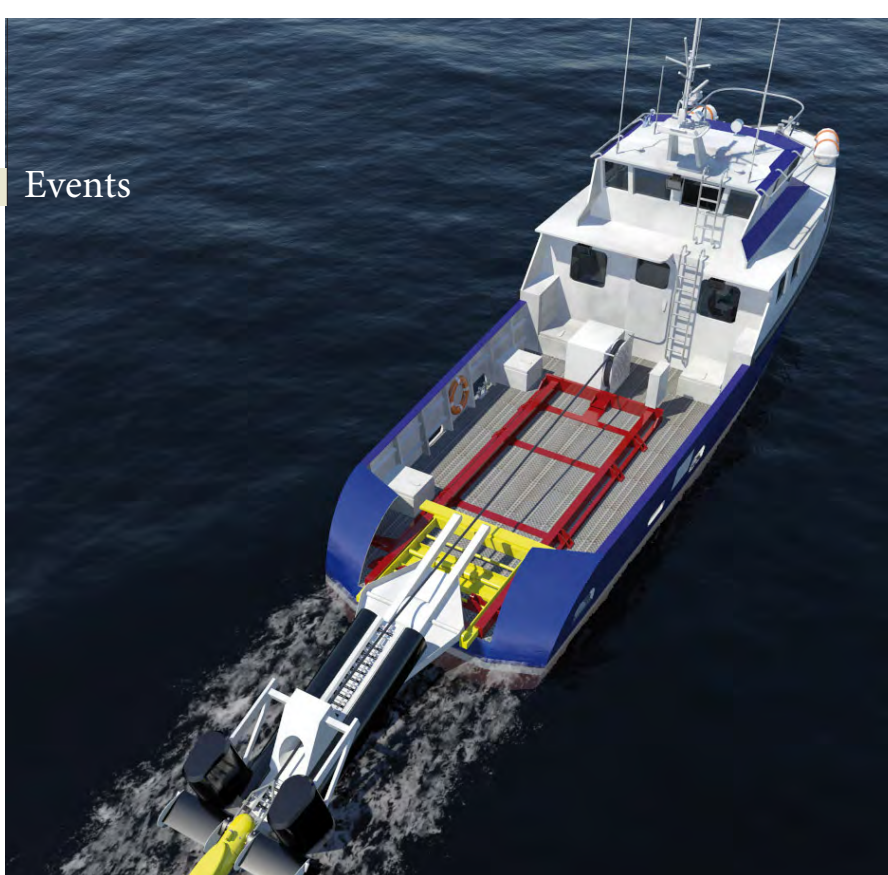
"Despite the fact that the European internal market is contracting, the global market of naval acquisitions is developing as a whole, driven by a certain number of countries who wish to increase the capacity of their fleet, either to address threats, or to protect the resources in their exclusive maritime economic zones," says Boissier.

"We are witnessing an increase in the demand for all types of vessels related to surveillance, and not just for coastal areas but increasingly for high seas, with corvettes, frigates and a large increase in the submarine sector."

This year, the Euronaval trophies were awarded iXBlue and Subsea Tech trop in the innovation category and Automatic Sea Vision for its export performance in the French SME category.

"Euronaval 2014 has shown that industrialists in the sector have broken new ground in terms of technology," says Jean-Marie Carnet, Euronaval's director.

"This proliferation of high-tech innovations, frequently presented for the first



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Vigy Observer - Photo Daniel Linares - Sagem

time at Euronaval is backed by private or state funding, to accompany an increasing international demand for high-performance, reliable and upgradable equipment for products with a lifespan of between 30 and 40 years”.

Some exhibitors signed major contracts, others, thanks to the particularly high quality of visits to their stands, look set to do so.

With approximately 45 per cent of all the exhibitors at the 2014 event, France reminds us that it is one of the main players in the sector. France holds between 5-7 per cent of the world market. In this highly competitive and geographically dynamic context, the French naval industry makes an excellent case, especially in

the field of technology, as proved by recent export successes. Over the last five years the French naval sector has represented more than 30 per cent of French military equipment exports.

New solutions

The biennial event is organised by the GICAN (French Marine Industry Group), representing and promoting the French naval industry. The GICAN spans more than 150 companies and represents 30,000 direct jobs in France for a turnover of six billion Euros.

SAAB: At the event Saab presented new solutions in the command and control area, including training concepts plus new features in tactical communication

Over the last five years the French naval sector has represented more than 30 per cent of French military equipment exports

systems.

Saab recently launched two new radars to complement the Sea Giraffe radar family and deliver increased situational awareness with the capability to detect and react to increasingly sophisticated threats.

DCNS: DCNS unveiled 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. All these new developments illustrate the unique expertise and innovative potential of DCNS teams.

Thales: Thales revealed Pastor, a unique service solution to protect vessels against piracy. Primarily designed for shipping companies, this high-level services solution is based on a combination of early warning, prevention and deterrence systems.

The Pastor solution alerts shipping companies to piracy threats ahead of time, helping them avoid the additional costs of route changes, late deliveries, thefts of cargo, large onboard vessel protection teams and higher insurance premiums.

It is designed around a set of proven products and systems to protect vessels, cargoes and crews quickly and effectively

during the day and at night. It is available as turnkey solution and is fully modular and scalable to meet evolving needs.

Pastor comprises detection (radar) and identification (gyrostabilised optronic system) functions to provide the vessel's security officer or onboard protection team with early warning of any potential piracy threat.

SAGEM: South Korea selected Sagem to supply non-hull penetrating optronic masts to equip the Republic of Korea Navy's new KSS-III diesel-electric submarines.

The contract award, signed by KSS-III prime contractor Daewoo Shipbuilding & Marine Engineering, marks a key export success for Sagem's latest Series 30 Search Mast System family.

Lockheed Martin: Lockheed Martin's fast, survivable and affordable international surface combatant designs – the multi-mission combat ship and surface combat ship – can meet the needs and counter the threats, quickly and affordably. Similar in design to the US Navy's modern Littoral combat ship, the vessel is a new, multi-mission ship designed with anti-submarine, anti-air and anti-surface warfare capabilities. It is a smart ship – providing the power of larger platforms with a smaller crew – that can be tailored to meet any naval requirement, including area air warfare, land and surface attack, anti-piracy, electronic warfare and special operations missions.

FN Herstal: Belgian firearms group FN Herstal has secured a launch customer for its new Sea deFNder small calibre stabilised remote weapon station (RWS), the company has confirmed.

The latest in FN Herstal's family of deFNder RWS, Sea deFNder has been conceived to meet both constabulary and force protection requirements on all types of naval and coastguard vessels. The system's universal cradle is designed to accommodate a range of machine guns,



Vipère multifunction buoy- major DCNS innovations improve submarine capabilities

from the 5.56 mm Minimi up to the M2HB-QCB or M3R 0.50 calibre heavy machine guns. The mounting can also be equipped with a 40 mm automatic grenade launcher.

MBDA : MBDA announced at Euro-naval the launch of a new 'club', as part of efforts to improve the commercial strength of European small and medium-sized enterprises in the maritime security export market.

With potential members ranging from equipment suppliers to naval shipbuilders, 'Club Corsaire' envisages a framework in which members meet to exchange commercial and marketing information in order to better organise and co-ordinate export activities.

According to MBDA, one of the aims is to provide smaller players that wouldn't normally be able to break into the market with the opportunity to promote their activities alongside larger naval shipyards and major prime contractors, to develop synergies for export.

Fincantieri: Fincantieri PPA (Pattugliatore Polivalente D'Altura), Offshore Polyvalent Patrol, was revealed. The vessel can perform a wide range of offshore patrolling missions thanks to its innovative modular sections conception. PPA have been chosen by Italian Navy for the replacement program of Italian Cor-

vettes, patrol vessels and Durand de la Penne destroyers.

Raytheon: Raytheon showcased for the first time the naval version of its combat proven Excalibur precision-guided projectile, the Excalibur N5. Retaining all the capabilities of the land version, the N5 has been adapted to be fired from a five-inch (127mm) naval gun with a range of 50 kilometers and an average miss distance of two meters.

Raytheon representatives at Euronaval 2014 said that the Excalibur N5 is gun agnostic - it may be fired from BAE System's five-inch or Oto Melara 127mm guns alike.

Excalibur N5 is effective against land as well as at sea targets. In a typical ASUW scenario, a surface combatant could use remote sensors such as a UAV to located an enemy ship, and hit it accurately up to 50 Km away.

Lebanon is the first export customer for the NARWHAL naval RWS. The first of two contracts dates back to 2012 (therefore it is not linked to the Saudi-funded large export deal between France and Lebanon). No-one could say precisely which class of patrol boat was fitted with the NARWHAL but we sources said they were existing hulls and the RWS are already integrated.

Saab and Brazil sign contract for Gripen NG

Defense and security company 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 to be performed over approximately ten years.

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

The contract is also for the development and production of related systems and equipment. The program comprises 28 single-seat and eight two-seat Gripen NG.

"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. Gripen NG deliveries to the Brazilian Air Force will be 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 program. 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).



1st Multiple Release of Paveway IV from a RAF Typhoon is a Success

Working closely with the Royal Air Force and weapons manufacturer Raytheon UK, a series of flight trials culminating in the successful release of two Paveway IV precision guided weapons simultaneously from a Typhoon aircraft have been completed. This is the first multiple release of the Paveway IV from an RAF Typhoon to multiple targets.

The trials were conducted by a joint industry and RAF team from Typhoon aircraft BT017 equipped with the very latest Phase 1 Enhancements package (P1Eb). P1E implements full air-to-surface capability onto the Typhoon Tranche 2 aircraft. The trials demonstrated the full air-to-surface capability of the P1Eb product, with the Paveway IV weapon, including self-designation with laser guidance to the target and GPS-only guided releases.

Steve Formoso, Typhoon Test Pilot said: "What this trial has demonstrated is the ability of Typhoon armed with

Paveway IV to attack multiple targets. The drop was part of a program proving the latest P1Eb upgrade for the RAF Typhoon fleet. P1Eb standard Typhoons can carry up to six Paveway IV weapons which can be released simultaneously against multiple targets."

Sean Cutler, deputy head of FAST Capability Acquisition at the MOD's Defense Equipment and Support organization, said: "P1Eb allows Typhoon to begin realising its air-to-ground capability using Paveway IV, while also delivering in the air-to-air arena. Our ability to switch between air-to-air and air-to-ground modes is a big step, providing flexibility for our pilots on operations. This is a key step to delivering capability for the UK's Interim Force 15."

The trials build on an earlier series of flight trials to fully exploit the Paveway IV weapon with the Typhoon aircraft, delivering an effective air-to-surface capability.

P&W Gets Contract for 8th Lot of F135 Engines

The U.S. Department of Defense awarded Pratt & Whitney a modification to a previously awarded contract for the eighth lot of F135 propulsion systems to power F-35 Lightning II aircraft. The announcement for \$793 million raises the total contract value to \$1.052 billion. Previous awards, valued at \$259 million, were given for long lead items and sustainment.

The low rate initial production (LRIP) contract for the eighth lot will deliver 48 total engines. The contract also includes program management, engineering support, and spare modules. Average prices for the conventional takeoff and landing and carrier variant (CTOL/CV) and short takeoff and vertical landing (STOVL) variant engines were reduced roughly 3.5 to 4.5 percent respectively from LRIP 7 to LRIP 8.

"Pratt & Whitney continues to keep their commitment to lower costs for the F135 propulsion system," said Lt. Gen. Chris Bogdan, F-35 Program Executive



Officer. "The government has negotiated a price reduction for every lot of engines, and the latest LRIP 7 and 8 contracts have demonstrated Pratt & Whitney's commitment to the plan."

"Pratt & Whitney and our supply base remain focused on delivering the F135 propulsion system on or below the cost targets we committed to for our customer," said Chris Flynn, vice president, Pratt & Whitney F135/F119 Engine Programs. The LRIP 8 contract was awarded at the conclusion of a joint investigation into the root cause of the June 23 engine mis-

hap on an F-35A at Eglin Air Force Base.

"Pratt & Whitney and the JPO worked around the clock and conducted an extensive investigation, and we are confident that we now have improvements in place that will allow us to resume normal flight operations," said Bogdan.

"We are working closely with the JPO and the Services to expand the flight envelope and to finish the last stages of development," added Flynn. "We are working closely with the JPO to finalize the fleet upgrade plan to meet key initial operational capability milestones".

Cubic Awarded \$15 M for Training Support for US Army

Cubic Applications, Inc., an operating company of the Mission Support Services business segment of Cubic Corporation has won a task order contract valued at more than \$15 million under the U.S. Army Forces Command (FORSCOM) Operations Training and Resource Support Services (OPTARSS) II multiple award indefinite delivery indefinite quantity (ID/IQ) contract for the Joint Base Lewis-McChord (JBLM) Mission Training Complex (MTC).

The task order leverages Cubic's expertise and leadership in training support services and live, virtual, constructive, gaming (LVCG) technologies. Cubic will assist the U.S. Army by providing contracted services to support the op-

erational mission requirements of JBLM, FORSCOM, Training and Doctrine Command (TRADOC), and others throughout the Department of Defense (DoD). Cubic's technical support will provide the JBLM MTC with the capability to enable individual and collective training, leadership development, warfighter functions training, first person simulations and constructive simulations supporting facilities management and access control.

"Cubic continues to provide the highest quality and most cost effective LVCG integrated training environment services in conjunction with our service support contracts for the Joint Readiness Training Center (JRTC); the Korean Battle Simulations Center at Yongsan, Korea since

1991; and the Joint Multinational Simulations Center at Grafenwoehr, Germany since 2012," said Rich Bristow, senior vice president and general manager, Cubic OSEG.

The contract award further strengthens Cubic's role as a key global provider of LVCG technology services for the DoD. The OPTARSS II multiple award ID/IQ contract acquires services in support of the training requirements, oversight and evaluation of the training of various component units of the U.S. Army. FORSCOM also partners with Training and Doctrine Command, Installation Management Command, and other Army components to support all aspects of combat readiness worldwide.

Boeing Completes Testing on New Anti-Jamming Technology

Boeing has proven its new anti-jamming communications technology is capable of operating as either a ground-based user terminal or satellite-based networking hub, enabling the military to send and receive secure communications at a significantly lower cost by using existing terminals and satellites.

The anti-jam technology uses a protected tactical waveform, which shields signals from interference by adversaries or cyber-terrorists. This demonstration complements previous on-orbit demonstrations over satellites like ViaSat-1 and the sixth Wideband Global SATCOM (WGS-6), showing the ability to operate anti-jam waveforms over existing commercial and military spacecraft.

"We've confirmed this technology can be applied quickly and affordably to existing assets, especially operational WGS satellites and ground terminals,"

said Dan Hart, vice president of Boeing Government Satellite Systems. "With threats to secure communications becoming increasingly frequent and sophisticated, providing this enhanced capability to warfighters on the ground is critical."

The recent test was conducted between a Boeing ground terminal using a programmable modem, designed and developed by ViaSat using one of its commercial off-the-shelf platforms and a ground terminal designed and built by MIT-Lincoln Laboratory.

This testing, done under contract for the U.S. Air Force Space and Missile Systems Center and supervised by the U.S. government, confirms that the modem meets technical interface specifications, while successfully transmitting information to and from the ground user terminal.

GD Receives \$84 M for Ohio Replacement Program Missile Tubes

The U. S. Navy has awarded General Dynamics Electric Boat a \$83.8 million contract modification to continue development of the Common Missile Compartment for the Ohio replacement submarine and the United Kingdom's Successor ballistic-missile submarine. Electric Boat is a wholly owned subsidiary of General Dynamics.

The contract provides funding for 17 tactical missile tubes: 12 for the U.K. Successor submarine; four for the Ohio Replacement submarine; and one for the Strategic Weapons System - Ashore test facility. A total of 241 missile tubes will be manufactured over the course of the program.

Initially awarded in December 2012, the five-year, \$1.85 billion contract calls for Electric Boat to perform research and development work for the Navy's next-generation ballistic-missiles.

USAF's \$174.5 M Contract to Raytheon for ISR Mission Support

Raytheon Company received a \$174.5 million follow-on contract from the U.S. Air Force to provide field support for high-altitude intelligence, surveillance and reconnaissance (ISR) and the Distributed Command Ground System (DCGS) mission. This is the 15th year that Raytheon has successfully partnered with the Air Force on this contract, and ninth year that Raytheon has implemented year-over-year cost savings.

Since 2005, Raytheon has supported over 14,000 airborne missions and more than 20,000 ground missions for the Air Force as part of the Contractor Field Services program. Under this Air Force Warner Robins Air Logistics Complex contract, the Raytheon-led team pro-

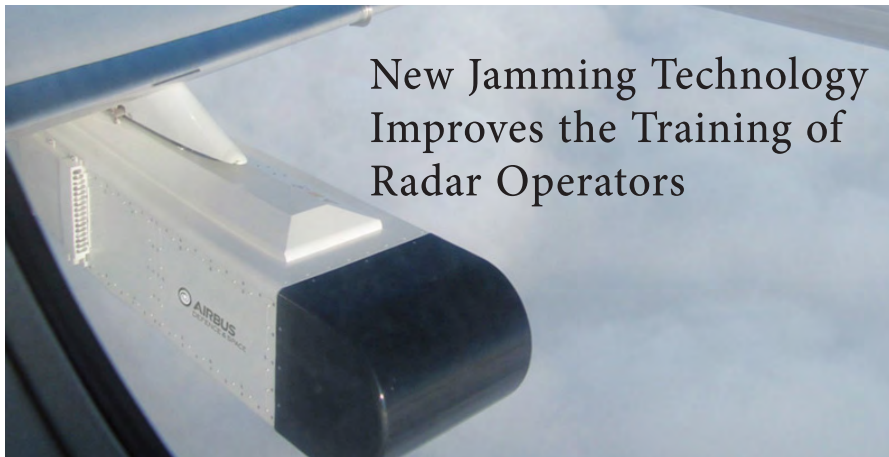
vides around-the-clock contractor field services to the warfighter at numerous sites around the globe. The contractor requirements cover a broad range of ground operations support including system maintenance, operations training, pre-flight system checks, mission support during flights, post-mission problem analysis and new system installations and upgrades.

In addition to the DCGS mission, the Raytheon team also supports data processing and dissemination for unmanned system sensors, ground controls, and data links.

"Our Contractor Field Service representatives offer mission critical expertise and are intimately familiar with how entire systems work which allows them

to successfully support the DCGS mission," said Todd Probert, vice president for the Mission Support and Modernization mission area at Raytheon Intelligence, Information and Services. "Our long partnership with the Air Force has allowed Raytheon to seamlessly collaborate with our customer to achieve mission success – we have reduced cost while maximizing system availability."

DCGS is a worldwide distributed, network centric, system-of-systems architecture that conducts collaborative intelligence operations. DCGS provides both physical and electronic distribution of intelligence, surveillance and reconnaissance data, processes, and systems.



New Jamming Technology Improves the Training of Radar Operators

Airbus Defense and Space is updating the radar jammer systems used by the German Armed Forces to train radar operators and pilots. This means the German Armed Forces are bringing their own capabilities for combating electronic jamming attacks in line with the increasing capabilities offered by new technologies.

Airbus Defense and Space have already delivered four jammer systems to GFD (Gesellschaft für Flugziieldarstellung mbH). The

multi-frequency jammer systems based on DRFM technology (DRFM = Digital Radio Frequency Memory) simulate electronic jamming attacks, with the help of which, for example, processes can be developed to protect aircraft from radar-guided missile attacks. Conversely, operators of air defense radars train to combat such jamming attacks in order to keep air defense systems functioning despite electronic countermeasures (ECM).

installed fasteners to secure the panels in place and covered them with a thermal protection coating. Orion was then lifted by crane, rotated into the proper orientation for mating with the Delta IV Heavy launch vehicle, and placed onto the transport pallet.

The team then performed a fairing purge test, which verifies how much dry gas needs to be pumped into the space between the Ogive panels and the spacecraft. The dry gas ensures that when Orion is transported to the launch pad, it does not accumulate moisture, which could cause corrosion and contamination.

When Orion arrives to launch pad 37 it will immediately be lifted 170 feet up and mated to the Delta IV Heavy rocket. Over the next few weeks, the rocket and spacecraft will be integrated, powered up, and interfaces between the two will be verified in preparation for Exploration Flight Test-1 (EFT-1) on December 4.

During EFT-1, the uncrewed spacecraft will launch on a Delta IV Heavy and will travel 3,600 miles beyond Earth—15 times further than the International Space Station. That same day, Orion will return to Earth at a speed of approximately 20,000 mph for a splashdown in the Pacific Ocean. EFT-1 will provide engineers with data about systems critical to crew safety such as heat shield performance, separation events, avionics and software performance, attitude control and guidance, parachute deployment, and recovery operations to validate designs of the spacecraft before it begins carrying humans to new destinations in deep space.

Orion Spacecraft Complete

NASA and Lockheed Martin have completed final assembly and testing of the Orion spacecraft. The spacecraft will remain inside NASA's Launch Abort System Facility at Kennedy Space Center until it rolls to launch pad 37 in November.

"An empty shell of a spacecraft arrived to Kennedy Space Center two years ago, and now we have a fully assembled Orion standing 72 feet tall," said Michael Hawes Lockheed Martin Orion program manager. "We're ready to launch it into space and test every inch."

The final assembly stages of the spacecraft included installing Orion's Ogive panels, which protect the crew module from harsh acoustic and vibration environments during launch and ascent. Engineers also





Dr. Mohammed Nasser Al Ahbabi

Director General of the UAE Space Agency

REACHING FOR THE STARS

UAE takes giant leap into space

Even by its own lofty standards, the UAE has set itself one of its most ambitious goals ever – entering the space race. Dr Mohammed Nasser Al Ahbabi, Director General of the UAE Space Agency, gives Nation Shield an exclusive insight into how all aspects the goals will be realised.

Will you brief us on the UAE Space Agency - why has it been created, what are its objectives and functions?

The UAE Space Agency is an independent body that reports to the Cabinet and enjoys financial and administrative independence, as well as the necessary legal capacity. It was established by a decree of His Highness Sheikh Khalifa bin Zayed Al Nahyan, President of UAE and Supreme Commander of the Armed Forces, to organize, supervise and manage the country's space sector, as well as support the national knowledge-based economy.

Moreover, the agency is to provide technical and advisory support for all stakeholders in the country. It aims to establish international partnerships in the space sector to enhance the role of the state and its position in the space sector, and to contribute to the diversification the national economy through a sophisticated national space sector. It also aims to transfer knowledge in the field of space technology and to represent the state in conventions, programs and international forums in the field of

space and its peaceful uses.

Within what strategy do you place the legitimate Emirati dream of space exploration?

There is no doubt that this step falls within the government's strategy to achieve the vision of the UAE for the year 2021 in terms of a quantum leap in economy and turning it into a knowledge-based economy, an economy based on transportation, production and effective use of knowledge by institutions, individuals and community.

What is the most important ingredient and what are the standards that qualify the UAE to successful carry out this huge project?

Thankfully, the State has thankfully viable and realistic constituents to achieve its goals in space, such as a clear vision for the future - the UAE vision 2021) - the wise leadership's support for ambitious strategic initiatives, a culture of excellence and the pursuit of the highest ranks and material resources. More importantly there is the strong desire of

national cadres to engage in the study of science and technology and in national space programs.

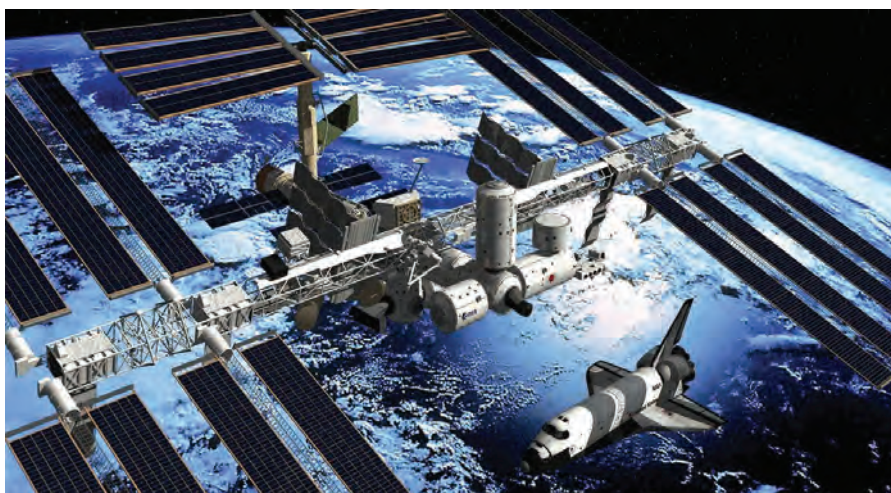
Who are the international partners participating in the development of the UAE space sector?

First we would depend on God and then the nation's youth for the advancement of the national space sector, considering that space programs typically rely on partnership. Therefore, some of the partners will be identified through the kind of techniques required in the national space projects, especially the transfer of knowledge and advanced technologies to the country.

It is known the UAE's plans and projects always bear a human and peaceful dimension that aims at the service of humanity. How do you think the UAE will employ its space program to serve humanity?

The UAE is an important model in human initiatives, such as Masdar Initiative for renewable energy. Likewise, in the field of space, space programs will





seek to overcome many complex challenges through research, development and knowledge of new technologies. These include materials science, factory systems, renewable energy technologies, robotics and autonomous systems.

How will the red planet probe project help build a national research base, and develop national cadres specialized in the field of space in the coming years?

Mars probe project will stimulate the academic and industrial bodies in the country to establish and adopt research and development centers and use scientific methods dealing with space technology and science, aimed at giving students of schools, colleges and universities a passion for space science and techniques, and encouraging them to get involved in this area.

What are the Emirati citizens' role in

the UAE's space program and what are the most important training programs that will qualify citizens to lead the space agency and operate its projects?

The UAE Space Agency will try to create a scientific and training platform for the preparation and development of young citizens by adopting centers of research, development and curricula that deal with space sciences. They will also train technical and administrative staff who will manage the agency by admitting them to advanced specialized courses inside or outside the country through strategic partnerships and cooperation agreements with local entities as well as with brotherly and friendly countries.

Is it our dream to see UAE astronauts on space expeditions in the near future?

The UAE and its prudent leadership like the challenge, and the cultural model that exists today is a pioneering one in the entire region. We do not rule out entering into astronaut preparation programs in the advanced stages of the agency's future plan.

To what extent do national cadres participate in the construction of Mars probe, which is scheduled to land on the red planet during the 50th anniversary of the establishment of the United Arab Emirates?

The concept is Emirati, and design, management and construction of the main parts of the project will also be with Emirati hands. The objective is for the project to be rightfully Emirati. Space projects certainly require high professionalism and the preparation of human resources in the highest disciplines is a goal pursued by specialized agencies. Carefully selected national students are enrolled in the most prestigious universities in the world in order to gain

knowledge and are provided with the best form of preparation and training to ensure that they do their jobs efficiently, accurately and professionally.

Building and preparation of core groups to explore the space undoubtedly require strengthening of partnerships and cooperation with expert international bodies, institutions and agencies. What are the plans and programs of the UAE Space Agency for the preparation of work and operations teams of the agency in general, and the Mars probe in particular?

The UAE Space Agency will be open to the world, as the space sector depends on international partnerships and cooperation agreements. The UAE has strong links with leading and experienced institutions in this area, and has ongoing programs of the scholarship and training.

Do you feel UAE's heading towards space requires the establishment of a specialized college in space science? It also requires beginning study of space science in early stages of basic education to serve as a real nucleus to supplement this field with specialized scientific groups able to keep up with the latest global space technology?

A fundamental objective of the UAE Space Agency is to motivate and encourage students to engage in the study of scientific subjects from the early stages, and to increase the community awareness of the importance of space technology. The Agency is working on the coordination between the relevant agencies in the country to adopt programs and curricula aimed to create a scientific basis concerned with science and technology space.





What is the size of the UAE investments in projects and industries related to space technology? How are they spent, and what is their proportion to the size of spending in the international space sector?

The UAE government gives the space sector great importance as one of the sources of national economy, since the volume of investments in this sector is about US\$7 billion (AED20 billion dirhams), which is the largest in the region in terms of the diversity and size of space projects. Among the leading companies in this field are: Yahsat, Thuraya and Emirates Institution for Advanced Science and Technology, which designed and manufactured the satellites series (Dubai Sat and Khalifa Sat).

What is the most important financing sources of the UAE Space Agency, and does its budget belong to the federal budget?

The agency is mainly dependent on funding from the federal budget. The UAE spares no effort to invest in areas that support the development of the cognitive side of the economy.

The current UAE investments in satellites, satellite communications and other programs exceed AED20 billion. Do you expect significant growth in the volume of demand for this strategic sector?

We expect the growth rate to be close to the volume of the global growth, which amounts to approximately 8 per cent per annum. The applications of these programs are growing day after day, and the need for them multiply. I expect that the region is oriented to enter the domain of satellites in general, and satellite communications in particular, and also to witness increased investments in it.

Will you tell us about the added value of the space sector in the national economy of the UAE and the prospects for developing it as a strategic economic sector?

Many sectors rely directly or indirectly on satellite services. Therefore, the space sector is a factor of diversity and sustainability at the economic and strategic levels. The space program applications will surely contribute to the promotion of sustainable development set by our gov-

ernment on the ladder of its priorities.

Based on this space project, the UAE will be within nine countries in the world that have the programs to explore Mars - what are the prospects and outcome of this trend and its reflection on the status of the UAE internationally and scientifically?

The probe project will put the UAE on the global satellite map and will highlight its regional leadership in the space sector. The UAE is generally one the countries that usually looks to the future and works in fields that seem difficult or impossible in the eyes of others.

How do you evaluate the formal announcement of the entry by the UAE to explore outer space in light of the multiple disorders and conflicts in the Arab world?

This is a clear indication that the State is proceeding with development and humanitarian service at all levels in spite of the harsh conditions and the frustration that we are witnessing in the region. This is, no doubt, a message to the world that mitigates the negative effect of unrest in the Arab world, restores the mental image of the Arabs away from the atmosphere of discord and division, provides an alternative picture founded on technical and cognitive development, and is reminiscent of the old Arab glory in the field of science and discoveries.

The UAE will be the leader of the Arab and Islamic worlds through the project to explore Mars with Emirati cadres and national action team. To what extent does this trend support national human, economic and scientific development plans?

The United Arab Emirates is not a pioneer just in this project. In fact, the UAE leadership emerges in important scientific developments in areas, such as re-

newable energy, nuclear power and micro industries, all of which are evidence of the major mutually supportive shifts taking place in the state. It is certain that the succession of these achievements and successes supports the march of the State as a whole, and leads to other educational, scientific, economic and even social successes.

The practical steps of building the first Arab-Islamic probe to explore Mars began on the ground, and seven years separates us from achieving this ambition. What are the most important stages and programs in this foundation Stage?

The project will pass through several stages, beginning with the design of the scientific mission, then spacecraft design, then workmanship testing phase, and then the launching and operation stage. While completion dates are delayed or disrupted in some countries, projects in the United Arab Emirates are completed in a timely manner, and perhaps before deadlines.

To which extent will this project cause the UAE to achieve global progress and excellence?

In addition to other space projects, this project will place the United Arab Emirates on the global map, especially in the field of space research and innovation, and enhance our relations with advanced scientific institutions in one of the most accurate disciplines. It will stimulate a climate of scientific research in the country, and open for its citizens a path to innovation and excellence in a field that was monopolized by a small group of countries.

In your capacity as the Director General of the UAE Space Agency, what are your promises to the UAE people and the country's wise leadership



from now until 2021?

The agency will do everything in its power to develop the national space sector, as well as to achieve the success of Mars discovery mission, raising the State's name high and advancing the national space sector.

What is your advice for the new generation of UAE young men and women who aspire to work in space science?

The space sector is a promising and ambitious one and a source of pride and inspiration, but it needs distinctive capabilities, so I would advise young people to join the training programs and scientific curricula to specialize in space technology, and also take applied sciences because they are the key to success in these advanced fields •

YEAR OF THE HAWKEYE

E-2D: The Eyes and Ears of Security and Prosperity

This has been a momentous year for the United States Navy's E-2D Advanced Hawkeye aircraft. Recently declared operational, the E-2D is preparing to deploy as the most technologically advanced, carrier-based airborne early warning and control (AEW&C) system. Last month the Japanese Ministry of Defense announced that it would procure the E-2D Advanced Hawkeye for its intelligence-gathering needs.

The E-2D Advanced Hawkeye, the latest Hawkeye variant, significantly changes how the US Navy will conduct battle man-

agement. By serving as the key command and control node to sweep ahead of strike, manage the mission, and keep carrier battle groups out of harm, the E-2D is the key to advancing the mission – no matter what it may be. The E-2D gives the warfighter expanded battlespace awareness, especially in the area of information operations. Just one system delivers battle management, air and missile defense, and numerous sensor capabilities to aid in complete international and domestic security.

With a two-generation leap in radar sensor capability and enhanced network capability, the E-2D Advanced Hawkeye will deliver critical data to joint forces

and first responders. These advances allow warfighters to drastically shorten the time between initial awareness and active engagement.

Thanks to the E-2D's new and extremely advanced radar, the system can detect smaller targets at longer ranges overwater, shore and land environments – even when densely cluttered. The APY-9 radar retains the legacy mechanical scanning capability, and also has the capability to stop rotating and scan a segment of interest.

Major milestone

The US Navy designated 2014 the “Year of the Hawkeye.” This follows a series of





An E-2D Hawkeye assigned to the Tiger Tail of Carrier Airborne Early Warning Squadron (VAW) 125 launches off the flight deck of the aircraft carrier USS Theodore Roosevelt

extremely positive developments with this critical program.

In late June, the E-2D reached a major milestone when the US Navy awarded Northrop Grumman Corporation a \$3.6 billion multi-year contract to deliver 25 new E-2D Advanced Hawkeye aircraft.

"A multi-year procurement of these additional E-2Ds will take advantage of efficient, stable production lines at both Northrop Grumman and our suppliers, and will generate significant cost savings for taxpayers and the Navy," said Bart LaGrone, vice president, E-2/C-2 Programs, Northrop Grumman Aerospace Systems. "It's a win-win – our warfighters will get the advanced AEW&C technology that the E-2D Advanced Hawkeye brings at a lower cost for taxpayers."

Last October the US Navy declared that the E-2D had achieved Initial Operational Capability (IOC). IOC signifies that the first operational squadron, Carrier Airborne Early Warning Squadron (VAW) 125, is manned, trained, equipped and ready to start deployment preparations with E-2D aircraft. IOC is the most sig-

nificant milestone in the introduction into service of any new system.

The US Navy's confidence in this aircraft system is significant. As other countries acquire the E-2D, the interoperability with US forces will result in military and operational advantages, as well as modernization and sustainment dividends.

Having a common system shared across allied forces means that commanders from both forces have an intimate understanding of system capabilities, which makes

E- 2D 'significantly changes' how the US Navy will conduct battle management

for better, more effective joint operations. Common systems also deliver industrial advantages and cost savings that begin at acquisition and go all the way through the entire life of the system.

Five Decades of Development, Refinement and Operational Success

The E-2 Hawkeye has been the US Navy's partner of choice for more than 50 years. This all-weather, AEW&C aircraft serves as the "eyes of the fleet."

In January, 1964, the US Navy delivered the first E-2 Hawkeye aircraft to Carrier Airborne Early Warning Squadron 11, becoming the Navy's only aircraft specifically designed for the carrier-based AEW&C mission.

E-2Cs are currently operating in the 5th Fleet, supporting strike operations against Iraq and Syria, and working alongside systems from other nations in the fight against extremists.

Unprecedented

The E-2D Advanced Hawkeye is the

only United States designed, tested and in-production AEW&C platform. With its structurally distinctive design – the rotodome and four vertical tail configuration – the E-2D Advanced Hawkeye provides unprecedented, 360-degree surveillance to the warfighter.

“Since the first E-2D Advanced Hawkeye delivery in 2007, every aircraft has been delivered on schedule and on budget,” LaGrone said. “It is this kind of proven program performance and partnership with our customer that results in a multi-year contract – validating that the E-2D Advanced Hawkeye is the right system at the right time for the right cost.”

The Navy’s E-2D Advanced Hawkeye program of record is for 75 aircraft, of which Northrop Grumman has already delivered 16 production aircraft.

A substantial advantage the E-2D system delivers is its adaptability. The air-

craft is highly flexible: it can take off and land on short strips, and can be used for military efforts, as well as environmental, humanitarian and other less traditional security missions. The Hawkeye can support search and rescue and drug interdiction efforts, and has assisted humanitarian relief missions after natural disasters such as the 2011 Tohoku earthquake, the tsunami in Japan and Typhoon Haiyan in 2013.

VAW-121 Launches Squadron’s First E-2D Advanced Hawkeye

Carrier Airborne Early Warning Squadron (VAW) 121, the “Bluetails,” launched the squadron’s first E-2D Advanced Hawkeye during a test flight from Naval Station Norfolk, Nov. 20.

The flight marks the end of VAW-121’s 37-year relationship with the E-2C Hawkeye, the previous model, and moving forward with the E-2D Advanced Hawkeye ahead of

most other early warning squadrons.

“It’s still an E-2 and we’re going to be capable to provide all the functions and perform all the same missions as we did with the E-2C,” said Lt. Cmdr. Nolan King, operations officer for VAW-121. “With the added improvements in our sensor capability we’re going to be able to improve efficiency and lethality of the strike group and other assets we’re working with.”

Many of the new improvements aboard the E-2D include an entirely new electronics suite, more powerful turboprop engines and the future potential for air-to-air refueling.

“It’s like anything brand new, everybody wants to get their hands on it,” said Aviation Machinist Mate 1st Class (AW) Luis Garcia, power plant leading petty officer for VAW-121. “One of the best things about getting this new aircraft is knowing that we get to be the pioneers and learn the





Start up of an E-2D Hawkeye

platform before anybody else.”

Garcia said many of his crew volunteered to extend at VAW-121 for the opportunity to deploy with the E-2D and become experts on the new aircraft ahead of many others in the fleet.

Even with the excitement of being the second squadron to receive the E-2D, the first being VAW-125 the “Tiger Tails,” many of the crew are sad to see an aircraft they had all grown familiar with start its slow march to becoming obsolete in the fleet.

“There’s always a little nostalgia to see an old friend go,” said King. “But there’s still enough of the E-2C in the E-2D that we can see our heritage in it.”

Testing for the E-2D began in 2007 at Naval Air Station Patuxent River, Maryland, with the craft’s first deployment scheduled with aircraft carrier USS Theodore Roosevelt (CVN 71) in 2015.

Photo credit: US Navy

AQS-24 UNMANNED MINEHUNTING

THE VALUE OF FORGING A NEW PATH IN MINE WARFARE.

At a fraction of the cost of competing platforms, Northrop Grumman’s AQS-24 Minehunting Sensor combined with an Unmanned Surface Vessel (USV) is the most capable and affordable minehunting system fielded to date. The AQS-24/USV uses unmanned technology to find and identify potential undersea threats, assuring critical access for our allies at sea. All because we know sometimes the best man for the job—is no man at all.

That’s why we’re the leader in Unmanned Systems.

THE VALUE OF PERFORMANCE.

NORTHROP GRUMMAN

Sagem: Innovative optronics and navigation systems

High-performance products tailored to the needs of navies

At the Euronaval 2014 trade show and exhibition held in Paris in October, Sagem (Safran) showcased its innovative optronics and navigation systems for naval forces, from frontline units to coast guards. Sagem's products on display covered the full range of maritime requirements, including merchant marine security, and were organized in four main areas: observation & engagement, navigation, airborne surveillance and self-defense.

The new Sagem products featured at Euronaval 2014 included:

Optronic attack mast. A high-performance mast for attack submarines, this optronic unit features multiple sensors in a small package. Sagem's mast offers a non-penetrating design for thick hulls. It incorporates four high-resolution cameras, panoramic surveillance and

antennas for electronic warfare, communications and GPS. Its modular design makes it adaptable to both new ships and the modernization of units already in service.

Vigy Engage. Combining surveillance capability and deployment of small caliber arms (up to 30 mm), Vigy Engage includes a gyrostabilized optronic turret and a fire control function. The surveillance version of the Vigy Observer is offered as an early warning and identification system for systems used on merchant vessels to protect them from pirates.

Paseo Marine. A multi-mission optronic system, Paseo Marine provides both panoramic surveillance and fire control. It's a very compact system, including a ballistic computer, laser range-finder and high-resolution cameras, in-

tegrated in a gyrostabilized turret. Paseo Marine supports high-precision firing against surface or aerial targets. It can be integrated with a combat system, or operated from a dedicated console, and can also be connected directly to most types of naval artillery.

EOMS NG. New-generation Electro Optical Multifunction System. The EOMS NG provides infrared panoramic tracking and shipborne artillery fire control from a multifunction console in the operations center. Designed for large warships, it offers very high performance. The new version of the EOMS NG now features an autonomous self-defense function for medium-tonnage ships, using a dedicated console.

Euroflir® 410SP. Designed for aircraft and drones, the Euroflir® 410SP system incorporates several types of very-high-



SIGMA 40 Sagem FREMM - Photo Sagem DCNS

resolution optronic sensors in a gyro-stabilized turret: infrared imagers and TV cameras, spotter with progressive zoom, pointer and laser illuminator. A pivotal part of any airborne surveillance setup, the Euroflir® 410 SP features new solutions for the operation of sensors and image recognition software. The Euroflir® 410SP was successfully tested on the Patroller tactical drone during the summer of 2014. A new optronic payload will be developed by Optrolead, the Sagem/Thales joint venture.

SIGMA 40 navigation system.

Sagem's navigation unit is spotlighting its SIGMA 40 military navigation systems at Euronaval 2014. Featuring laser gyro inertial sensors, the Sigma 40 meets the most demanding performance requirements of different types of warships: aircraft carriers, combat vessels, support and special mission ships. The Sigma 40 XP version, also a very compact design, is specially designed for attack submarines, and has become the global benchmark in submarine navigation systems.

SIGMA 20M gyro-compass. Sagem continues to extend its inertial range with this new navigation system, combining a compact design, cost-competitiveness, robustness and maintenance-free operation. The SIGMA 20M offers a breakthrough inertial technology, namely the Hemispherical Resonator Gyro (HRG), patented by Sagem. The SIGMA 20M gyro-compass is intended for demanding naval applications and is fully compliant with military standards. It complements the SIGMA 40 range based on laser-gyro technology, the leader in its market segment.

BlueNaute® attitude and heading reference system. Sagem has developed the BlueNaute® family of attitude and heading reference systems to meet the needs of both commercial ships and government agencies operating at sea (police, customs, coast-guards, support vessels,

The new Sagem products displayed at Euronaval 2014 included Optronic Attack Mast, Vigy Engage, Paseo Marine, EOMS NG, and Euroflir® 410SP

etc.). In production since the end of 2012, BlueNaute® uses Sagem's patented hemispherical resonator gyro technology. This highly innovative technology offers virtually unlimited lifetime and very high reliability, while also perfectly matching the requirements of the International Maritime Organization and the SOLAS (Safety of Life at Sea) treaty.



Euroflir 410 Sagem



Rafale: New heavily-armed configuration; comprising six air-to-ground precision AASM Hammer missiles, four medium and long range air-to-air missiles from the MICA family

RAFALE ON ALL FRONTS

The Dassault Aviation Rafale has become a key asset in the French inventory and the omnirole fighter is now always deployed first to take part in combat operations in Africa and further afield.

Since early 2013, the Rafale has been heavily engaged in Africa in support of French and allied ground forces, conducting strategic reconnaissance and bombing missions from bases in France and in Chad. Dozens of targets – ammunition dumps, command posts, training centres, vehicles, machine gun positions, etc. – have been hit with clinical accuracy with Hammer (Highly Agile, Modular Munition Extended Range) precision weapons or GBU-12 laser-guided bombs. Rafales have also conducted ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) missions to locate enemy forces in the vast expanses of the Sahara desert, using their reconnaissance pod for day and night photography from stand-off distances. The Pod Reco NG (new generation recce pod) offers the capability to download imagery in real-time or near real-time while the Rafale is still in flight to accelerate the OODA

(Observe, Orient, Decide and Act) loop.

Excellent availability

From late 2013, French Air Force Rafales have also flown ISTAR and close air support missions in the Central African Republic where French ground troops conduct peace-keeping operations in difficult conditions. Flying direct from N'Djamena with tanker support, they have performed numerous shows of force to deter uncontrolled elements from attacking French forces. Such are the flexibility and reactivity of the Rafale that two operating areas are simultaneously covered from a single Forward Operating Base (FOB).

Operating from the N'Djamena FOB, in the harsh African environment, was definitely not a problem for the Rafale which remained fully capable of taking off at extremely heavy weights in the scorching Chadian heat, under the hot desert sun. Thanks to the Rafale's proven maintenance concept and inherent reliability, availability rates hover between 90% and 100%, a significant achievement which helps keep both the logistic foot-print and the operating costs under strict control.

Into Iraq

With the beginning of the combat operations in Iraq, in September 2014, the Rafale is now engaged on three fronts simultaneously. Like in Mali and in the Central African Republic, two-seat and single-seat Rafales carry out ISTAR, strike and close air support missions against enemy forces that threaten the stability in the whole Persian Gulf region. The French Air Force fighters operate as part of a much wider coalition composed of allied fighters, bombers, tankers and UAVs from a large number of local and western nations and they seamlessly integrate into local command and control networks. Rafales also often refuel from allied tankers on the way to and back from their allocated target areas. In a high threat environment, like in Libya, the Rafale could have achieved air-superiority and carried out precision strikes – at stand-off ranges if needed with cruise missiles – without changing configuration thanks to its remarkable load-carrying capability and its unmatched operational flexibility.

AAR Selected to Support Design of New Military MRO Facility

AMMROC awards contract for one of the world's largest military MRO centers

The 1.2 million-square-foot facility will support more than 40 different types of military aircraft and the deal represents the largest military-focused MRO advisory and design services contract in AAR's history."

AAR has been selected by AMMROC (Advanced Military Maintenance Repair and Overhaul Center) LLC, the Abu Dhabi-based Joint Venture between Mubadala Development Company, Sikorsky and Lockheed Martin, to support in the design, outfitting and integration of key areas of AMMROC's state-of-the-art facility in Al Ain, UAE. The new facility will be one of the largest dedicated military Maintenance, Repair and Overhaul (MRO) centers in the world, and will be an anchor tenant at Nibras Al Ain Aerospace Park (Nibras), the free-zone project being jointly developed by Mubadala and Abu Dhabi Airports Company to support the establishment of a sustainable aerospace hub in Abu Dhabi.

AMMROC was formed jointly by Mubadala, the Abu Dhabi-based investment and development company, Sikorsky, and Lockheed Martin, to serve as a leading provider of MRO services to the UAE Armed Forces, as well as other military providers across South Asia, the Middle East and North Africa. AMMROC's new facility. The approximately 1.2 million-square-foot facility will support more than 40 different types of military aircraft. This major feat is unmatched by any other similar facility in the SAMENA region.

AMMROC contracted AAR to design support areas including hangars, work areas, and machine and special processes shops for this military maintenance center. AAR has a global reputation in the aviation sector for improving operational efficiencies and turn times, as well as lowering costs through its customer-centric solutions.

"We chose AAR to support us as we develop this world-class facility because of their experience and expertise in this area," said Fahed Al Shamesi, CEO of AMMROC. "We are excited to start work on this military aviation MRO that will allow us to reduce maintenance costs, increase fleet readiness levels for our valued customers and provide high-tech employment opportunities for UAE nationals."

AMMROC was formed jointly by Mubadala-the Abu Dhabi based investment and development company, Sikorsky, and Lockheed Martin

"This deal allows the UAE government to retain control over maintenance of their military aircraft while leveraging AAR's industry experience and best practices," said David P. Storch, CEO and Chairman of AAR Corp. "While AAR has provided customers with counsel and training in the past, this deal brings our work to the next level, and will hopefully lead to additional opportunities once the facility begins operations."

Since 1999, AAR has provided training and advisement on aircraft components, hydraulics, avionics and landing gear for government customers around the world including the U.S. Department of Defense, Poland, Greece, Turkey, Singapore, South Korea and Egypt. The AMMROC deal represents the largest military-focused MRO advisory and design services contract in AAR's history.

Headquartered in Abu Dhabi AMMROC LLC is a leading provider of MRO services across South Asia, Middle East and North Africa. AMMROC offers best practice military aviation MRO services for a wide range of fixed and rotary wing aircraft. Launched in 2010, AMMROC continues to expand the boundaries for flight as it leverages world-class capabilities, a highly skilled workforce and innovative technologies to deliver robust, MRO solutions that provide military operators with the highest level of aircraft readiness, fleet deployability and safety. AMMROC's key customers include the UAE Armed Forces.

DCNS unveils SMX®-Océan

The new blue-water SSK boasts many key innovations and expanded capabilities

At Euronaval 2014, DCNS unveiled 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.

A world leader in naval defense and an innovator in energy, the DCNS Group and its 13,600 employees are committed to applying their advanced know-how to help keep the oceans safe and secure. The Group's internationally acclaimed expertise is perfectly illustrated by the SMX®-Océan project.

Exceptional 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 com-

bined 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.

4D firepower: Effective against underwater, surface, land and air threats. 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 pro-

vide a salvo capability for cruise missile strikes on land targets.

A reconfigurable multi-role submarine

The SMX®-Ocean offers more multi-role capabilities than any other submarine of its type. It can operate alone or as part of a carrier group or other naval deployment, and will be the only conventionally powered submarine with the ability to deploy special forces, combat swimmers, unmanned underwater vehicles (UUVs) and even unmanned aerial vehicles (UAVs).

Carrier group escort

Equipped with tactical datalinks meeting international standards, the SMX®-Ocean is ideal for carrier group escort roles in support of coalition operations in any theatre of operations.

DCNS believes that the sea is central to our planet's future. As a world leader in naval defense and an innovator in the energy sector, the Group is developing advanced technologies and solutions to secure the future and sustainably develop the planet's potential. Its leadership is built on a proven ability to meet customer needs by combining exceptional know-how with unique industrial resources. DCNS designs and builds submarines and surface combatants, develops associated systems and infrastructure, and offers a full range of services to naval bases and shipyards. The Group has also expanded its focus into civil nuclear engineering and marine renewable energy. Aware of its corporate social responsibilities, DCNS was one of the first major defense groups to achieve full certification to ISO 14001. The Group generates annual revenues of €3.4 billion and employs 13,600 people (2013).

Technical data

Length: 100 m
Height: 15.5 m
Beam: 8.8 m
Surface displacement: 4,750 t
Maximum diving depth: 350 m
Maximum speed, submerged: 20 kts



SMX®-Océan could cross the Atlantic six times without surfacing

“Implementing Strategy: Strategic Leadership”

Even the best strategy can fail without effective leadership. An understanding of the tools of national power and the ways they may be used to implement strategies can only benefit the nation if leaders make things happen. And as the founding president, Sheikh Zayed, once said: “The real spirit behind the progress is the human spirit, the able man with his intellect and capabilities.” Strategic Leadership must provide the vision and direction for the success of any nation. Current events require strategic leaders who can not only provide such vision, but who can also manage change and deal with ambiguity to accomplish national goals under increasingly complex circumstances.

Today’s leaders are responsible for the directing activities within environments that are increasingly global and unwaveringly complex. “Strategic” leadership implies broad scale and scope and issues of great import, requiring vision extending over many years. Thus, strategic national leaders set a country’s direction for the future, gain the support of key constituencies necessary for resourcing over the long term, and manage execution under difficult and often uncertain conditions.

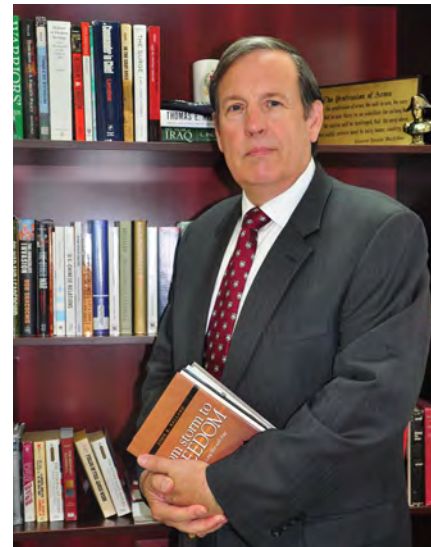
Strategic leaders must manage Change. This nation has witnessed phenomenal change over its 43 years; few could have imagined today’s UAE in 1971, but thanks to God, one true strategic leader did. Such dynamic change will likely continue over the next 43 years; modern world events are highly volatile, increasingly uncertain (even with so much information), more and more complex due to globalization and new technologies, and highly ambiguous, often creating situations with few precedents for decision-makers. Because world affairs are so complex and ill-defined, strategic leaders must be creative problem-solvers who are innovative yet levelheaded, in order to effectuate inevitable changes.

Strategic leaders must effectively communicate a Vision. In today’s dynamic environment senior officials must be able to understand and evaluate the opinions of others and be able to communicate options coherently and passionately. They are often called upon to work closely with industrialists, scientists, educators, representatives of other government departments, and leaders from other nations and international groups. They must bring to this decision making pool not only clarity of thought and mastery of problem solving, but also a comprehensive knowledge of the national, regional and international affairs influencing national security, and they must be able to inspire action by communicating their ideas effectively to everyone concerned, thus creating a common vision for the future.

Strategic leaders who can not only provide vision, but can also manage change and deal with ambiguity to accomplish national goals under increasingly complex circumstances can meet every test. But leaders cannot do everything themselves. To effectively carry out the range of responses typical today, national leaders must rely on others to understand their strategic intent and support their strategies by adapting as required in their areas of responsibility. So the challenge of strategic leadership is not only producing an optimum strategy and a clear vision but also creating a strategic team and developing the people required to adapt in execution as conditions require.

The UAE Vision 2021 calls for the nation to “harness the full potential of its national human capital by maximizing the participation of Emiratis and nurturing home-grown public and private sector leaders.” With a new National Innovation Strategy and a proud history of strategic visionary leaders, the nation can be confident in the future, but our strategic leaders will still need all of our support as they manage the complex world of tomorrow •

Strategic Perspectives



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College
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Sanctions Don't Ground Russian Helicopter

International presence is expanding

Russian Helicopters, a subsidiary of Rostec, a corporation affected by the US and EU sanctions resulting from Russia's Ukraine policies, continues to develop and increase sales despite the political situation.

Last year alone, Russian Helicopters delivered 275 units of nine various types to recipients in 10 countries.

Overall, about 9,000 Russian-made helicopters are currently operating in more than 100 countries. Traditionally, the highest demand for the Russian-made helicopters is in the Middle East, Africa, South Pacific, Latin America, in Russia itself and in the CIS. Last year, over 40 machines were contracted by various Latin American countries. In 2013, deliveries to China and Europe doubled.

Based on the orders collected in the first half of 2014, over 120 helicopters will be delivered overseas by the company. Currently, Rostec is the only exporter of these machines, as Rosoboron export is not participating in helicopter tenders.

It is planned to participate in an Indian light helicopter tender for intelligence and surveillance purposes of the Indian Army and Air Force. The previous tender to deliver 197 helicopters was cancelled in 2008.

Ready for testing

The work on a new ship-based Ka-52K helicopter goes on as scheduled. To shorten the development cycle, the company used Ka-52 'Alligator' as the base model for it and is focusing on adapting it to be utilized aboard aircraft carriers. The model is currently ready for testing



Ka-52

including aboard Mistral class ships.

Mi 17B-5 helicopter delivery to Afghanistan, which is based on an agreement with the US Defense Ministry, will be completed next month. The Russian side has an obligation to service these helicopters under warranty. The decision regarding servicing them beyond warranty limitations will be made separately by the buyer.

The international presence of the Russian Helicopters is expanding, which is the result of Rostec granting the company rights to service helicopters overseas. Helicopters sold to foreign clients will no longer travel to Russia for repairs; now they can be repaired in the same countries where they are being used.

'A license to repair', means that Rostec and Russian Helicopters now have the right to conduct international sales activities in regards to the products of

military use – which includes servicing, space parts, engines, equipment, training aides, supplementary equipment, technical documentation, labor to extend the lifespan of helicopters, and repairs.

This will allow Russian Helicopters to drastically increase the level of service response and generate higher profitability, which in turn will make the company more competitive in the international marketplace.

Russian Helicopters are intending to increase the number of service centers around the world and modify them to bring them to the highest standards.

Next year, a new service center will be opened in Egypt, which will service Mi-8/17-1B units. In 2016 new centers will be opened for Mi-35 in Brazil and for Mi-17 in Peru. That same year the company is planning to complete an overhaul of a Mi-17B-5 repair facility in India.



As of today, there are more than 10 authorized service centers for both military and civilian Russian-made aircraft operating around the world. These centers are located in Spain, South Korea, Kazakhstan, Slovenia, Bulgaria, Czech Republic, UAE and several other countries.

New markets

The company leadership is also hoping to raise interest in Russian Helicopters by operators in Europe and North America, since these are relatively new markets for them.

Current sanctions complicate the process of entering a new market but these difficulties are more of psychological rather than objective nature, as they will not impact the Russian Helicopters' fulfillment of the state orders. Nor will they affect the production process, which does not include the use on any European or US made components.

As for the sanctions in regards to Rostec, the Russian Helicopters parent com-

pany has not taken out any loans or received credits from any European banks or other foreign financial organizations.

According to the company experts, the sanctions will only stimulate the processes of substituting foreign parts with

The international presence of the Russian Helicopters is expanding, which is the result of Rostec granting the company rights to service helicopters overseas

domestic equivalents including adopting newest Russian technologies. The Russian Helicopters have all necessary intellectual and financial resources to implement these solutions.

At the same time, the company is not going to refuse international cooperation and is making steps to further develop it in various directions. "A wise and balanced approach is needed, which would take into consideration both the task of strengthening our country's defense capabilities and of the development and strengthening of the Russian Helicopters leading position in the industry, while raising the level of effectiveness and also achieving the 20 per cent world market share by 2020," say Russian Helicopters officials.

The holding company has been working in partnership with the Ukrainian company 'Motor Sich', which provides engines for a number of civilian helicopter models.

Pratt & Whitney introduces next-gen PW800 engines

Pratt & Whitney Canada (P&WC) has announced that its PurePower® PW800 engines are the power behind the new Gulfstream G500 and G600 business jets, which have been launched at Gulfstream Aerospace Corp.'s Georgia headquarters. P&WC is a United Technologies Corp. company.

A 16,000-pound-thrust-class powerhouse, the PurePower PW800 engine is optimized for high-flying, fast, long-range business jets and shares the same proven, rigorously tested core technology used in Pratt & Whitney's award-winning PurePower family of geared turbofan commercial engines. The PurePower engines have been chosen for five other applications demonstrating the performance, flexibility and robustness of this technology.

Certification of the PurePower PW-814GA and PW815GA engines that will power the Gulfstream G500 and G600 respectively is expected before the end of 2014. It is anticipated that by the time the PurePower PW800 engine enters into service, the PurePower engine family will have accumulated more than 1.5 million hours of service. Building on this, the PurePower PW800 engine, with its proven core, best-in-class availability, technology innovation and comprehensive service plan, will be uniquely positioned to serve business aviation.

"Gulfstream has once again raised the world standard in aircraft performance and design with the launch of the G500 and G600 business jets," said John Saabas, president, P&WC. "Along with its demonstrated core technology, the PurePower PW800 engine is built with the same innovative design philosophy and outstanding dependability for which

Pratt & Whitney engines are renowned."

"These achievements are possible in part because of our successful collaboration with Pratt & Whitney Canada on the powerplant system, including the new PurePower PW800 engine, its latest and most advanced engine family" said Dan Nale, senior vice president, Programs, Engineering and Test, Gulfstream.

Every aspect of the PurePower PW800 engine has been thoughtfully designed with people, performance and customer service at heart. The engine establishes a new benchmark for passenger experience by ensuring an exceptionally quiet cabin. The robust powerplant design also ensures best-in-class availability and provides maximum peace of mind to owners, operators, pilots and passengers alike, with 99.99 percent dispatch reliability.

The PurePower PW800 engine incorporates the latest generation of technologies in every aspect, from advanced design technologies and state-of-the-art manufacturing processes to innovative maintenance functionality. Features include a high efficiency and low maintenance single-piece fan, the latest full authority digital engine control (FADEC) system with advanced diagnostics as well as lightweight, advanced materials such as titanium and composites to deliver superior performance and availability.

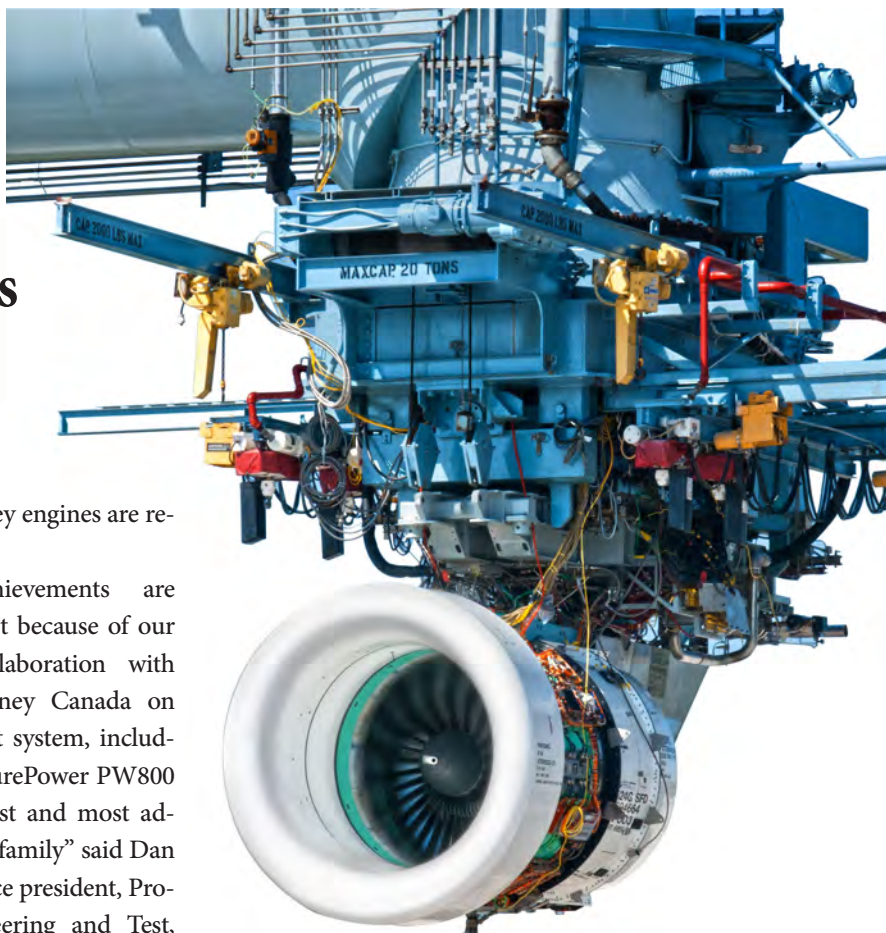
The PurePower PW800 engine delivers exceptional fuel efficiency with double-digit improvement over the previ-

ous generation of engines in this thrust class. It also incorporates an advanced TALON™ X combustor which sets a new "green" engine standard with respect to future environmental regulations, including double-digit margin to anticipated CAEP/8 (Committee on Aviation Environmental Protection) regulations for reduced nitrogen-oxide (NOx) emissions and ultra-low levels of unburned hydrocarbons and smoke.

The PurePower PW800 engine, featuring advanced manufacturing technologies and the use of sustainable materials, will be assembled and tested at P&WC's world-class Mirabel Aerospace Centre in Quebec, Canada.

A global leader in robust powerplant design, P&WC has been providing fully integrated powerplant systems since 1990 and has introduced multiple successful powerplant families in business and commercial aviation.

From a maintenance perspective, the PurePower PW800 engine sets the industry standard, requiring 40 percent less scheduled maintenance and 20 percent fewer inspections than other engines in its class.



IDEX displays global reach at Euronaval 2014

IDEX/NAVDEX officials hold high level meetings with industry leaders at the expo

IDEX 2015 will feature the third edition of NAVDEX, the maritime security show that has already become the largest naval defense exhibition in the region, along with the first edition of UMEX, an unmanned systems technology show designed as an ideal business platform to promote and showcase the modern era of defense.

The International Defence Exhibition and Conference (IDEX) had a high profile presence at the 24th International Naval Defence & Maritime Exhibition & Conference, Euronaval 2014.

Euronaval 2014 attracted over 350 exhibitors from nearly 30 countries, including 90 government delegations from 65 countries. IDEX and NAVDEX (Naval Defence & Maritime Security Exhibition), a key pillar of IDEX 2015, held high level meetings with industry experts and major maritime defense sector companies in order to facilitate a mutually beneficial dialogue surrounding the latest industry trends and technological advancements.

On the occasion, Saleh Al Marzooqi, IDEX Chief Executive Officer noted: "Our attendance at Euronaval is representative of the type of relationship we strive to foster with other industry counterparts. In line with IDEX and NAVDEX 2015 strategies and objectives, we work to bring the global defense industry the best possible platform to showcase ongoing initiatives and future ambitions in defense from around the globe".

He added: "Participating at an established event like Euronaval and con-



Saleh Al Marzooqi, IDEX Chief Executive Officer (R) at Euronaval

ducting talks about naval defense help to add value to the discourse at Euronaval, while setting the stage for continued conversation and collaboration in February at NAVDEX 2015".

NAVDEX 2015 provides unparalleled access to the innovative and cutting edge technology that is defining the modern naval defense industry. NAVDEX, a unique and specialized pillar of IDEX, will run with IDEX February 22-26, 2015 providing exhibitors the opportunity to showcase the growing capabilities of naval defense and maritime security industry.

IDEX is one of the the world's leading defense exhibitions. IDEX takes place biennially under the patronage of HH Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE, and is organized by IDEX LLC (an ADNEC Group Company) in association with the UAE Armed Forces GHQ.

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rity show that has quickly become the largest naval defense exhibition in the region, along with the first edition of UMEX, an unmanned systems technology show designed as an ideal business platform to promote and showcase the modern era of defense.

IDEX, NAVDEX & UMEX demonstrate the latest defense technologies across land, sea and air. It is a unique platform to establish and strengthen relationships with government departments, businesses and armed forces. In 2013 the IDEX and NAVDEX attracted 1,112 exhibiting companies and over 80,000 visitors.

IDEX 2015, welcoming Tawazun as Strategic Partner, will take place at the Abu Dhabi National Exhibition Centre (ADNEC), United Arab Emirates during 22-26 February.

LEADING THE WAY IN WHEELED ARMoured VEHICLES

GDLS boasts 25 years experience in the Gulf

As a full-system integrator of wheeled combat vehicles, General Dynamics Land Systems (GDLS) offers proven expertise in all phases of vehicle life-cycle. The company is proud of the leadership position occupied by its 8x8 family of vehicles, considered the premiere wheeled light armored vehicle (LAV) platform in the world.

“Our LAV’s success is the result of continual technology enhancement, enabled by feedback from our customers, whose vehicles continue to experience high operational use in all environments and terrains,” said Danny Deep, General Dynamics Vice-President, International Wheeled Vehicles Operations.

The most recent result of this evolution is the flagship of GDLS wheeled vehicle offerings, the LAV 6.0, which was delivered

to the Canadian Army in 2012. Lieutenant-General Marquise Haines, Commander of the Canadian Army told ‘Vanguard’ magazine that the LAV 6.0 enabled the Army to eliminate a requirement for a close combat vehicle to accompany its tanks into battle.

He said the LAV 6.0 is “far superior to what was originally envisioned...[with the LAV] we will have in terms of protection the same level of protection that the CCV would have provided, hence the reason why the CCV is considered no longer essential.”

“We are pleased to have accumulated more than 25 years experience working in the Arabian Gulf region, and look forward to working in unity with partners like the Armed Forces of the United Arab Emirates for another 25.”

The LAV 6.0 offers a high level of protection, with blast-deflecting Double-V Hull

technology and energy-absorbing seating for crew and troops. Add-on armor allows exceptional protection against kinetic energy and IED threats. GDLS uses only the latest in systems engineering processes and tools, including modeling and design systems that allow highly accurate prediction of performance in key areas such as survivability and mobility.

Mobility trials

The accuracy of these predictions is borne out by hundreds of blast tests and thousands of hours of mobility trials, producing a high degree of confidence in design. Only then does the design undergo independent validation and verification by third-party testing firms and customer agencies.

For such a highly protected vehicle, the LAV 6.0 demonstrates remarkable mobility, with speeds exceeding 100 km/h and the ability to self-deploy over hundreds of kilometers. This means it can fulfill roles across the combat spectrum, from aid to the civil power to operations in high-intensity conflict. Very robust amphibious capability is available, extending the vehicle’s mobility into surf zones and river environments.

Off-road, the LAV 6.0 gets the highest possible marks. Sixth-generation suspension and driveline technologies, a commercially supportable high-performance turbo-diesel engine, driver-selectable central tyre inflation system, in-depth tyre trade studies and engineered balance and wheel spacing all combine to provide track-like mobility in even the most demanding terrain.

Highly accurate firepower is provided by proven 25 and 30mm cannons in an



LAV III Royal Guard



Swim demonstrator two stack

ergonomically efficient turret, equipped with the latest in optical and thermal sights, all linked to a digital electronic architecture. Other proven weapon solutions are also available, from small-calibre remote weapon stations to anti-tank guided missile launchers, mounted/dismounted mortar systems and 90mm/105mm cannons.

GDLS customers have accumulated more than 100 million kilometers of operational use, routinely achieving operational readiness rates as high as 97 per cent. With a design focus on reducing maintenance times, and the durability of the latest generation of vehicles, readiness has only increased. In 2012 the U.S. Army Stryker Fleet's product manager Lt. Col. Eric Frutche spoke to the Army News Service about the most recent Stryker.

He said: "The Stryker DVH's operational readiness rate has 'measurably improved' to an average monthly rate of 99 per cent. The Stryker's operational readiness rate means that 99 per cent of the time, it is ready to roll when called upon by soldiers in the field. This means

not only has the [upgraded Stryker] cut down on Soldier injuries, but that it has done so while being ready for more combat missions."

Global presence

GDLS has a global presence, with thousands of employees in 21 time zones. From business offices and manufacturing facilities to support and repair and overhaul depots, they support customers worldwide. GDLS engineering, program management, manufacturing and through-life support resources support their customers' needs from conception through vehicle life cycles in excess of 25 years. Their global presence means that they are close at hand to work with their customers, and can expand their footprint when needed, reaching back to the rest of the General Dynamics organization to support emerging requirements.

From the nimble LAV II to the durable and highly mobile LAV 6.0, all GDLS LAVs provide users with extremely affordable life-cycle costs. High reliability and low fuel consumption contribute to lowered operational costs in an obvious way, but the commonality inherent in the LAV family of vehicles provides truly powerful benefits. Proven lower costs include significant savings resulting from common operator's training and training support materials.

Logistics costs are further reduced through commonalities on crew and maintenance tool sets, consumables, and special tools and test equipment. The result is lowered warehousing and supply system demands, and a decreased requirement for logistics transportation.

GDLS recognizes that its products are mission critical for the soldiers who depend on them. "That's why we have a dedicated Through-Life Support team committed to providing our customers with timely, high quality, and cost-effective initial fielding and through-life sup-

port," said Deep.

GDLS Through-Life Support packages provide for lowered operational costs, increased operational readiness and improved reliability. Collaborative and proactive obsolescence management allows continued high availability and rapid repair of systems. Including its Abrams tanks and popular tactical vehicles, GDLS currently supports a fielded fleet of over 30,000 armored vehicles, including over 11,000 LAVs, at multiple locations around the world.

Enhanced support

Some of these LAVs are currently saving lives more than 35 years after their original fielding. This accomplishment is made possible by ensuring that new technologies are compatible for use as upgrades to fielded platforms. Modular and upgradeable, the LAV is purpose-built to ensure a long, productive and combat-relevant life-cycle.

Providing a single point of contact for its customers, the GDLS Through-Life Support team uses a performance-based logistics approach which incorporates metrics valued by its customers. This ensures all its products are fully supported, from a base capability to a growth capacity for enhanced support as customer needs evolve.

"All these strengths are put to work for our customers, as we work in unison to support their requirements and the meet the needs of their soldiers. As our current user base knows, and our new customers are pleased to discover, with General Dynamics Land Systems as a partner, you truly do have Strength on Your Side," said Deep.

In the course of accumulating more than 100 million kilometers on operational deployments in theaters, climates and terrains around the world, General Dynamics LAVs have achieved operational readiness rates as high as 97 per cent.

Saab Surface Radar

The new generation Giraffe radar is on track for delivery in 2016

The first of Saab's new generation of Giraffe radars is in production and on track for delivery to its customer in 2016. Saab has also recently completed a further round of testing with the Giraffe 4A radar that again validated the system in a series of real-world operational scenarios.

Defense and security company Saab extended its surface radar portfolio earlier this year. With the introduction of five all-new complementary Giraffe radars for land and sea, there is now a Giraffe option for all kind of needs in air surveillance and air defense. Production of the first Giraffe 4A system for an undisclosed customer is ongoing at Saab in Gothenburg, Sweden. This incorporates the latest technology in radars, Gallium-Nitride (GaN) circuits.

In parallel with this production activity, during August this year Saab conducted a suite of operationally-focussed, deployed field tests with the new Giraffe 4A radar – demonstrating weapons location, air defense and air surveillance functions. These tests, performed at multiple locations, were witnessed by representatives from several countries. All tests met or exceeded the expected performance, with the radar demonstrating impressive functionality against small targets and jamming.

“Saab can now cater for all ground and naval defense radar needs; from VSHORAD to long-range air surveillance and weapons location, with multi-functional capability. Distinctive characteristics for our radars include the use of a stacked beam (digital beam forming), a high update rate, plus superb performance in clutter and jamming resistance,” says Anders Linder, Head of Saab's business



Saab can now cater for all ground and naval defense radar needs; from VSHORAD to long-range air surveillance and weapons location, with multi-functional capability

unit Surface Radar Solutions.

The multi-function capability means simultaneous functions for:

- Automatic air and surface surveillance and 'track-on-jam'
 - Classification of targets including hovering and moving helicopters
 - High accuracy indication to weapon systems for anti-air and anti-surface engagements
 - 360 degree incoming mortar/rocket fire alert and hostile weapons location
 - Target designation for long-range surface-to-air missiles
- Saab's combat-proven and highly-regarded surface radar portfolio, including the renowned Giraffe AMB and Arthur radars, has been improved and expanded through the addition of new technologies and designs. Alongside its existing products, Saab is now producing new active electrically scanned array (AESA) radar

variants for land and sea.

These radars use leap-ahead design techniques that put them in a class of their own in terms of performance and capability. For the first time Saab's Giraffe radars also offer a solution for long-range air surveillance. There is now a Giraffe option for every air surveillance and air defense application on land and at sea.

Saab has more than 30 years of AESA design experience. This depth of experience – and Saab's understanding of radar cost, performance, reliability and packaging issues – results in a unique technology solution. Saab's advanced surface-based radars are highly-effective against multiple 'difficult' air targets in the most dense and challenging operational environments.

Members of Saab's surface-based radar family for land and sea now include:

- **Giraffe 1X and Sea Giraffe 1X:** short-range radars fitted with an X-band AESA, offering a comprehensive set of 3D functions with impressive performance and flexibility.

- **Giraffe 4A and Sea Giraffe 4A:** medium- to long-range radars, combining air surveillance, air defense, sense and warn and weapon locating capabilities in a single, low-footprint S-band AESA-based unit.

- **Giraffe 8A:** a long-range S-band AESA radar, including anti-ballistic missile capability, that pushes performance and functionality to a new level.

- **Giraffe AMB and Sea Giraffe AMB:** Saab's existing short- to medium-range surveillance radar and command and control system for ground-based air defense. These combat proven C-band systems have now been enhanced with increased range and coverage.

- **Arthur:** Saab's superior mobile combat proven C-band medium-range weapons-locating system which detects and locates enemy fire. With 80 units

sold to date, the system's performance and functionality has now been further enhanced.

Saab's In-Service Solutions is another vital part of the overall radar family product offering and is currently contracted by more than 20 customers worldwide. Saab's radar logistics support removes 100 percent of real-life risks related to cost of ownership and has proven to deliver 98.5 percent long-term mission availability.

Finally, Saab also offers a Common Radar Upgrade solution, providing upgrades to or extending the lifetime of customers' existing (non-Saab) radar systems.

Saab's advanced surface-based radars are highly-effective against multiple 'difficult' air targets in the most dense and challenging operational environments



Giraffe radars are for all kind of needs in air surveillance and air defense

Northrop Grumman displays cutting edge cyber capability

MilCIS is the only Australian conference dedicated to military communications

NORTHROP GRUMMAN

Northrop Grumman Corporation's cyber capability was a major attraction at the Military Communications and Information Systems (MilCIS) conference held at the National Convention Center, Canberra, Nov. 11-13.

Northrop Grumman showcased a range of capabilities including live demonstrations and detailed briefings on innovative technologies for cyber operations.

MilCIS is a partnership between the Australian Department of Defense Chief Information Officer Group (CIOG), the University of New South Wales, Canberra, and the Institute of Electronic and Electrical Engineers (IEEE). It is the only Australian conference dedicated to the crucial technologies, products, systems and services associated with military communications and information systems.

"Northrop Grumman is an industry leader in information systems, computer network operations and cybersecurity and we are strongly positioned at every level to respond to Australia's needs," said Ian Irving, chief executive for Northrop Grumman Australia. "As we continue to expand and strengthen our presence in Australia, MilCIS provided an opportunity for us to demonstrate our breadth of military communications and information systems to our customers, academia and industry partners."

"Addressing new cyber threats demands real-time network diagnostics and monitoring, situational awareness and readiness," said Tony Marceddo, director M5 Network Security, Northrop Grumman Australia. "We are at the

forefront of developing innovative and affordable solutions that can effectively defend networks and offer protection across the entire cyber domain. Whether it's securing a network or cyber-hardening a payload, sensor or platform, Northrop Grumman can rapidly tailor solutions to and deliver products for a diverse set of problems."

Leveraging more than 30 years of experience, Northrop Grumman has a deep understanding of the breadth and complexity of cyber. Through technology investments in key research areas such as identity management, situational awareness, secure mobility, defensive cyber operations and supply chain, Northrop Grumman continues to pro-

vide innovative solutions to address the rapidly evolving cyber threat.

Northrop Grumman capabilities exhibited at the conference include:

- The official launch of the **Secure Communications Systems (SCS)-400**, part of Northrop Grumman's next generation of secure communications solutions for military, government and large corporations. Each device in the SCS range can manage multiple simultaneous external connections and provide superior performance and economy;
- **Cyber Solutions Products & Capabilities**, including intelligence collection and fusion, threat detection, incident response, digital forensics and security monitoring;
- **Interoperable NetworkEnabled command and control (C2)**, the integration of multi-echelon, network centric battle management solutions that enable increased C2 across a spectrum of threat scenarios and coalition environments; and
- **Enhanced C4ISR Operationally Responsive Enterprise (eCORE)**, enabling rapid mission integration, deployment, support, training and maintenance with an affordable, developed solution. eCORE reduces users' footprint, power, cooling and sustainment requirements, and uses commercial-off-the-shelf and open source software to interface with any network.

Leveraging more than 30 years of experience, Northrop Grumman has a deep understanding of the breadth and complexity of cyber

TAWAZUN AND ADNOC SIGN MOU TO EXPLORE MUTUAL AREAS OF INTEREST



Tawazun and the Abu Dhabi National Oil Company (ADNOC) have signed a Memorandum of Understanding (MoU) that will see the two parties explore business opportunities in various fields over the next two years. Signing of the MoU took place in November during the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC).

about the various initiatives that will be generated as a result of this collaboration between Tawazun and ADNOC. This agreement is a testimony to the growth that we've witnessed in the strategic manufacturing industry and I am sure, will further strengthen our combined capabilities both here and abroad, allowing us to better compete on the global stage alongside key industry players."

of these materials and equipment continue to grow because of the huge expansion plans and mega-projects implemented by ADNOC, Al Qubaisi added.

He stressed the importance of such partnerships in supporting efforts and initiatives aiming at creating a national entity capable of manufacturing and supplying the equipment necessary for oil

The agreement provides for mutual cooperation in a number of areas together with affiliates of Tawazun and ADNOC. Such cooperation may, include, but not be limited to involvement from Tawazun Precision Industries (TPI) – the precision manufacturer and subsidiary under the Tawazun group - in the fields of manufacturing and supply of critical items used in the oil and gas industry.

The MoU was in presence of H.E. Saif Mohamed Al Hajeri, CEO of Tawazun and Mr. Mohamed Butti Al Qubaisi, Director of Exploration & Production at ADNOC and senior executives from the two sides.

H.E. Saif Mohamed Al Hajeri stated: "We are very optimistic

On his part, Mr. Mohammed Butti Al Qubaisi praised the mutual constructive cooperation between ADNOC TAWAZUN stressing the importance of this agreement in creating opportunities to raise and enhance skills and competences of the UAE workforce in the field of manufacturing. The future needs

operations such as pipelines and wells coating materials and lower equipment for drilling operations as a strategic goal for the company ADNOC.

Thales unveils CAPTAS-1

Thales has expanded its sonar range to include two new compact versions for small- and medium-sized surface combatants and patrol vessels displacing more than 300 tonnes.

Launched at Euronaval in Paris, the Thales BlueWatcher hull-mounted sonar and associated CAPTAS-1 (Combined Active Passive Towed Array Sonar) have been developed specifically for navies wanting to provide their offshore patrol vessels (OPVs) with an anti-submarine warfare (ASW) capability.

"Navies now want to equip their small offshore patrol vessels with some form of ASW capability - not necessary to do the complete job of ASW that a frigate does, but to offer a deterrence capability to help manage the exclusive economic zones for which they are responsible," Thales Underwater Systems CEO Benoit Plantier said.

"This is why we decided to invest in developing new, smaller, more compact sonars, by taking technology from existing products and downsizing it; for new navies who would like some basic level of ASW capability; or for older, larger navies that want to enhance their traditional ASW capabilities with some capability on smaller ships."

Thales Underwater Systems senior sonar expert André Buhart said the new sonar suite comprising the BlueWatcher and CAPTAS-1 was developed on the understanding that, in today's market, an increasing number of navies will be equipped with ships displacing around 1,000 tonnes designed for littoral operations.

Based on the same technology as the FLASH dipping sonar for helicopters, the Bluewatcher is a 'plug and play' sonar that is easily installed under the hull of a small vessel.

"The FLASH dipping sonar has been at sea for more than 20 years, so the technology is very robust, proven at sea," Buhart said. "What we did was to make a little modification: we injected a transmitter into the middle of the receiver; and we put everything inside a cylindrical dome [700 mm in diameter and 600 mm in height] so that it fits below the surface of the ship. What is impressive is that it reduces the draught to 85 cm. So it's a very compact sonar, which is nice for the captain of the ship." The only inboard components are a single cabinet and the operator console.

BlueWatcher can operate in active and passive modes. Active mode can be used for the active detection of submarines or anti-collision/obstacle avoidance, while in passive mode the sonar is able to pick up small, fast surface craft.

The Bluewatcher can be used in conjunction with the CAPTAS-1, which is containerised to ease integration and

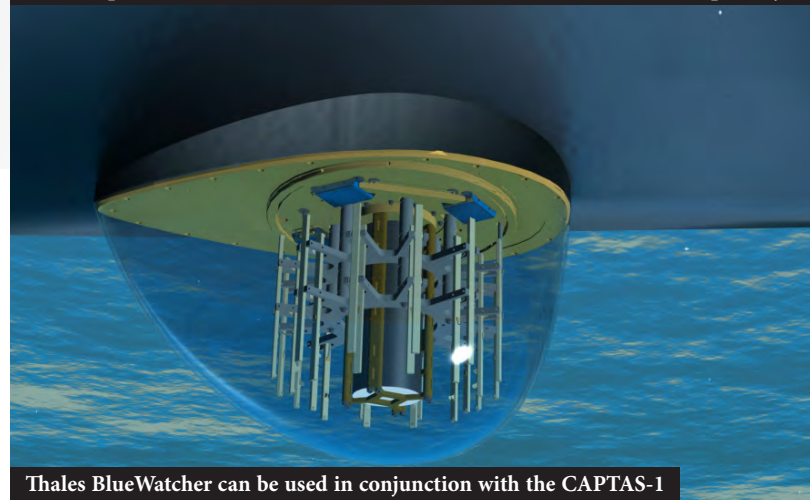
help reduce cost.

Weighing just 9 tonnes, the lightweight, compact CAPTAS-1 is the latest addition to the CAPTAS family of low-frequency active/passive sonars. The single ceramic ring configuration uses the same technological building blocks as the CAPTAS-2 and CAPTAS-4, which are in service with several NATO countries. The four-ring CAPTAS-4 is designed for extended range underwater surveillance from specialist ASW frigates of 3,500 tonnes or above, while the two-ring CAPTAS-2 can be installed on ships down to 1,800 tonnes.

The new CAPTAS-1 has been designed for operation at speeds of up to 12 kt, and at depths down to 100 m, with a detection range claimed to be in the region of 20-30 km. To simplify ship fitting and removal, the complete CAPTAS-1 system is packaged into two enclosures: the sonar body/receive array and electrically powered towed array handling system are installed in a standard 20 ft shipping container; the winch control and electronic cabinets are stored in a 10 ft container mounted adjacently.

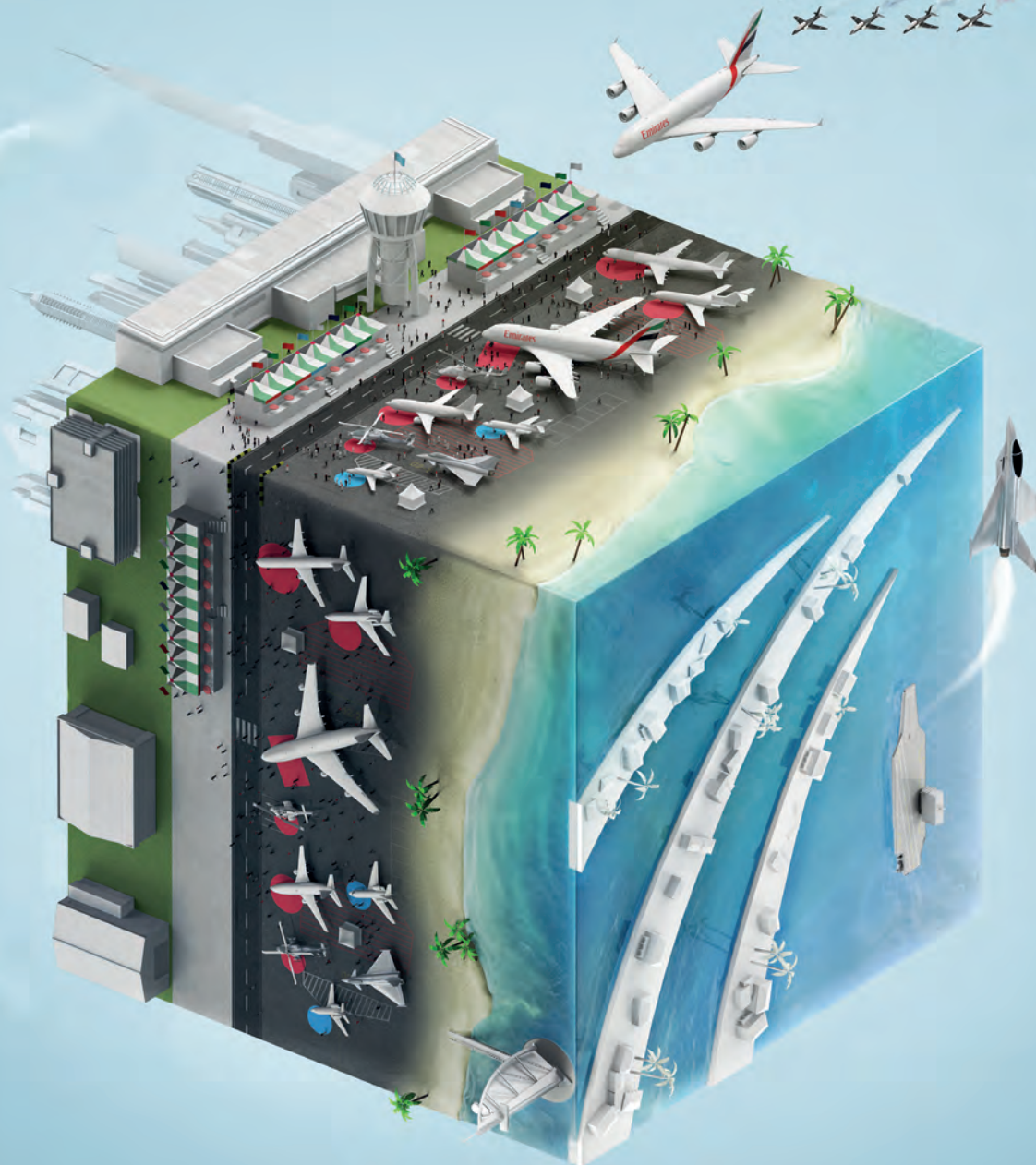


Captas-1 have been developed specifically for navies wanting to provide their offshore patrol vessels (OPVs) with an anti-submarine warfare (ASW) capability



Thales BlueWatcher can be used in conjunction with the CAPTAS-1

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High-tech expertise in defence, security and aviation technology

Patria is a trusted provider of defence, security and aviation life-cycle support services and technology solutions. Patria's most significant export products include the armoured modular vehicle, Patria AMV and Patria Nemo mortar system, which have both been selected by international customers, including the UAE Armed Forces.

Patria is an internationally operating defence, security, and aviation group providing customers with competitive solutions based on strong expertise and collaboration with trusted partners. Patria's strength is based on its excellent products complying with NATO standards.

Patria AMV and Patria Nemo – at the core of modern defence

Patria AMV, the market leader among 8x8 armoured wheeled vehicles, is Patria's key export product. Patria AMV is currently contracted by seven customer countries, among others by the Finnish, Polish and Swedish Defence Forces, and it has been fielded in ISAF operations since the year 2007. AMV products are

under continuous development and are fitted with the latest technology. Patria AMV's structural solutions enable high payload capacity, high level of protection and integration of heavy weapon systems.

Patria also produces advanced mortar systems. The newest product of Patria's mortar systems is Patria Nemo, which is a 120 mm remote controlled mortar turret, providing indirect and direct fire as well as MRSI (Multiple Rounds Simultaneous Impact) and direct lay capabilities. As a modern and compact system, Patria Nemo can easily be mounted onto various armoured vehicles, both wheeled (6x6, 8x8) as well as tracked ones. Due to its low weight, Patria Nemo is also adaptable to lightweight, high-speed vessels and can be effectively used for harbour patrolling and protection, coastal guarding and infantry landing operations.

Patria Nemo can also be equipped with the Fire Control System - Command Post (FCS-CP) solution, which is designed to support and coordinate indirect fire for one or several Patria

Nemo Mortar Units enabling the Units to be operated as a group.

In 2014 Patria introduced Patria Nemo gunner-commander training simulator which provides a realistic, virtual training environment for all kinds of fire missions that can be performed with Patria Nemo mortar system.

For Patria, The Arabian Peninsula is an important focus area in the future.

A firm footing in aviation

With a firm footing in aviation, Patria is one of the leading European providers of aviation life-cycle support services. Current operations focus on the life-cycle support of F-18 Hornet jet fighters, Hawk training jets, and NH90 transport helicopters.

In military pilot training, Patria has reached excellent results in the elementary pilot training under contract for the Finnish Air Force (phase I - II training for conscripts, cadets and flight instructors). Patria also operates in the civilian sector specializing in professional pilot training. Patria Pilot Training is a leading Flight Training Organisation (FTO) in Northern Europe.

System integration know-how

Today's defence systems are large entities that are comprised of several sub-systems. Patria's solid system integration know-how ensures that the entire system functions faultlessly. Patria specialises in intelligence, surveillance, and command and control systems, as well as their integration and life-cycle support. Patria's system integration know-how has been developed for decades to meet the needs of the increasingly complex systems used by customers.



The Armoured Modular Vehicle, Patria AMV, showcased in UAE



Predator XP – Providing Persistent Surveillance, Enhanced Situational Awareness

General Atomics Aeronautical Systems (GA-ASI), a leader in intelligence, surveillance, and reconnaissance technologies, is best known for development and production of the Predator family of unmanned aircraft systems (UAS) in operation by numerous customers throughout the world.

Currently amassing some 50,000 flight hours per month, GA-ASI UAS have accumulated over 3.1 million cumulative flight hours to date.

GA-ASI is currently in full production on its newest aircraft system, the Predator XP UAS. Predator XP exhibits the same physical dimensions, altitude, speed, and long endurance (up to 35 hours) as the original RQ-1 Predator aircraft first flown by the US Air Force in 1995 and has been updated to include triple redundant avionics and an automatic takeoff and landing capability.

The aircraft supports a broad customer export base, including Middle East, North African, and South American regions.

Predator XP systems can be equipped with line-of-sight and beyond-line-of-sight data link systems for over-the-horizon operations. The aircraft is integrated with multiple ISR sensors, including state-of-the-art electro-optical infrared cameras and GA-ASI's wide-area search Lynx multi-mode radar.

State-of-the-art

The Lynx radar features a state-of-the-art

synthetic aperture radar mode that offers all-weather, high resolution, day/night performance for a wide-area search capability. Its ground moving target indicator mode provides a quick and easy method for locating moving vehicles.

The radar's maritime wide-area search mode provides the capability to complete a variety of maritime missions successfully, including coastal surveillance, drug interdiction, long-range surveillance, small target detection, and search and rescue operations.

Predator XP incorporates an automatic identification system for maritime ship identification. Other new additions from the original Predator are a new fault-tolerant tail design and winglets for increased endurance.

Predator XP UAS features the Claw integrated sensor payload control and analysis software with moving-map displays, cross-cueing of all onboard sensors, pre-mission planning, and post-mission sensor data analysis and exploitation.

Offering unsurpassed ISR capabilities, Predator XP is available now to support a variety of overland and maritime ISR missions for a wide array of countries.

Industry milestone

Last October it was announced that Predator/Gray Eagle-series aircraft family has achieved a historic company and industry milestone of three million flight hours.

The aircraft supports a broad customer export base which includes the Middle East

That's the equivalent of flying over 340 years, around-the-clock, every day. The milestone occurred on October 2, with nearly 222,000 total missions completed and almost 90 per cent of all missions flown in combat.

"Three million flight hours is a tremendous accomplishment that attests to the reliability and versatility of our proven technology," said Linden P. Blue, CEO, GA-ASI. "We strive to provide solutions that support the requirements of our customers but could not have reached this milestone without the hard work and dedication of our employees."

"We eagerly look forward to four million flight hours and beyond and will keep focusing on improving the mission capabilities of our systems because what they can do when they're flying is as important as keeping them airborne".

LIGHTNING BOLT

The F-35C Lightning II carrier variant Joint Strike Fighter completed its first phase of developmental test aboard an aircraft carrier in November, three days ahead of schedule aboard USS Nimitz.

During the DT-I event, F-35C Lightning II Joint Strike Fighter the F-35 Lightning II Integrated Test Force from Air Test and Evaluation Squadron 23 located at Naval Air Station Patuxent River in Maryland, tested the carrier suitability of the aircraft and its integration with carrier air and deck operations in the at-sea environment, achieving 100 per cent of the threshold test points.

The aircraft demonstrated exceptional performance throughout its initial sea trails, accelerating the team's progress through the DT-I schedule and enabling them to conduct night operations - a milestone typically achieved during the second at-sea phase of developmental tests, as evidenced by the test schedules of the F/A-18 Hornet and F/A-18 E/F Super Hornet.

"We had such confidence in how the plane is flying that we lowered the weather minimums to what the fleet is actually using, knowing that when I lower my hook and come into the groove I'm going to trap," said Lt. Cmdr. Ted Dyckman, Navy test pilot. "That says a lot for the airplane. So, when it came time for night traps, we said the plane is ready and we launched it. It flew very

well behind the ship. Even on the darkest night - pretty much as dark as you can get behind the boat. Two hook-down passes and two traps and that says it all right there. It's unheard of to conduct night ops on the first det.

Effective re-design

"The engineers responsible for the aircraft's control laws at Pax (Patuxent) River and Fort Worth have done a phenomenal job designing a carefree aircraft from the pilot's perspective," said Cmdr. Tony Wilson, DT I Team Lead. "The F-35C's performance on the ball was revolutionary, providing carefree handling on approach. The Integrated Direct Lift Control allows ball control like no other aircraft. The control schemes of the F-35C provide a tool for the below average ball flyer to compete for top hook. And, Delta Flight Path is an innovative leap in aircraft flight controls - this command enables the F-35 to capture and maintain a glideslope, greatly reducing pilot workload, increasing safety margins during carrier approaches and reducing touch-down dispersion."

The cadre of DT-I test pilots logged a total of 39.2 flight hours as they conducted 33 flights featuring 124 catapults, 222 touch-and-go landings, and 124 arrestments. There were zero unintentional hook-down bolters, or missed attempts to catch an arresting wire on the

flight deck. (Two hook-down, intentional bolters were conducted as part of the DT-I test plan.)

Successful carrier landings of the F-35C also point to an effective re-design of the once-troubled tailhook. Initial testing shore-based testing pointed toward tailhook design issues and the Atlantic Test Range at NAS Patuxent River captured critical measurement data with their precision photogrammetric technology and modeling capabilities. The re-design collaboration between Lockheed Martin and Fokker Technologies of the Netherlands - with insight and participation by Navy airworthiness engineers - has yielded a preponderance of three-wire landings during DT-I and firmly established the success of the re-design.

The goal of DT-I, the first of three at-sea test phases planned for the F-35C, was to collect environmental data through added instrumentation to measure the F-35C's integration to flight deck operations and to further define the F-35C's operating parameters aboard the aircraft carrier. A thorough assessment of how well the F-35C operated in the shipboard environment will advise the Navy of any adjustments necessary to ensure that the fifth-generation fighter is fully capable and ready to deploy to the fleet in 2018.



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Osprey delivers faster, better - and without peer

The V-22's unique abilities and combat tests have often been touted as a game changer for covert and expeditionary forces. The V-22 Osprey is a joint-service, medium-lift, multi-mission tilt-rotor aircraft developed by Boeing and Bell Helicopters. Boeing is responsible for the fuselage, landing gear, avionics, electrical and hydraulic systems, performance and flying qualities.

A total of 112 V-22s are currently operated by the US Air Force (USAF) and the US Marine Corps (USMC).

At twice the speed of a helicopter, the Osprey carries 24 combat troops, or up to 20,000 pounds (9,072 kg) of internal cargo or 15,000 pounds (6,804 kg) of external cargo. Its cargo bay can accommodate nine litters with medical personnel and equipment.

Two Rolls-Royce AE1107C Liberty turboshaft engines supply power for the V-22, producing 6,150 shp (4,586 kW) each. For safe, reliable flight, the V-22's cross-coupled transmissions allow either engine, separately or together, to power the rotors.

Designed with folding rotors and a rotating wing, the V-22 fits nicely in the maritime base. It stores compactly on board an aircraft carrier or assault ship in a minimal footprint. With air-to-air refueling capability, it meets the US Navy requirements for combat search and rescue, fleet logistics support, and special warfare support.

Multi-missioned

The V-22's multi-mission capability is like no other. From all manner of assault, support or transport to whatever the need requires in a speed-to-scene, coupled with a hovering capability, the Osprey delivers faster, better - and without peer.

More than 200 V-22 Ospreys are currently in operation and the worldwide fleet has amassed more than 185,000 flight hours, with half of those hours logged in the past three years.

Tilt rotor capability

The aircraft operates as a helicopter when taking off and landing vertically. The nacelles rotate 90 degrees forward once airborne,

converting it into a turboprop aircraft.

The aircraft can provide VTOL (vertical take-off and landing) with a payload of 24 troops, or 6,000lb of cargo at 430nm combat range, or VTOL with a payload of 8,300lb of cargo for a range of 220nm.

The helicopter is self-deployable worldwide, with a ferry range over 2,100nm. Normal operating range is up to 1,100nm.

The tilt-rotor aircraft is available in three configurations: the Combat Assault and Assault Support MV-22 for the USMC and the US Army; the long-range special operations CV-22 for US Special Operations Command (US SOCOM); and the US Navy HV-22, for combat search and rescue, special warfare and fleet logistic support.

Shipboard compatible

The V-22 is fully shipboard compatible, with the world's first complete blade fold and wing stowage system. It is able to operate off all US Navy L-class amphibious ships, the LHA/LHD assault carriers, and can be stowed on full-size CV/CVN car-

riers.

The aircraft is armed with an M240G 7.62mm machine gun mounted on the back ramp.

Sensors

The US Air Force and US Navy variants are equipped with a Raytheon AN/APQ-186 terrain-following, multimode radar. The helicopter night-vision system is the Raytheon AN/AAQ-16 (V-22) FLIR, which is mounted on the nose.

The aircraft's electronic warfare suite includes the ATK AN/AAR-47 missile warning system, which consists of four electro-optic sensors with photomultipliers, a signal processing unit and a cockpit display.

The V-22 Osprey aircraft is equipped with a 12.7mm turreted gun system.

The aircraft is also equipped with a radar and infrared threat warning system and chaff and flare dispensers with 60 rounds of dispensables.

The CV-22 features the suite of integrated radio frequency measures (SIRFC) developed by ITT Avionics.

Engines

The aircraft is powered by two Rolls-Royce

The aircraft operates as a helicopter when taking off and landing vertically

AE1107C turboshaft engines rated at 4,586kW maximum continuous power.

The engines are fitted with full-authority digital electronic control (FADEC) supplied by Lucas Aerospace, backup analog electronic control system, and fire protection system from Systron Donner.

A transmission interconnect shaft provides single-engine operation. The thermal signature of the aircraft is minimised with an AiResearch infrared emission suppression unit, installed on the nacelles near the engine exhaust.

The entire rotor, transmission and engine nacelles tilt through 90 degrees in forward rotation and are directed forwards for forward flight, and through 7 degrees 30' in aft rotation for vertical take-off and landing.

Performance

The V-22 can climb at the rate of 16.2m/s. The maximum and cruise speeds of the aircraft are 565km/h and 510km/h respectively. The range is 3,379km. The combat range and service ceiling are 692km and 7,620m respectively.

After a series of successful tests, the US Navy in March this year certified that the Boeing Phantom Badger combat support vehicle can be transported inside a V-22 Osprey tiltrotor aircraft. That is another step toward providing warfighters with more options to deploy the versatile vehicle.

The tests included form-fit checks, pressure tests and structural evaluations exceeding four G-forces.

"This certification validates Phantom Badger's versatile design while offering the warfighter increased battlefield access and deployment options," said John Chicoli, program manager for Boeing's internally transportable vehicle program.

"Phantom Badger is designed to easily fit in the compact space of the V-22 and it is also compatible with many larger aircraft."

Ten Phantom Badgers fit in a C-17 transport aircraft and two fit in a C-130 aircraft or CH-47 Chinook helicopter.

Phantom Badger has completed more than 5,000 miles of rugged terrain durability testing and successful airdrop tests from a C-17.

Developed by Boeing Phantom Works, Phantom Badger supports a wide range of missions not possible with existing combat support vehicles. Its rear section is modular and can be quickly changed for missions including reconnaissance, combat search and rescue, casualty transport, direct action with weapons mounts or explosive ordnance disposal.

This combination of modularity, transportability and proven all-terrain performance provides increased mission flexibility and enhanced survivability.





The UAE's Overall Strategy to Counter Terrorism

Vision, Implications and Dimensions

In light of its firm position against terrorism, militancy and extremism for many years, the United Arab Emirates (UAE) is one of the first countries in the world that has had a multi-dimensional strategy that addresses political, economic, security, media, cultural and social aspects, in order to confront this obnoxious phenomenon at the local, regional and international level. In this regard we cooperate with the states, forces and organizations that seek to promote global security, peace and stability, which are facing a growing threat from terrorist organizations. In this issue, "Nation Shield" sheds light on the UAE strategy in the face of terrorism, and describes its dimensions, premises, pillars, and objectives.

The UAE has been one of the first countries that recognized early, and many years ago, the threat of terrorism and called for the need to address it regionally and globally. It also interacted seriously with regional and international efforts aimed at combating and extirpating terrorism, and when the September 11 attacks took place in the United States claiming the lives of thousands of innocent people, the UAE strongly condemned them.

When extremist groups began to grow in

the region in the wake of the so-called Arab Spring, the UAE warned about the danger of these groups to security and stability in the region and the world, and called for regional and international cooperation to address them; it has even supported the countries that suffer from this danger such as Egypt, Yemen, Iraq and Syria, and provided material and political support to help them to confront this danger. It has also joined the international coalition that was formed to strike ISIS "Daash", which dominated vast

areas in both Iraq and Syria. In his speech during the 69th Session of the UN General Assembly in September 2014, His Highness Sheikh Abdullah bin Zayed Al Nahyan, Minister of Foreign Affairs, stressed that "terrorism, besides being a violation of human rights, threatens the entity and values of states, breaks their social tissue, takes away the security of their people and destroys their development achievements and human and cultural heritage."

Realizing the threat from terrorism to the



security and stability of the region and the entire world, the UAE has adopted a comprehensive strategy to address it, taking into account all political, financial, cultural, educational, media and legislative dimensions associated with this phenomenon. It has also engaged in regional and international efforts to combat extremism and terrorism. The anti-terrorist crimes law No. 7 of 2014 issued by His Highness Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE, may God protect him in August 2014, enunciates the UAE's comprehensive strategy with a composite vision of the concept of terrorism in all its manifestations. The time at which the law was issued confirms clearly the UAE's understanding of the criticality of the present stage witnessed by the region, in view of the escalation of extremism and terrorism in the region, which requires the amendment of the legislative and legal framework to cope with these changes and developments in the security environment post-Arab Spring, and the related shifts that contributed to the emergence of new vio-

lent radical jihadi groups.

First: The UAE's Vision in Encountering the Phenomenon of Terrorism

The UAE adopts a comprehensive and balanced vision towards terrorism, emanating from the following considerations and constants:

1. **Global Terrorism**, as a phenomenon that has no religion, homeland or identity, and an action that is alien to Islamic principles. This was confirmed by HH Sheikh Abdullah, Minister of Foreign Affairs in his statement before the Ministerial Meeting of the UN Security Council in September 2014, when he said, "We are facing a malignant phenomenon that carries serious dimensions which threaten communities and countries beyond the Arab and Islamic worlds, and therefore, international solutions have to be found to contain the menace by eliminating the root causes of extremism, and also an international partnership to combat terrorism should

be based on long-term goals so that is not confined to facing Daash only."

2. **Terrorism is the main threat** facing the countries of the whole world, not only because it threatens coexistence among all, but also because it hinders development since it disrupts security and stability in the region and the world, as HH Sheikh Abdullah, Minister of Foreign Affairs said in his UN General Assembly speech in September.

3. **Any effective confrontation** with the phenomenon of terrorism should be in a collective framework and under the umbrella of the UN, other relevant rules relating to international human rights, international humanitarian law, international refugee law and other international conventions and protocols, so as to ensure that these measures are not exploited for the purposes of practice of violence and violations of human rights against civilians or political purposes.

4. **The war against terrorism** is an extended war and needs a comprehensive move



that is not confined to the military or security aspects only, but extends to many intellectual, religious, cultural, economic, social and other aspects as well.

5. **The war on terrorism** should not be limited to a specific area, but should include all areas where extremist ideas spread, and this is why HH Sheikh Abdullah, in his UN General Assembly, called on the international community to cooperate to tackle these terrorist groups through a clear and unified strategy, targeting all terrorist groups without limiting the efforts to Iraq and Syria.

6. **An effective fight against** the trends and forces of extremism and violence in the world mainly necessitates the promotion and deepening the values of moderation,

tolerance, coexistence and dialogue among civilizations and cultures.

Second: The UAE Counter-Terrorism Strategy Dimensions:

The UAE adopts a comprehensive and integrated vision to confront the phenomenon of extremism and terrorism, and has become a model for the same. UAE's strategy in this regard includes the following aspects and dimensions:

The Legislative and Legal Dimension:

The UAE has taken a series of legislative and legal measures to strongly contain extremism and terrorism, the latest being the "Anti-Terrorist Crimes Law" No. 7 of 2014 which adopts a comprehensive strategy on terrorism, because it involves articles cover-

ing all themes of terrorism, including intellectual terrorism, as well as deterrent penalties for those threatening the security and stability of the nation.

The Financial Dimension, which aims at draining the various sources of terrorism. The UAE has led the way in cutting the financial sources of terrorism, and has taken many measures at different levels to achieve this goal, especially with regard to the development of an appropriate legislative and effective framework for plugging money laundering and other terrorist financing methods and trapping the forces behind the same. The UAE has also introduced several domestic laws to combat money laundering for the first time in the Middle East.

The Federal National Council has agreed, at its twelfth session in May 2014, to the draft federal law on amendments to the "Federal Law No. 4 of 2002 on anti-money laundering", and then law's name became "Federal Law No. 4 of 2002 on Anti-Money Laundering and Combating The Financing of Terrorism", which highlights the commitment of the UAE to drain the financial sources of terrorism.

In this context, the UAE has taken a series of preventive measures, such as the arrest of individuals suspected of involvement in money laundering, the freezing of a large number of suspicious bank accounts



and the closure of a number of currency exchange shops.

Moral and Cultural Dimension: Promotion of the values of moderation, coexistence and tolerance, as the main barrier against these extremist groups, through the adoption by the UAE of many constructive initiatives, notably:

Supporting the reform efforts of religious discourse, promoting the image of Islam as a tolerant religion highlighting its positive principles and values so as to counter some extremist tendencies in religious discourse in the Arab and Islamic societies.

Supporting moderate religious institutions in the Arab and Islamic worlds, mainly Al-Azhar. So the UAE in 2013 began to fund several projects at Al-Azhar at a cost of about AED 250 million, to enable it to continue to play its civilized role, and promote its mission of moderation and enlightenment.

Engagement in regional and international counter-terrorism efforts: As an embodiment of the vision that fighting terrorism should be a joint international responsibility, His Highness Sheikh Khalifa bin Zayed Al Nahyan said, in his speech on the occasion of the National Day on 2 December 2005, that the UAE will not retreat from its support for international efforts to combat terrorism. In fact, the UAE has made many

achievements in international cooperation in the fight against terrorism, both at the regional or international level:

At the regional level, the UAE has cooperated significantly with the rest of the Gulf Cooperation Council (GCC). In the GCC summit held in Muscat in late December 2001, the UAE joined the rest of the Member States in the Council in approving the formation of a “higher council for common defense” and the development of a common strategy to combat terrorism.

At the Arab level, the UAE supported the Arab Counter-Terrorism Convention, which entered into force as of May 1999. Under this agreement, the signatory states undertake not to organize, finance or commit terrorist acts, or participate in them in any form.

At the Islamic level, the UAE has ratified the Convention of the Organization of the Islamic Conference on Combating International Terrorism, under which States undertake not to initiate or participate in any way in the organization, financing or commission of or incitement to commit terrorist acts or support them, directly or indirectly.

At the international level, the actions taken by the UAE in this regard varied, whether by joining the international coalition against terrorism, or cooperation in the ex-

change of information and experience with other countries and regional and international organizations. The UAE also cooperated with the anti-terrorism committees of the UN Security Council to handle all the possible gaps in its relevant national legislation and regulations, including decisions to prosecute and the freeze the funds of terrorist groups or their supporters.

Organizing major events and launching leading initiatives to counter extremism and terrorism, including mainly:

* In March 2014, Abu Dhabi hosted the Global Forum “to Promote Peace in Muslim Societies”, which announced a set of important recommendations, which would correct misconceptions that some forces of violence, intolerance and extremism tried to disseminate and attribute to Islam.

* In July 2014, Abu Dhabi witnessed the launch of “the Muslim Council of Elders”, which became the first independent international body aimed at promoting peace in the Muslim world, and which will be supported by the UAE with Headquarters and finance. The Council is chaired by Grand Imam Sheikh Dr. Ahmed Al-Tayeb, Sheikh of Al-Azhar, and H.E. Sheikh Abdullah bin Bey, the head of the Forum for Promoting Peace in Muslim Societies.

MISSILE DEFENSE

Stopping a missile attack begins with detecting launch

Ballistic missiles have become a serious threat to international security. Missiles are fast, traveling up to 15,000 mph. They can cover long distances, with the most advanced missiles reaching into space and traveling over the North Pole to hit targets. Because they are expensive and can carry only small payloads, rogue countries are more likely to outfit them with weapons of mass destruction.

Countries must be able to detect a missile launch, track an incoming missile or warhead, and then intercept it. The United States and its allies have developed several overlapping systems to stop missile attacks.

Tracking and Discrimination

Stopping a missile attack begins with detecting a launch. Space-Tracking and Surveillance System-Demonstrator (STSS-D) satellites carrying built sensors can spot multiple missile launches and beam the information to ships and interceptors.

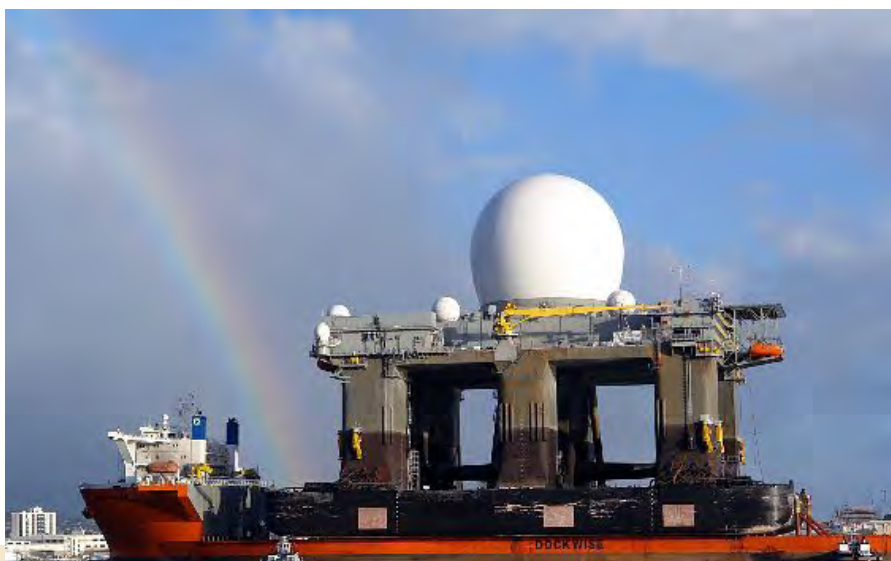
The Missile Defense Agency's Space Tracking and Surveillance System-Demonstrator program is a research and development capability for the Ballistic Missile Defense System that can detect and track ballistic missiles and other cold objects in space.

STSS-D consists of two satellites carrying sensor payloads in a low-Earth orbit. Raytheon developed the sensor payloads for the two STSS satellites under contract to Northrop Grumman, prime contractor for the STSS-D program. The STSS-D payloads are able to detect infrared and visible light.

The STSS-D spacecraft demonstrate the value of space-based sensors to mis-



First SM-3



The Sea Based X-band radar is the largest X-band radar ever constructed. (Photo courtesy of the U.S. Navy)

sile defense. Since they were launched in 2009, the STSS-D sensor payloads have demonstrated the ability to:

- Detect missile launches and track targets from boost phase into midcourse
- Acquire and track short range air-launched targets
- Track multiple targets simultaneously
- Communicate with missile defense command and control systems
- Provide "launch on remote" cueing information to U.S. Navy ship defenses before the ship itself acquired the target

Early warnings also come from the Sea-based X-Band Radar (SBX), a nine-story-high radar mounted on a converted oil drilling platform. The AN/TPY-2 radar, a mobile radar mounted on a semi truck chassis, provides warning from sites on

land. The Air and Missile Defense Radar increases detection range and adds powerful discrimination accuracy, helping naval forces respond to airborne and ballistic missile threats.

Sea-Based X-Band Radar-1

The Sea-Based X-Band Radar-1 (SBX-1) constitutes a mid-course fire control radar based on a seagoing semi-submersible vessel. The platform was developed by Boeing, as part of the ground-based midcourse defence (GMD) component of the US Ballistic Missile Defence System (BMDS). The GMD intercepts incoming warheads.

The SBX vessel was transferred to the Military Sealift Command (MSC) in December 2011. MSC operates and maintains the vessel, while the Missile Defence Agen-

Radars can provide detailed information about a missile's type, trajectory and possible target

cy (MDA) is responsible for the x-band radar. The SBX will be assigned with a limited test support role from fiscal year 2013. On 23 March 2012, SBX-1 sailed from Pearl Harbor to the Pacific region, ahead of North Korea's planned space launch.

In 2002, Boeing was awarded a \$31m contract by MDA to oversee the development of a new sea-based radar system for its BMDS. In 2003, the US Government purchased a 50,000t semi-submersible seagoing platform from Norwegian company Moss Maritime for the integration of radar system.

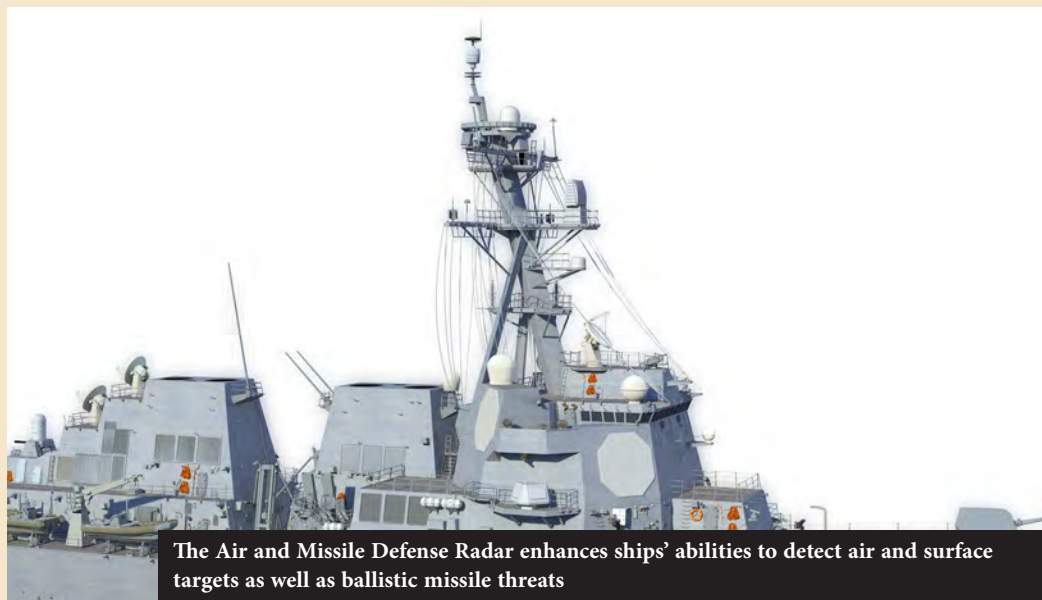
The platform was modified at the Kiepel AMFELS shipyard and the assembly and installation of the x-band radar on to the platform was completed in 2005 by Kiewit Offshore. The platform underwent additional alterations at the Pearl Harbor Naval Shipyard. In July 2005, the vessel was officially named as the Sea-Based X-Band Radar-1 (SBX-1) by the MDA. The SBX-1 underwent a series of sea trials and exercises in the Gulf of Mexico and the Pacific Ocean, prior to its service entry.

Design and features

The twin-hulled vessel can withstand high winds and rigid sea conditions. It houses x-band radar, a bridge, control rooms, accommodation units, workspaces, storage spaces, a power generation area and a heli-deck.



The AN-TPY-2 radar defends against the growing ballistic missile threat



The SBX-1 platform is equipped with a command, control and communications system, plus an in-flight interceptor communication system data terminal.

The platform has the capacity to hold supplies and fuel for 60 days. It also offers additional space for installation of new modules.

The vessel has a length of 389ft, beam of 238ft and a draft of 33ft. It can travel at a maximum speed of 9kt. It can accommodate a crew of 87, including officers, civilians, civil service mariners and contract mariners.

The SBX-1, integrated with the BMDS system, provides tracking information of incoming missiles and countermeasures discrimination for GMD interceptor missiles, in order to destroy the threat missile outside the Earth's atmosphere. It also protects the US and its allied forces from potential missile attacks.

The radar performs cued search, precision tracking, object discrimination and missile kill assessment. The in-flight interceptor communication system data terminal transfers commands from the GMD fire control system to the interceptor missile during its engagement with the target missile.

X-Band Radar, or XBR

The x-band radar, or XBR, was designed, built and tested by Raytheon for Boeing, the prime contractor of the SBX-1 development. It is the most advanced electro-mechanically steered phased array x-band radar derived from the radar of the Aegis combat system.

The radar beam is formed by the 45,000 transmit/receive modules, mounted on an octagonal flat base. It can see an object similar to the size of a baseball at a range of 2,500 miles. About 69,632 multisectional circuits are used in the radar for transmitting, receiving and amplifying signals.

The 18,000lbs radome measures 103ft in height and 120ft in diameter. It is built with high-tech synthetic fabric material to withstand wind speeds of more than 130mph. Air pressure supports the flexible cover which surrounds the radar. The vessel is also installed with small rigid radomes. Onboard equipment is powered by six 3.6MW generators.

AN/TPY-2

The first step in defeating a ballistic missile that has been fired is 'seeing' it. And that's where Raytheon's Army Navy/Transportable Radar Surveillance, AN/TPY-2 X-Band radar comes in. A critical element in

the Ballistic Missile Defense System, AN/TPY-2 continually searches the sky for ballistic missiles. Once it detects a missile, it acquires it, tracks it, and uses its powerful radar and complex computer algorithms to discriminate between the warhead and non-threats such as countermeasures.

The AN/TPY-2 radar can be deployed in two different modes. In forward-based mode, the radar is positioned near hostile territory, and acquires ballistic missiles in the boost (ascent) phase of flight, shortly after they are launched. It then tracks and discriminates the threat, and passes critical information required by decision makers to the Command and Control Battle Management network.

When the AN/TPY-2 radar is deployed in terminal mode, the radar's job is to detect, acquire, track and discriminate ballistic missiles in the terminal (descent) phase of flight. The terminal-mode AN/TPY-2 also leads the Terminal High Altitude Area Defense ballistic missile defense system by guiding the THAAD missile to intercept a threat.

AN/TPY-2 has a record of flawless performance against all classes of ballistic missiles. In forward-based mode, it has proven capability against short-, medium and intermediate-range ballistic missiles. In terminal mode, AN/TPY-2 has demonstrated its ability to enable an intercept of short- and medium-range ballistic missiles.

Raytheon has delivered ten AN/TPY-2s to date, and is in the process of building two more for the U.S. customer, and two for international partners. These radars are an important step in the right direction to meeting the growing U.S. and international demand for an affordable, proven system that can stay ahead of the increasing ballistic missile threat.

Air and Missile Defense Radar

The Air and Missile Defense Radar is the Navy's next generation integrated air and missile defense radar. It is currently



Upgraded Early Warning Radar

planned to be deployed on the DDG-51 Flight III beginning in 2016.

The radar significantly enhances the ships' abilities to detect air and surface targets as well as the ever-proliferating ballistic missile threats.

AMDR provides greater detection ranges and increased discrimination accuracy compared to the AN/SPY-1D(V) radar onboard today's destroyers.

The system is built with individual 'building blocks' called Radar Modular Assemblies. Each RMA is a self-contained radar transmitter and receiver in a 2'x2'x2' box. These RMAs stack together to fit the required array size of any ship, making AMDR the Navy's first truly scalable radar.

This advanced radar comprises:

- S-band radar – a new, integrated air and missile defense radar
- X-band radar – a horizon-search radar based on existing technology
- The Radar Suite Controller (RSC) – a new component to manage radar resources and integrate with the ship's combat management system

AMDR's performance and reliability are a direct result of more than 10 years of investment in core technologies, leveraging development, testing and production of high-powered Gallium Nitride (GaN) semiconductors, distributed receiver exciters, and adaptive digital beamforming. AMDR's GaN components cost 34 per cent less than Gallium Arsenide alternatives, deliver higher power density and efficiency,

and have demonstrated meantime between failures at an impressive 100 million hours.

AMDR has a fully programmable, back-end radar controller built out of commercial off-the-shelf (COTS) x86 processors. This programmability allows the system to adapt to emerging threats. The commercial nature of the x86 processors simplifies obsolescence replacement – as opposed to costly technical refresh/upgrades and associated downtime – savings that lower radar sustainment costs over each ship's service life.

AMDR has an extremely high predicted operational availability due to the reliable GaN transmit/receive modules, the low mean-time-to-repair rate, and a very low number of Line Replaceable Units. Designed for maintainability, standard LRU replacement in the RMA can be accomplished in under six minutes requiring only two tools.

JLENS

Airplanes, drones and cruise missiles pose a significant threat to people, population centers, key infrastructure and to military. That's where JLENS, a blimp-borne radar system made by Raytheon, comes in.

JLENS, which is short for Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System, is a system of two aerostats, or tethered airships, that float 10,000 feet in the air. The helium filled aerostats, each nearly as long as a football field, carry powerful radars that can protect a territory roughly the

size of Texas from airborne threats.

JLENS provides 360-degrees of defensive radar coverage and can detect and track objects like missiles, and manned and unmanned aircraft from up to 340 miles away. JLENS can also remain aloft and operational for up to 30 days at a time. This potent combination of persistence and capability give defenders more time and more distance to identify potential threats, make critical decisions and to conduct crucial notifications.

JLENS allows the military to safeguard hundreds of miles of territory at a fraction of the cost of fixed wing aircraft, and it can integrate with defensive systems including Patriot, Standard Missile 6, Advanced Medium Range Air-to-Air Missile and National Advanced Surface-to-Air Missile System.

One JLENS system, known as an orbit, can provide the same 24/7 coverage for a 30-day period that 4-5 fixed wing surveillance aircraft.

Upgraded Early Warning Radar (UEWR)

The UEWR provides early detection and precise tracking of incoming ballistic missiles, as well as quick, accurate determination of threat versus non-threat objects. UEWR is a key sensor for the Missile Defense Agency's Ballistic Missile Defense System, supporting the intercept of threatening ballistic missiles above the atmosphere and well away from their intended targets while concurrently performing the early warning mission.

Upgraded early warning radars are building-sized radars based in California, Alaska, the United Kingdom and Greenland. They and the AN/TPY-2 radar provide tracking information out to 3,000 miles.

Working together, these systems provide detailed information about a missile's type, trajectory and possible target. They can also help identify a warhead if it is accompanied by decoys.

Ref/Photo: www.raytheon.com

RAIDER REVOLUTION

S-97 Helicopter's technology looms as 'game-changer'

Imagine a next-generation attack helicopter platform so advanced that it can reach speeds more than 220 knots, flying as high as 10,000 feet in 95° heat. The Sikorsky S-97 Raider helicopter is poised to do it and revolutionise next-generation military aviation.

The S-97 Raider aircraft multi-mission capabilities will meet both conventional US Army and special operations future requirements in a variety of combat roles. Sikorsky is also reviewing potential applications for USAF, US Navy, and US Marine Corp services.

Sikorsky Aircraft has invested in the X2 Technology to illustrate its commitment to developing future capabilities that are achievable and affordable. X2 technology is scalable to a variety of military missions including assault, armed reconnaissance, close-air support, combat search and rescue, and unmanned applications.

Like the X2 Technology demonstrator aircraft that unofficially broke the helicopter speed record in 2010, the S-97 Raider helicopter prototypes will feature twin coaxial counter-rotating main rotors (in place of one main rotor and a tail rotor) and a pusher propeller.

For the armed reconnaissance mission, the S-97 Raider helicopter will have space aft of the cockpit for armament and auxiliary fuel. In an assault configuration, the cabin will afford space to accommodate up to six troops.

In addition to flying at nearly twice the speed of a conventional helicopter, the S-97 Raider prototype aircraft will


incorporate other key performance parameters critical to combat operations — increased maneuverability, greater endurance, and the ability to operate at high altitudes.

Compared with other light military helicopters, the Raider prototypes are expected to significantly reduce turning radius and acoustic noise signature, while significantly increasing the aircraft's payload, flight endurance and hot and high hover capability.

Last October the first of two S-97 RAIDER helicopter prototypes were unveiled, signalling the start of activities in the program's test flight phase and a major step toward demonstrating the new – and first – armed reconnaissance rotorcraft featuring X2 Technology designed for military missions.

"Sikorsky unveiled the next generation of military rotorcraft, with capabilities and performance never seen before in our industry," said Sikorsky president Mick Maurer.

"Just four years ago, we announced plans to build the S-97 Raider and



teamed with some of the best companies in the industry, understanding the need to ensure aircraft development would not falter as government defense budgets shrank in response to economic pressures. Sikorsky is proud of its leadership in this area, and of the leadership the S-97 RAIDER represents among the world's military rotorcraft."

Based on Sikorsky's rigid X2 rotor coaxial design, the S-97 Raider helicopter features next-generation technologies in a multi-mission configuration (armed aerial scout or light assault), capable of carrying six troops and external weapons.

The technology is claimed to offer safer high-speed flights with improved efficiency and safety. The helicopter is suitable for assault and armed reconnaissance missions. The technology is, however, scalable to a range of other missions such as close-air support, combat search and rescue and special operations.

The coaxial counter-rotating main rotors and pusher propeller provide cruise speeds up to 220 knots (253 mph), more than double the speed of conventional helicopters. Sikorsky will offer the Raider aircraft as a replacement for the US Army's OH-58D Kiowa Warrior helicopter fleet based on the Army's future operational and financial priorities, and for the special operations platform.

Designed with a lower turning radius and acoustic noise signature, the S-97 is expected to be a game-changer in the light military helicopters segment.

"Military rotorcraft fleets need maximum performance and increased capabilities to achieve their objectives," Maurer said. "The Raider delivers on that with its greatly improved manoeuvrability and speed, significantly improved high/hot hover performance, and greater range and endurance."

The single-engine Raider features a

composite airframe and a maximum gross weight of slightly more than 11,000 lbs. The aircraft will be capable of carrying an array of weapons and sensors, necessary for the mission. The cockpit will fit two pilots, seated side-by-side. The flexible cabin space will carry up to six combat-equipped troops, or additional fuel and ammunition for extended missions.

"Raider marks the first unveiling of a new relevant rotorcraft configuration in 30 years," said Mark Miller, Vice President of Research & Engineering. "With the Raider program, Sikorsky has brought innovation to every aspect of the process, rethinking the way we design, build, test and support the product."

"We've kept a close eye on lowering development, production and support costs while increasing productivity and quality, and we are confident that the RAIDER is the solution for the future

warfighter. We are looking forward to getting air under its tires and expanding the envelope in flight test in the coming months.”

The Raider helicopter program is 100 per cent industry funded. Sikorsky provides 75 percent of the investment, and 53 principal suppliers provide the remaining funding.

Sikorsky Aircraft Corp., based in Stratford, Connecticut, is a world leader in helicopter design, manufacture, and service. United Technologies Corp., based in Hartford, Connecticut, provides high technology products and services to the aerospace and building

Sikorsky unveiled the next generation of military rotorcraft, with capabilities and performance never seen before in industry



The Raider helicopter program is 100 per cent industry funded

systems industries.

The Raider program follows Sikorsky's successful X2 Technology demonstrator helicopter, which in September 2010 achieved more than 250 knots (287 mph) flight speed, or twice the average cruise speed of a conventional helicopter. The National Aeronautic Association awarded Sikorsky the 2010 Robert J. Collier Trophy for the achievement, and for its potential as a future rotorcraft technology.

The S-97's first military customer is aimed to be the US Special Operations Command to replace the MH-6M Little Bird. Unspecified foreign militaries have shown interest in the S-97 design. With the US Army's AAS program on hold (but not cancelled outright), it may be difficult to get approval for export for a next-generation helicopter if the American military does not yet have it. The Raider is a prototype, so the first customer would need to fund and support a production development program.

Budget projections for FY 2015 include a measure to retire the US Army's OH-58 Kiowa fleet and remove AH-64 Apache attack helicopters from US Army Reserve and US Army National Guard control and transfer them to the active Army to take the place of the aerial scout role. Sikorsky has suggested the possibility of buying the S-97 Raider as a replacement for the loss of Apaches to fulfill armed helicopter needs.

Sikorsky will invest about 75 per cent of the Raider program's expected cost, with suppliers investing about 25 per cent.

Development

First proposed in response to a request for information for the Armed Aerial Scout program in March 2010,



Raider rollout

the S-97 was formally launched on in October 2010. It is intended as a possible contender for the US Army's requirement for an Armed Aerial Scout to replace the Bell OH-58D Kiowa Warrior. Other military roles are possible, with the U.S. Special Operations Command having expressed interest in the concept as a replacement for the MH-6 Little Bird, and the possibility of adapting it for civilian applications also exists.

The first Raider is scheduled to fly at the end of 2014. One will be used for tests, and another for demonstrations. Sikorsky wants to offer the S-97 for the AAS program, but also wants the helicopter to fly before the Army makes its down select. Sikorsky invested \$150 million and its 54 suppliers (who provide 90% of the parts) are spending the remainder of a total of \$200 million on two prototypes, but production models must meet the \$15 million unit cost budgeted for the program. The company plans to fly the aircraft by Decem-

ber 1, 2014.

The S-97 Raider development is also being sponsored by a number of companies including GE, Lockheed Martin, BAE Systems, Northrop Grumman, Honeywell, Garmin, Parker Aerospace, Hamilton Sundstrand, among others.

Design features

The S-97 Raider armed scout helicopter is 37ft long and 16ft wide. It is fitted with a 34ft diameter rotor and a 7ft diameter propeller in the rear.

The fuselage of the helicopter will be built of composite materials. The cabin will have seating for a troop of six. The cockpit can accommodate two pilots in a side-by-side seating arrangement.

The helicopter will be fitted with twin rigid co-axial counter-rotating main rotors. An auxiliary internal fuel tank will be provided aft of the cockpit for extended mission support and operational flexibility. The helicopter features a retractable landing gear and fly-by-wire flight controls.

Armaments / weapons

The S-97 Raider will carry armament payloads including Hellfire missiles, 2.75in rockets, a .50 cal gun and a 7.62mm gun. It can also carry additional ammunition for extended missions. The armament space is located aft of the cockpit - towards the tail of the aircraft.

The helicopter can be armed with external weapons and will be equipped with a variety of sensors to support reconnaissance and light attack missions.

Engine/propulsion

The S-97 Raider will be powered by a single engine. The pusher type clutched propeller will enable the helicopter to fly at speeds up to 220kt. The dash speed will be more than 240kt, which is nearly double that of a conventional helicopter. An auxiliary power unit will also be provided to start the engine.

Ref/Photo: www.sikorsky.com