AEROMAG ASIA

a magazine dedicated to aerospace & defence industry

Special issue UMEX 2018, Abu Dhabi

P.1HH HammerHead – Piaggio Aerospace's Unique Redefinition of UAS

AEROSUN MEDIA PUBLICATION

in association with Society of Indian Aerospace Technologies & Industries

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The Chief of the Air Staff, Air Chief Marshal B.S. Dhanoa presenting a memento to the Air Force Chief of Staff, French Air Force, General Andre Lanata, in New Delhi on February 05, 2018.

Rosoboronexport to Promote Small Submarines

JSC Rosoboronexport, part of Rostec State Corporation, and JSC United Shipbuilding Corporation will give importance to the promotion of small and midget submarines in the external market in 2018.

Igor Sevastyanov, Deputy Director General of Rosoboronexport, has said that Rosoboronexport notes the growing interest in small and midget submarines in South-East Asia, Africa, Latin America and the Middle East. Russia's shipbuilding industry and Navy have considerable experience in their development and operation, which gives grounds for success in promoting such boats in the world market.

"According to preliminary estimates, the capacity of this segment of the arms market will be approximately US$4 billion for the coming five years. Rosoboronexport is ready to supply its foreign partners with custom-designed small and midget submarines of up to 10 different models. These include the boats displacing 130 to 1000 tons that meet the needs of most potential customers. The special exporter carries out after-sales service of the delivered products under a separate contract," he said.

Small and midget submarines are designed to guard coastal maritime borders through covert patrolling; to destroy single surface ships, submarines and vessels; to deploy (retrieve) commandos; to plant minefields; to conduct reconnaissance in designated areas and suppress enemy forces; to conduct electronic intelligence; to evacuate people from local conflict areas; to attack enemy shore facilities located on the coast and deep inside its territory etc.

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HAL Flies Hawk with Indigenous Avionics System

Giving further fillip to Hindustan Aeronautics Ltd.'s (HAL) increased thrust towards technology development, the State-run defence undertaking has flown the advanced jet trainer (AJT) Hawk-i in Bengaluru for the first time with an indigenous Real Time Operating System (RTOS) developed by it. Suvarna Raju, CMD, HAL, has said that the feat is another milestone for HAL as it is the first indigenous RTOS that has been developed in the country from scratch, and it is also the first instance that an indigenous RTOS has been certified by CEMILAC.

"The RTOS is the system software which provides a standard run-time environment for real-time applications execution in a safe and reliable manner. The RTOS is a key technology for concurrent execution of multiple applications and optimal use of hardware resources which is of paramount importance for increased complexity of modern avionics software," said Raju. Advanced modules like network stack and file system have been co-developed with IIT- Kharagpur which also carried out formal method-based verification of the RTOS kernel.

At present, avionics systems in India are developed using commercial RTOS procured from foreign suppliers. The import of technology leads to high cost, provides very limited flexibility in incorporating new features and adaptation to new hardware platforms. The imported RTOS may also be vulnerable to cyber-attacks which may compromise the safety and security of the avionics system. To overcome this dependency and achieve self-reliance, HAL had earlier taken up the onus of designing an indigenous RTOS for safety-critical and mission-critical avionics systems.

The HAL-RTOS provides a comprehensive feature set based on international specification - ARINC-653, to support Integrated Modular Avionics (IMA) architecture. Key features include address, space and time partitioning, priority pre-emptive process scheduling and health monitoring. The RTOS performance has been validated on the Mission Computer of HAL's Hawk-i trainer aircraft. The complete Operational Flight Program, which includes real-time sensor data processing, navigation algorithm computations, controls and display management and interface management have been ported and the RTOS has met all its design requirements during the flight.

"With this development, the HAL-RTOS can be made as a standard Real Time Operating System for any future avionics systems development in the country. The real-time operating system is a key technology for executing multiple applications and optimal use of hardware in modern avionics software," added Suvarna Raju. The tandem-seat Hawk-I aircraft is used for ground attack, flying and weapons training at supersonic speed. Powered by Adour Mk 871 turbofan engine, it is also used for aerobatic manoeuvres.

Navy Installs IAAMS at INS Garuda

Making a further step in the modernisation of meteorological infrastructure at Naval Air Stations, The Indian Navy has unveiled the newly installed Integrated Automation Aviation Meteorological System (IAAMS) at INS Garuda naval air station located in Kochi, Kerala. Rear Admiral RJ Nadkarni, VSM, Chief of Staff, Headquarters, Southern Naval Command has inaugurated the IAAMS, making INS Garuda the fourth air station to have been installed with this integrated system. IAAMS is an ambitious project of the Indian Navy to modernise the meteorological infrastructure of the nine Naval Air Stations. The newly installed system at INS Garuda will give a major fillip to aviation safety through automation of weather monitoring process.

Equipped with the state of the art Meteorological Sensors viz., Radar Vertical Wind Profiler, Transmissometer, Ceilometer and Automatic Weather Observation System, IAAMS undertakes automatic and continuous recording of relevant weather parameters that are vital for accurate weather forecasting. It has a special alarm feature that alerts the duty staff about any abnormal change of weather parameters that may affect safe flying operations. The system can also provide automatic dissemination of routine weather reports of the air station as per World Meteorological Organization (WMO) standards to other Air Stations and to ATC tower without human intervention.

HAL's LCH Completes Maiden Flight with Indigenous AFCS

The state-run defence PSU Hindustan Aeronautics Limited has successfully carried out the first flight of the Light Combat Helicopter (Technology Demonstrator) with indigenous Automatic Flight Control System (AFCS), giving further thrust to the Union Government's 'Make in India' initiative, The flight of the LCH using the HAL's own designed and developed AFCS has been the first time in the country. The LCH has flown the maiden flight flawlessly for about 20 minutes with the engagement of the system throughout.

T. Suvarna Raju, HAL, CMD, has said that the HAL-funded indigenous AFCS development project will replace the high value imported system. "The AFCS is a digital four-axis flight control system capable of performing control & stability augmentation function and auto-pilot modes of helicopters. The indigenous development of the Hardware, Software and Control Law is a fully in-house effort of HAL R&D Centres - RWR&DC and MCSRDC at Bengaluru, SLRDC at Hyderabad and Korwa Division," said Suvarna Raju.

During the maiden flight, Wg Cdr (Retd) Unni K Pillai, Chief Test Pilot and Gp. Capt (Retd) Rajesh Verma, Test Pilot have been at the controls of LCH. Representatives from certification agencies and senior officers from HAL have also witnessed the flight. HAL has already indigenised the Cockpit Display System on LCH namely the Integrated Architecture Display System (IADS) with the participation of Indian private industries and development flight testing is under progress. The LCH has received its Initial Operational Clearance (IOC) for LCH on August 26, 2017 in the presence of Defence Minister.

Latvia Signs €108 Million Deal with EuroSpike

The Latvian Ministry of Defence has signed a contract worth 108 million Euros, with EuroSpike GmbH, for the production and delivery of a variety of Spike Family Missiles. The Spike Family consists of 4th and 5th generation electro-optical missile systems, providing high precision and high lethality against various targets, including advanced MBTs. The missiles, which are expected to be delivered by 2023, will be fitted on Latvia's CVR-T armoured fighting vehicles acquired from the United Kingdom to provide a highly mobile and flexible anti-tank capability.

"The development of anti-tank capability is one of the priorities for defence industry purchases and the anti-tank missile system "Spike" has been recognised as the most appropriate one meeting operational requirements of the National Armed Forces. The newly acquired Spike missile system, which will complement the existing stockpile of this armament, will significantly strengthen the combat capabilities of the National Armed Forces and the National Guard," said a statement by the Ministry.

Spike is in operational use in over 29 countries, including the Lithuanian, Polish, Finnish and German armed forces and many NATO countries. Over 29,000 missiles have been supplied worldwide. Approximately 5,000 SPIKE missiles have been fired in combat and in training. SPIKE has been integrated on more than 40 platforms, aerial, vehicular and naval, including from modern remote-controlled weapon stations.

UMEX howcases Latest Unmanned Systems Technologies

The UMEX 2018, at the Abu Dhabi National Exhibitions Centre (ADNEC) in Abu Dhabi, United Arab Emirates during February 25-27, has been a reflection of the growth and investment in unmanned systems technology in the UAE and GCC countries, giving a further fillip to the unmanned technologies and systems market in the Middle East region. Building on the success of UMEX 2016, the latest edition has been a business platform to promote unmanned systems technology and capability to a dedicated and focused industry audience in the Security & Defence industry. With the three-day event, the UMEX 2018 has been bigger and better than the previous edition with a broader scope and with Simulation and Training (SIMTEX) zone has been a support to the manufacturers by bringing the next generation of defence technology to the region.

The impressing cutting-edge unmanned vehicles, the latest models in this field, showcased at UMEX 2018 has been an attraction for a lot of visitors and participants from the defence industries, media representatives etc. from all over the world. UMEX and SIMTEX have been ideally positioned to provide a professional platform for manufacturers to showcase their latest innovations to a qualified and targeted audience, and establish lucrative business relationships while promoting the ecological, environmental, civil and humanitarian benefits of unmanned systems and military simulation and training. The participants of UMEX and SIMTEX have been able to meet local and international manufacturers and providers of components required for unmanned systems in the air (UAVs), ground (UGVs), surface (USVs) and underwater (UUVs).

The highlights at the event, included unmanned systems, equipment, technologies, and vehicles; attend the Unmanned Systems Conference; live unmanned systems demonstrations; network with regional Governments, Armed Forces, Official Delegations, academia and industry peers. The participants have been able to network with senior military and industry leaders and hear about the latest military simulation training requirements across the GCC and Middle East. UMEX has marked the participation of government agencies and regulators, top level international delegations, senior military personnel, prime defence contractors, industry suppliers, pre-qualified defence trade professionals, defence media etc. has

Supported by UAE Armed Forces GHQ, the UMEX aims to promote unmanned systems technology and capability to a dedicated and focused industry audience. Keeping pace with the forefront of industry innovations and market requirements, UMEX has been a standalone show which will feature an exhibition, conference and live flying demonstrations, providing an ideal platform to discuss the latest developments, trends and innovations in the UAS sector. As part of Vision 2030, Abu Dhabi has been concentrating on its capabilities in the manufacturing and maintenance of civil and military aerospace equipment and parts, defence electronics and other equipment and space apparatus. As an ideal business platform to meet the objectives of the UAE Armed Forces, UMEX also addresses changes in the market environment.

The Simulation & Training (SIMTEX) section has been to promote cooperation among the Armed Services, Industry, Academia and various Government Agencies in pursuit of improved training and education programmes identification of common training issues and development of multiservice programmes. The display of aviation, shipbuilding technology, autonomous system investment, to that of advanced armour engineering-based products and services associated with the field has been the highlights of UMEX.

The UMEX 2018 Conference, comprises of world-class speakers and the international defence fraternity to deliberate about the future developments, opportunities and challenges relating to unmanned systems across the globe, with focus on infra structural development and create unique prospects for military, government, simulation manufacturing and academia professionals to share information about their advanced research and projects.

Since UMEX and SIMTEX were delinked from the International Defence Exhibition and Conference (IDEX) to become standalone biennial events, they have emerged as the leading platforms for the full spectrum of civil defence and military segments, such as marine, air and land search and rescue, as well as aerial photography.

Third Scorpene Submarine ‘Karanj’ Launched

The Chief of Naval Staff, Admiral Sunil Lanba addressing the launch of the third Scorpene Submarine ‘Karanj’, at Mazagon Docks, Mumbai on January 31, 2018.

The third Scorpene class submarine constructed by Mazagon Dock Shipbuilders Limited (MDL) for the Indian Navy has been launched. The submarine ‘Karanj’, the third after the recently commissioned INS Kalvari and to-be-commissioned Khanderi, has been launched by Reena Lanba, President, Navy Wives Welfare Association, at a ceremony held at MDL. Admiral Sunil Lanba, Chief of the Naval Staff has been the chief guest on the occasion. Karanj is the third of the six Scorpene-class submarines being built by (MDL) under the P-75I project. The historic event has reaffirmed the giant strides taken through the ongoing ‘Make in India’ programme, which is being actively implemented by the Department of Defence Production (MoD).

Reena Lanba, President, Navy Wives Welfare Association, along with the Chief of Naval Staff, Admiral Sunil Lanba launching the third Scorpene Submarine ‘Karanj’, at Mazagon Docks, Mumbai.

Admiral Sunil Lanba has said that the launch of Karanj marked a significant departure from the manning and training philosophy that was adopted for the first two submarines and added that from third submarine onwards the Navy would be fully self-reliant in training and certification processes. He has also mentioned that the old Karanj had served the nation for 34 years from 1969 to 2003 including participation in 1971 war. After the launch, the submarine has been towed to Mumbai Port Trust, for separation from the pontoon.

“Karanj will now undergo rigorous trials and tests, both in harbour and at sea before it is commissioned into the Navy. It is one of the most advanced submarines and better than those that the enemy country has. As of now, four to five companies have responded to the request for information (RFI) issued by the Indian navy. The meeting has also been conducted with the Indian navy and finalisation of the firm will soon be decided. Karanj is expected to be handed over to the Navy after two years,” said Lanba.

The state-of- the-art technology utilised for construction of the Scorpene class submarines has ensured superior stealth features such as advanced acoustic silencing techniques, low radiated noise levels, hydro-dynamically optimized shape and the ability to launch a crippling attack on the enemy using precision guided weapons. The attack can be launched with both torpedoes and tube launched anti-ship missiles, whilst underwater or on surface. The stealth of this potent platform is enhanced by the special attention given to various signatures. These stealth features give Karanj an invulnerability, unmatched by most submarines.

According to MDL, Scorpene submarines can undertake multifarious types of missions i.e anti-surface warfare, anti-submarine warfare, intelligence gathering, mine laying, area surveillance etc. The submarine is designed to operate in all theatres, with means provided to ensure interoperability with other components of a Naval Task Force. It is a potent platform, marking a generational shift in submarine operations.

Last year, on 14 December 2017, INS Kalvari, the first Scorpene class submarine was commissioned into the Indian Navy, by Prime Minister Narendra Modi. Khanderi, the second Scorpene class submarine has been launched in January 2017 and is currently undergoing the rigorous phase of sea trials and is also scheduled to be delivered shortly. The Scorpene submarines are a primary modernisation requirement of the Indian Navy at a time when the Chinese navy has a growing presence in the Indian Ocean.

Leveraging the experience and the transfer-of-technology of the Scorpene project, with enhanced and upgraded infrastructure, MDL is ready to undertake construction of the next generation submarines. The contract for the construction and transfer-of-technology for six Scorpene submarines in series has M/s Naval Group (formerly DCNS) of France as ‘Collaborator’ and are being built by MDL.

UAV Era - India's Drone Market to Conquer Skies

Anantha Narayanan K

The production of Unmanned Aerial Vehicles (UAV) or drones is constantly on the rise in today's world, and in India too, a young drone industry is booming with tremendous practical applications that can no longer be disputed. Drones have started becoming part of Indian life with a plethora of roles just like the smartphones became inevitable. Earlier the UAVs have been purely used for reconnaissance purposes, but now drones are everywhere with defined roles. Drone manufacturers, including Indian Start-ups are revolutionising the multifarious drone-applications in both military and non-military sectors including communication, combat roles, electronic warfare, surveillance, bomb detection, shipping and delivery, rescue operations, agriculture, surveying, disaster management, safety inspection, weather forecasting, wildlife monitoring, filming and journalism and even law enforcement.

Drones even have some creative purposes these days like drone selfies and drone racing. They also have increasing uses in civil applications, such as policing, firefighting and inspection of power lines and pipelines. State departments and ministries such as the railways, surface transport, power, and law enforcement are also using drone-enabled services. All these applications of the UAV confirm that the uses of the UAVs are not limited to just military. Now, business players focus on the untapped potential of drone industry by investing millions to manufacture unique UAVs, with innovative and practical purposes. Moreover, the new set of drone rules, unveiled by the Ministry of Civil Aviation, came as a relief for the industry, and has given the boost for drone-makers in the country, and the coming years will see a massive growth of drone industry in India.

Drones in Military

Today, the world's military forces are competing each other to go more unmanned. India is no exception in the case. The advent of drones in military sector has brought in potential changes in the way armed forces work. Now, drones in military, known as Unmanned Aerial Combat Vehicles (UACV), have become indispensable lethal assets and almost all countries are now focusing on developing their own UAV fleet. The UAVs assume high relevance because of their relative simplicity, manoeuvrability, flexibility and affordability for a wide range of missions and applications like surveillance, scouting enemy activities, collecting information, and even attacking military targets and terrorist hideouts.

Being a country with one of the largest military spending, India is focusing on strengthening its UAV capabilities of the armed forces. The DRDO has made many unmanned aerial vehicles like Abhyas High Speed Expendable Aerial Target, Nishant UAV, Lakshya Pilotless Target Aircraft, Rustom-Medium Altitude Long Endurance Unmanned Combat Air Vehicle and AURA-Autonomous Unmanned Combat Air Vehicle, which is an unmanned stealth bomber. Rustom-II MALE UAV is the latest addition to the Rustom series of UAVs, intended for use by the Indian Armed Forces in intelligence,

surveillance and reconnaissance (ISR) tasks. DRDO is also going ahead with the plan to develop a new class of UAVs. The government's 'Make in India' initiative, is encouraging private companies to boost manufacturing unmanned surveillance devices and weapon systems for the armed forces.

UAVs are more preferred for missions that involve too danger and risk for soldiers as well as manned aircrafts, especially in adverse terrain conditions and hostile grounds. The greater manoeuvrability of drones coupled with lower capital and operating costs, longer operational duration, less maintenance and higher energy efficiency increase the acceptance of drones in military. For decades, countries like the United States and Israel have held the edge in the development and use of aerial unmanned systems. The Predator of the US and the Heron of Israel are examples of top-of-the-line UAVs which are being used worldwide. The drones are one of the primary weapons in U.S. counter terrorism strategy as both the Predator and the Reaper have strike capabilities, usually carrying a payload of AGM-114 Hellfire air-to-ground missiles. But now, more countries are reaping the advantages of unmanned systems after being convinced by its uses.

India hopes to expand its army's existing fleet of Searcher Mk 2 UAVs and procure mini-UAVs. With an aim of keeping a close watch on the borders with Pakistan and China, the Director General of Artillery of the Indian army has recently decided to procure 60 short-range UAVs for aerial scrutiny. The UAVs, which can be equipped with different types of surveillance payloads such as electro-optical and infra-red (IR) with laser designator, electronic intelligence, communication, synthetic aperture, maritime patrol radar, radio relay and traffic collision avoidance systems, will give the Indian armed force an edge over the enemies.

Non-Military Drones

Drones have found an array of applications in sectors other than military, and manufacturers are developing advanced UAVs to meet diverse needs of various sectors. One of the latest applications of drones is shipping and delivery of parcels, which is going to be revolutionary for the world in the coming years by significantly reducing delivery times and human labour. Chinese e-commerce firm Alibaba has recently completed delivery of packages six boxes of passionfruit with a combined weight of around 12 kilograms using three drones. E-Commerce giants Amazon and Flipkart too are working on bringing to fruition its home delivery project using drones. The draft policy, recently unveiled by the Indian Civil Aviation Ministry seeks to promote drones for the use of parcel delivery.

At the Singapore Airshow in February, Airbus has announced the launch of its Asia-Pacific operations for aerial commercial drone services. Aiming at the emerging business of package delivery, Airbus has demonstrated its Skyways UAV at the Singapore National University, where the drone showed its automatic loading and unloading capability of parcels using a robotic arm. Recently, Boeing has unveiled a new unmanned electric vertical-take-off-and-landing, (eVTOL), cargo air vehicle prototype that it plans to use for cargo, logistics use. Boeing Chief Technology Officer Greg Hyslop has said that the eVTOL cargo air vehicle is designed to transport a payload up to 500 pounds and will assist in future cargo and logistic applications. Earlier in December, Boeing has unveiled its MQ-25 unmanned aircraft system for the aerial refuelling of U.S. Navy jets, operating from aircraft carriers.

Drones are being utilized to ensure effective monitoring and maintenance works. The Thiruvananthapuram Division of Indian Railways has decided to use drones for monitoring the maintenance of tracks and other railway infrastructure development, via aerial videography of the entire division track. The ministry of railways has earlier directed the officials to utilize the service of UAVs to enhance safety and efficiency of train operations. Research & Skill Development Centre (RSDC), a Hyderabad-based drone manufacturer has developed a drone for the Andhra Pradesh Panchayati Raj Department for mapping of villages in the state. More similar drones would be made and sold to state-owned departments like police, municipal administration & urban development for various tasks and operations like mapping of cities and towns.

Giving a major fillip to organ donation in the state of Kerala, Kerala Network for Organ Sharing (KNOS), in collaboration with Canadian scientists, has decided to use drones for transporting organs from brain dead patients to recipients in hospitals, as makes drones a faster and comparatively cheaper option. The trials of the project will be soon started to check the feasibility. The drones will transport the harvested organs, which have a short shelf life, from one hospital will be delivered directly to another hospital within 200 to 250 km in the initial phase.

For the rescue purposes during last month's heavy rain floods in Chennai, The Tamil Nadu Disaster Rescue Force (TNDRF) and personnel from TN Commando Force (TNCF) have used four UAVs to locate people stranded in certain pockets of the city's interiors, which was submerged in the flood water. The high-resolution surveillance drones have covered 2.5km radius and transmitted a direct feed to the control room. The drones, equipped with thermal and high-definition cameras, have hovered at a speed of up to 60Kmph.

The drones have applications in wildlife monitoring and forest study. Haryana's forest department has planned to use drones to increase surveillance in the most ecologically sensitive areas of the Aravalli mountains to prevent poachers and activities like cutting trees, building roads and encroachments. Drones are better than satellites in capturing images and can take videos that become important evidence in these cases.

HAL Invites Private Players to Manufacture ALH Dhruv

Promoting the defence manufacturing in India by involving more private players, the Hindustan Aeronautics Limited (HAL) has invited private defence manufacturers to make the civil version of its Advanced Light Helicopter (ALH) Dhruv. HAL has offered the indigenous ALH Dhruv' (Civil version) for manufacturing to potential Indian private companies through Transfer of Technology. The move, which is for the first time in the history of India, will give a major boost to defence manufacturing and Government's 'Make-in-India' initiative,

T Suvarna Raju, CMD, HAL, has said that the Company invited Expression of Interest (EOI) for identification of Indian Partner. considering the increasing need of helicopters in civil operations of the country, this will be a mega deal from HAL which is the OEM and Licensor. "HAL is the Design Authority and Original Equipment Manufacturer (OEM) of ALH-Dhruv. The Company is now looking forward to developing a reliable Indian Partner (IP) to service the potential demand to different customers in civil sector in shorter time span. The selected Indian Partner would also be required to provide support to the customers throughout the life of the product (20 years) thereby ensuring long term business relationship," said Suvarna Raju.

As a technology provider, HAL shall provide transfer of technology through license and transfer of know – how, technical assistance and license rights for production of ALH-Dhruv (Civil) for the selected business partner. HAL is looking for the Indian Partner, who has the capability of having five years of experience in engineering/aerospace industry (including manufacturing and assembly); having net worth of Rs.2000 crores and minimum turnover of Rs.2500 crores; possessing skilled and qualified manpower; registered in India or having majority holding by Indian stakeholders and willing to enter strategic collaboration with HAL.

ALH Dhruv has successfully proved itself with different customers in varying roles and missions in demanding operational conditions and has bright business prospects. Besides the current orders, Dhruv is envisaged to have potential demands in domestic as well as foreign markets due to flexibility of configuration for different roles.

Rear Admiral Mukul Asthana Appointed ACNA (Air)

The Ministry of Defence has appointed Rear Admiral Mukul Asthana, NM as the Assistant Chief of Naval Staff (Air) at New Delhi. Asthana has been commissioned in 1986 in the Executive Branch of the Indian Navy. A graduate of the Naval Academy, he has attended the 141 Pilots Course and was awarded wings in Jun 1988, at the Air Force Academy. An experienced pilot, he has flown four types of aircraft and held operational and supervisory assignments in Indian Naval Air Squadrons 551, 550 and 310, the IW Squadron. He has attended the Command and Staff Course at the Defence Services Staff College, Wellington in 2000 and the Higher Command Course and the Naval War College, Mumbai in 2009.

Asthana has commanded INS Rajali a premier Naval Air Station, from Aug 2009 till Dec 2010. During this period, he has overseen the drawing-up and implementation of plans for induction of the state of the art Boeing P8I Long Range Maritime Reconnaissance ASW aircraft. His staff appointments include Command Aviation Officer at Headquarters Eastern Naval Command Visakhapatnam, Chief Staff Officer (Air) at Headquarters Naval Aviation, Goa and Principal Director Naval Air Staff at the Naval Headquarters, New Delhi. During these assignments, he has steadily steered various cases and policies for enhancing and optimising operational, training, and modernisation aspects of Naval Aviation.

P.1HH HammerHead – Piaggio Aerospace's Unique Redefinition of UAS

By redefining the concept of Unmanned Aerial Systems with its uniquely designed and developed UAS P.1HH Hammerhead, Italy's Piaggio Aerospace has earned its own identity in the field of defence and security. With its peerless operational versatility, this one-of-a-kind hammer-headed UAS is Piaggio Aerospace's assurance to play a character role in the UAS segment. Being a promising future of land, sea and air security with its sophisticated navigation and mission management systems, the P.1HH HammerHead, one of Piaggio's main attraction at the Unmanned Systems Exhibition & Conference (UMEX) 2018, gives a new meaning to the very notion of aerial patrol.

Piaggio Aerospace is one of the few companies in the world in possession of both the technology and the experience to design, develop and build unmanned Medium Altitude Long Endurance class systems (MALE). P.1HH Hammerhead, which is the prime product in the segment, is an unmanned derivative of Piaggio Aerospace's P180 Avanti II twin-turboprop aircraft, which is one of the fastest business aviation aircrafts in the world. Based on the P.180 Avanti II' architecture and technologies, P.1HH HammerHead is designed to be an all-weather aircraft with twin turboprop propulsion to provide maximum safety, operational reliability and the lowest mishap rate in its category, inheriting the P.180 Avanti II' proven service record of more than 20 years and 800,000 flight hours. The Hammerhead has a flight endurance time of up to 16 hours, can soar up to 45,000 feet and has the unique ability of loitering as slowly as 135 knots true airspeed (KTAS) or sprint as fast as 395 KTAS with its ISR payload. It has a flexibility that allows it to extend its capabilities with an array of features that makes the P.1HH Hammerhead a unique UAS in the market.

The Hammerhead is a UAV system Piaggio Aerospace claims to be Europe's only medium altitude long endurance (MALE) program, with top-of-the-line combination of performance and operational characteristics. Piaggio Aerospace has designed the P.1HH HammerHead to suit for a wide range of ISR, Defence and Security missions, and it defines a peerless mission role flexibility and sets a new frontier of Concept of Operations (CONOPS) for Defence. The Hammerhead can host several payload combinations and perform multiple missions like aerial, land, coastal, maritime and offshore security, COMINT/ELINT, electronic warfare as well as other roles.

With its hammer-headed front and the rear positioned wings, the UAS stands distinct from others in the market in terms of design. The P.1HH HammerHead UAV platform has an aerodynamic configuration largely similar to P.180 Avanti II. The unique patented 3 lifting surfaces configuration and high aspect ratio laminar wings of the Avanti II have been adapted for the P.1HH design by moderately increasing the wing span to sustain larger vehicle masses and allocating a quick detachable joint to the outer wings for rapid aerial deployment of the UAS in remote areas. Being a derivative of a Mach 0.70 aircraft, P.1HH HammerHead is the one of the fastest MALE UASs in the market. Its design complies with STANAG USAR 4671 standards that authorises it to fly in both restricted and unrestricted flight areas.

The P.1HH HammerHead is powered by Pratt & Whitney Canada's PT6A-66B turbine engines integrated with 5-blade propellers. With its smart fuel system that controls and minimize the movement of the aircraft's centre of gravity, Hammerhead has maximum operational flexibility in a wide range of mission payloads. The triple redundant electrical generation and distribution system caters to all the energy needs of the UAS with adequate operational reserve through the envelope, and completely satisfies large power demands from a variety of power consuming payloads.

> With its state-of-the-art UAS P.1HH Hammerhead, Piaggio Aerospace offers the Middle East and Asian markets yet another potential unmanned aerial system that can bolster defence security.

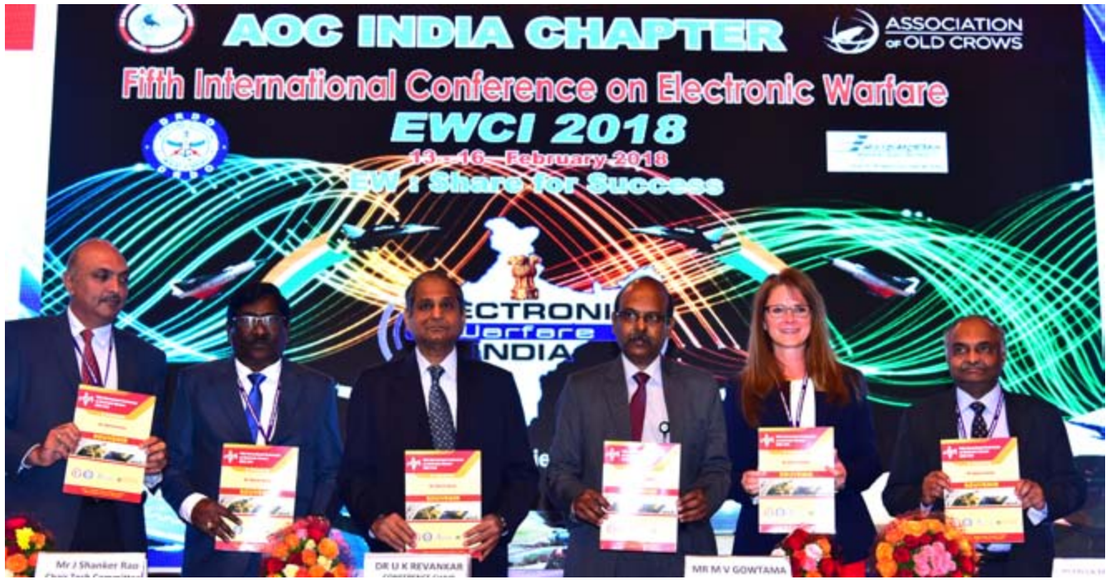
Apart from having the same design of the P.180 Avanti II aircraft, the Hammerhead also inherits several of its general systems and sports a hydraulic dual pressure system for landing gear extensions/retraction and brake activation. These subsystems are all commanded via fail-safe Remote Interface Units by a technologically advanced Vehicle Control & Management System (VCMS). The VCMS, combined with the advanced Mission Management System (MMS), manages the UAV and its mission specific equipment. The VCMS is commanded from the Ground Control Station (GCS) via an airborne datalink system. It conducts the vehicle commanding aerodynamic control surfaces and manages on-board equipment with a triple redundant Flight Control Computer (FCC) system and multiple remote multi-lane Servo Interface Units (SIU), that helps Hammerhead in achieving the required level of safety and mission reliability.

HammerHead's VCMS also features an Automatic Take-Off and Landing (ATOL) system served with dual redundant external sensors to assure reliability and safety. All VCMS LRU's are installed in such a way to provide zonal separation and temperature analysis for achieving a state of the art operative temperature range, highest VCMS reliability and above all, the drone's safety, with one of the best maintainability in the segment.

An advanced Ground Control Station (GCS), developed and supplied by Leonardo Spa, is the P.1HH HammerHead UAS's Command & Control centre. The GCS is located in an autonomous shelter that hosts crew, equipment and consoles necessary to manage up to three UAVs (two operational, one in transfer mode) and their related payloads. The GCS is provided with multiple Ground Data Terminals (GDT) that when coupled with the associated Air Data Terminals (ADT) on the vehicles provide Line of Sight (LOS) and Beyond Line of Sight (BLOS) Link for Vehicle and Payload Control. The P.1HH HammerHead UAS Mission Management System redefines the concept of patrolling and ISR missions, to encompass threats that range from terrorist attacks to illegal immigration, as well as protection of Exclusive Economic Zones (EEZ), infrastructures and critical sites. The onboard airborne Mission Management System (MMS) manages sensors, video and data, communications, and ISR functions and it is capable of recording video and mission data.

With its state-of-the-art UAS P.1HH Hammerhead, Piaggio Aerospace offers the Middle East and Asian markets yet another potential unmanned aerial system that can bolster defence security.

AOC Organises Conference on Electronic Warfare



The Fifth International Conference on Electronic Warfare has been held during February 13-16 at IISc Bengaluru. The three-day conference has been organised by Association of Old Crows (AOC) India Chapter with support from Defence Research and Development Establishment (DRDO), Bharat Electronics Limited (BEL), Bangalore, Armed Forces and many Industries like Alpha Technologies Ltd, Bangalore.

The conference and exhibition have been inaugurated by M V Gouthama, Chairman and Managing Director, B E L, on 14th Feb 2018 at National Science Seminar Complex, Indian Institute of Science, Bangalore. Many senior officials from MoD, DRDO, Defence Services, Defence PSUs and industries have marked their presence. Nearly 400 delegates and 100 exhibitors have participated in the Conference.

Gouthama has said that the dynamic electronic warfare field has a tremendous scope for innovation and continuous research process in tune with galloping technology. "The progress in this area is definitely required for future warfare and will establish growth of peace and harmony among the neighbours. Make in India concept of our prime minister supports the swadeshi production of critical software technology products leading to saving the nation's exchequer in a big way. BEL is committed to work hard in its field because more than 15 % of the R & D budget is utilized to produce E W systems for the branches of armed force of the country," he added.

Lisa K. Fruge, International President, AOC, U.S. has said that India is emerging as one of the most successful and active hubs of electronic warfare professionals in the world due to the advancement of technology in the defence systems. "This mutually vibrant set up of technologists envisages the faster connectivity for communication, collaborating, membership driving and mentoring among the professionals to help their country to grow," she said.

As no single platform can be used by the different branches of armed forces of a country, it is the need of the hour to innovate in this field, because the future warfare would be only an electronic warfare, the technology of which is growing very fast, said Lisa, while calling for the right involvement of young professionals in the field to infuse fresh blood leading to new applications.

The conference has addressed the technical and commercial needs of Operational Users, Planners, Developers, Procurers, Testers and Trainers of the latest EW Technologies and Systems. A large scale Indoor Exhibition with more than 50 booths has been organised, displaying the latest EW products from National and International EW Organisations. The conference has envisaged to be a confluence of EW professionals who would collaborate and share their knowledge and experience in the field. Hence, the theme of the conference has been chosen as "EW: Share for Success".

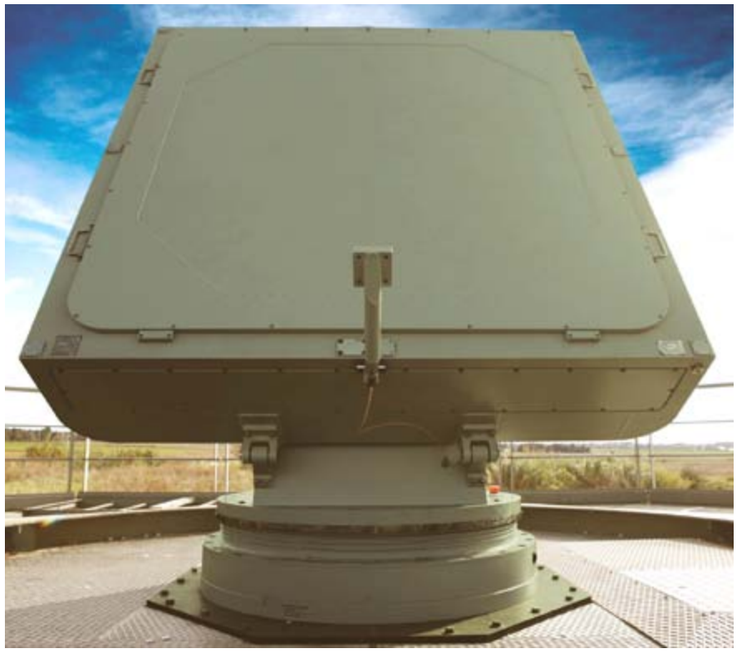
The conference will create adequate interest and enthusiasm among the Indian entrepreneurs and Scientists to venture into effective solutions for Armed Forces. Besides, the conference has thrown up ample of opportunities to develop Business Partnership for the Development of EW Systems, with advanced countries which will further enhance the expertise in India.

Leonardo to Display its Defence Capabilities at DIMDEX 2018

Italian aerospace and defence manufacturer, Leonardo will showcase its state of the art capabilities in defence and aerospace sectors at the Doha International Maritime Defence Exhibition and Conference (DIMDEX). At the 10th anniversary of DIMDEX exhibition, to be held in Doha from 12 to 14 March, Leonardo will be demonstrating its top products in defence, security and aerospace sectors aimed at promoting security in Qatar and the surrounding region by protecting civil infrastructures in the Gulf, such as airports, ports, sports stadium and oil and gas platforms.

Leonardo's focus at the show will be to promote its range of naval capabilities, spanning from turnkey combat management systems for all classes of military vessels to naval guns, ammunitions and underwater defence systems which are increasingly being recognised in the Gulf region as the gold-standard for integrated maritime security. At DIMDEX, Leonardo will arrange a retrospective display of its solid foundation of over 20 years in the industry partnering with Qatar.

Qatar has ordered 21 new-generation AW139 helicopters for a number of military applications, while, in the commercial market, Gulf Helicopters operates a fleet of AW139s for offshore transport missions and of AW189s for the same application. In addition, the company has a strong position in the Gulf's commercial and military helicopter markets and sees significant future opportunities for a number of its helicopter types on display in Doha.



In the avionics domain, the visitors will be able to see some of Leonardo's most advanced electronics products including airborne radars, Directed Infra-Red Counter-Measure (DIRCM) systems and Identification Friend or Foe (IFF) equipment. An interactive display on the stand will also give visitors the opportunity to find out about Leonardo's ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) capabilities.

Of note is Leonardo's significant contribution to the Eurofighter Typhoon, 24 of which ordered by Qatar at the end of 2017. Qatar's Typhoon platforms will be the most advanced type and will include the Leonardo-led 'Captor-E' E-scan/ AESA radar. Beside a significant share of the airframe, Leonardo provides more than 60 percent of the avionics for the Typhoon, including leading the consortia responsible for providing the aircraft's radar, defensive aids suite and infrared search and track (IRST) system.

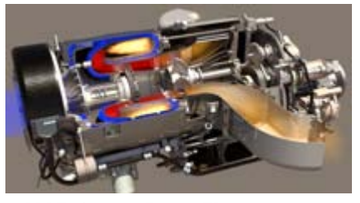
PBS TJ150-The New Turbojet Engine from PBS Velka Bites

Czech aircraft engine manufacturer PBS Velka Bites, a.s., has developed a new aircraft turbojet engine, PBS TJ150, to cater to the needs of missile and UAV markets. With its in-house expertise in design, development, production and testing, PBS continually works on new engine development in order to meet missile and UAV market requirements. This year PBS has finished the development of its new turbojet engine PBS TJ150.

The newly developed engine PBS TJ 150 has been derived from PBS Velka Bites' most commercially successful model of PBS TJ 100 turbojet engine (1,300 N thrust). It is a single-shaft engine composed by a starter generator integrated in the radial compressor impeller, one axial turbine, autonomous oil system and digital control system.

So far, almost 800 units have been delivered to customers.

PBS is a producer of jet engines in the power range from 200 to 1,500 N. The company also produces a range of gas turbine auxiliary power units end



PBS Turboprop Engine TP 100

PBS TJ 150

Spanish Target Drone DIANA with PBS Turbojet Engine TJ 100

environmental control systems mainly for small helicopters and trainers.

PBS Turbojet Engines

PBS turbojet engines have proven to be efficient propulsion units in hundreds of aerial targets, UAV and UCAV systems, powered gliders and piloted micro jets, mainly in Spain, China, Russia, UAE, the USA, France, Germany and other countries.

With an excellent power-to-weight ratio, compact design, reliable operation, low fuel and oil consumption, and starting at high altitudes and at high speeds, PBS jet engines stand out from competing engines.

New development PBS TJ150

Weighing just 19.6 kg and 272 mm in diameter, the engine PBS TJ150 offers 1,500 N thrust. It features an integrated starter-generator with 600 W electrical power output and is controlled through full-authority digital system FADEC. The engine can operate at speed up to 0.9 M, ambient temperature of -50 °C to +45 °C and altitudes up to 9,000 m. It has an ability of ground and in-flight restart up to 4,000 m and at maximum speed 0.6 M.

PBS Turboprop and Turboshaft Engines

PBS is also a manufacturer of turboprop and turboshaft engines designed for MALE UAVs, unmanned helicopters and small experimental aircraft. The PBS TP100 and TS100 delivers a max. power of 180 kW. Low weight, small installation dimensions, extended intervals between overhauls (TBO), and high efficiency at high altitudes are the competitive advantages of PBS engines. They are able to achieve flight levels of 9,000 m with a maximum starting height of 6,000 m.

PBS turbine machinery design and manufacturing processes meet the highest standards and successfully completed a rigorous programme of certification by the European Aviation Safety Agency (EASA).

Doha All Set to Host DIMDEX 2018

A cargo ship docked at the newly launched Hamad Port, Doha.

Doha, the capital of Qatar, is all set to welcome the naval and defence industry professionals around the world to the Middle East, as the sixth edition of Doha International Maritime Defence Exhibition & Conference (DIMDEX) will kick off in March. DIMDEX 2018, which is the sixth edition of three-day event, will be held from 12 March at Qatar National Convention Centre (QNCC), Doha. It will also be the 10th anniversary of DIMDEX, which has been first held in 2008. DIMDEX, which has grown to become a leading event in the global maritime defence and security industry calendar, will showcase state-of-the-art technology in the naval and defence industry and maritime transportation.

DIMDEX is renowned to be a dynamic gateway to industry insights, solutions and procurement opportunities, for maritime and defence leaders from around the world. The latest edition of the prestigious event provides a platform for naval and defence industry players to initiate commercial deals and provide consultation on sustaining stability across global waters. It is a premier programme that provides the maritime and security community with access to cutting-edge military technology and the opportunity to build and strengthen relations with key stakeholders.

As a prominent large-scale event for Qatar, DIMDEX introduces businesses to key procurement decision makers with key elements to support exhibitors and visitors achieve their goals. This includes the Exhibition to explore the latest state-of-the-art technologies; and the Middle East Naval Commanders Conference (MENC) discussing pressing industry trends with academic and military speakers; the VIP Delegations for exhibitors to access key stakeholders; and, the Visiting Warships.

The Qatar government has made a number of arrangements to make this year's DIMDEX a grand success. With DIMDEX 2018 around the corner, one of the Middle East's largest port, has geared up for the first time the Visiting Warship Display at its state-of-the-art facilities. The newly opened28.5 square kilometres Hamad Port will facilitate the docking of international Visiting Warships for DIMDEX. The Port, operated by Qatar Ports Management Company (Mwani Qatar), boasts a 4 km long, 700 meters wide, and 17 meters deep basin, enabling it to harbour some of the world's largest seafaring ships.

Hosted off-site from the QNCC, the extensive display of visiting warships will be comprised of several types of vessels including destroyers, frigates, and fast-attack craft, to amphibious transport docks from the region and beyond. To date, DIMDEX has received over 70 warships at previous editions. The arrival of the warships is one of the key elements of the leading three-day maritime defence event, as navies from around the world get to display their latest vessels and showcase their capabilities in protecting trading routes, borders and shorelines. This year, DIMDEX and Hamad Port will welcome international vessels and provide exhibitors and visitors with the

The Chief of Army Staff, General Bipin Rawat presenting the Indian Army Coffee Table Book to the Chief of General Staff, UK, Gen. Sir Nicholas Carter, who was in New Delhi in February as part of an official visit.

opportunity once again to explore modern naval warships and meet with the respective leaders and crew.

Staff Brigadier (Sea) Abdulbaqi Saleh Al-Ansari, Chairman, DIMDEX has said that the organising committee is finalising preparations for the special sixth edition that will mark the 10th anniversary. "Since DIMDEX was launched in 2008, we have continued to identify new avenues for putting on a larger, more diverse and exciting global maritime defence and security exhibition and conference. This year's event utilises the new facilities and capabilities at Hamad Port and DIMDEX 2018 will display the latest technologies from the maritime security and defence industry, offering solutions to entities responsible for securing sea routes, international borders, and regional waters," he said.

Hamad Port has been inaugurated by the Emir of The State of Qatar, Sheikh Tamim bin Hamad Al Thani, in September 2017 representing a long-term manifestation of the Qatar National Vision 2030 – an all-encompassing plan focusing on the nation's social, economic, environmental and human development. Staff Brigadier (Sea) Al-Ansari has added that the Visiting Warships segment has proved to be one of the most popular key elements of DIMDEX and Hamad Port will serve as a docking venue for these vessels. "Through the new collaboration with Mwani Qatar, we will be able to welcome larger vessels and showcase one of the many core infrastructure developments in the country, that represent a beacon for the future prosperity of MENA region and maritime stability and security," he said.

Hamad Ali Al Ansari, Director of Public Relations and Communications, Qatar Port's Management Company (Mwani Qatar), has said that some of the world's largest naval vessels will be part of the premier event. "Hamad Port offers expanded capacity, new sector-specific capabilities and hosts a base for offshore and marine support vessels. The port is strongly positioned to develop a regional shipping hub in the region and to play a major role in diversifying the Qatari economy and preparing it for a post-hydrocarbon future," he said.

Vice Admiral RB Pandit Takes Charge as INA Commandant

Vice Admiral RB Pandit AVSM

The Indian Navy has appointed Vice Admiral RB Pandit, AVSM, as the Commandant of Indian Naval Academy, Ezhimala, Kannur, replacing Vice Admiral SV Bhokare AVSM, YSM, NM. RB Pandit, is an alumnus of the National Defence Academy, Khadakvasala; Defence Services Staff College Wellington; the College of Naval Warfare, Mumbai and the Royal College of Defence Studies, London, UK. The Flag Officer, specialised in Anti-Submarine Warfare, has commanded INS Nirghat, INS Vindhyagiri, INS Jalashwa and the 22nd Missile Vessel Squadron at Mumbai.

RB Pandit has been the Naval Adviser at the High Commission of India at Islamabad, Pakistan. He has also held important staff assignments such as ACNS (Foreign Cooperation and Intelligence) at IHQ MoD (Navy) and Chief of Staff, Southern Naval Command. He was the Flag Officer Commanding Western Fleet at Mumbai, prior being appointed as the Commandant of Indian Naval Academy. The officer has been promoted to the rank of Vice Admiral on 19 February 2018 and took over as the sixth Commandant of Indian Naval Academy, which the premiere training centre for naval officers.

The outgoing commandant, Vice Admiral Bhokare has handed over his responsibilities as the Commandant of INA to Pandit at a grand ceremony held at the INA. Bhokare, who has taken over as the Commandant of the Indian Naval Academy in October 2016, completed a successful tenure of over 15 months at INA.

During his tenure, the Academy has witnessed transformation in infrastructure and training facilities.

P.1HH HAMMERHEAD UAS

RNI REG. NO: KARENG/2008/26436

P.1HH HammerHead

The Piaggio Aerospace P.1HH HammerHead is a new, state-of-the-art Unmanned Aerial System (UAS) designed for Intelligence, Surveillance and Reconnaissance (ISR) missions. Its combination of performance and operational characteristics is at the very top end of the UAS MALE category.

An unmatched combination of range, wide operative speeds, fast climb gradient, high operative ceiling and potential variety of payloads, provides end-users with a powerful yet flexible Defense System that outperforms other MALE systems, identifying the P.1HH HammerHead as a Super MALE UAS.

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