SEE US AT HALL E (E1.5)

रक्षा मंत्रालय MINISTRY OF DEFENCE

AERO INDIA 2019 The Runway to a Billion Opportunities

नागर विमानन मंत्रालय MINISTRY OF CIVIL AVIATION

DAY-2
THURSDAY,
FEBRUARY 21, 2019

SP'S

AN SP GUIDE PUBLICATION

SHOWNEWS

PUBLISHERS OF
SP'S MILITARY YEARBOOK, SP'S CIVIL AVIATION YEARBOOK, SP'S AVIATION, SP'S AIRBUZ, SP'S LAND FORCES, SP'S NAVAL FORCES, SP'S M.A.I. & BIZAVINDIA

We at SP's offer our humble prayers for the bravest soldiers of our motherland, martyred in Pulwama

INSIDE

EXCLUSIVE

Photographs by SP Guide Publications (Archive), Karthik Kumar & respective organisations

DEFENCE MINISTER LAYS OUT THE RED CARPET FOR INDUSTRY

Nirmala Sitharaman assures space for private sectors and foreign OEMs in 'Make in India' programme

DEFENCE MINISTER NIRMALA SITHARAMAN AND CIVIL AVIATION MINISTER SURESH PRABHU WITH THE DIGNITARIES AT THE INAUGURAL FUNCTION OF AERO INDIA 2019 AT YELAHANKA AIRBASE IN BENGALURU ON FEBRUARY 20, 2019

By **VISHAL THAPAR**

Defence Minister Nirmala Sitharaman laid out the red carpet for both foreign and domestic industry to participate in the 'Make in India' programme for defence and aerospace production while inaugurating the 12th edition of India's biggest airshow, Aero India 2019 at the Yelahanka airbase in Bengaluru on February 20.

A US Air Force B-52 bomber which flew in from Guam for the inaugural flypast and headed straight thereafter to Diego Garcia underscored the potential of partnerships in building up capability.

Outlining the policy initiatives and reforms, Sitharaman set out India's agenda of emerging as a key player in the global defence arena, and promised to create an industrial ecosystem to make that possible. Sitharaman went at length to emphasise that there is ample space for both the public and the private sector as well as foreign OEMs in the vision for the 'Make in India' story.

"Aero India 2019 intends and endeavours to put India on the global map and intends metaphorically to be a 'Runway to a billion opportunities'," she said in her inaugural speech, alluding to the catchy tagline for the show. To an audience comprising global leaders in defence and aerospace, the Defence Minister pitched India's potential and competence of end-to-end or "nose-to-tail production". The India Pavilion, which she later inaugurated, bears testimony to such potential, she said.

Sitharaman rolled out the success stories in the production of the S-92 helicopter cabin, advanced aircraft cockpit, glass cockpit for Dornier and CH-47 Pylon for Boeing – all displayed in the Indian Pavilion – to illustrate her point, further pointing out that India has manufactured more than 4,000 aircraft to date.

The sheer size of the Indian market is incentive enough for industry, she urged. Since 2014, 150 defence contracts worth about ₹1,27,500 crore have been signed with Indian vendors. Acceptance of Necessity (AoN), during this period, has been accorded to 164 proposals, worth ₹2,79,950 crore for various 'Make in India' schemes. The Value of Production (VoP) in respect

of government-owned Ordnance Factories and Defence PSUs grew from ₹43,746 crore in 2013-14 to ₹58,163 crore in 2017-18, of which 40 per cent was outsourced to the private sector.

As many as 275 Ordnance Factory items have been de-notified and are now available for production by the private sector. Testing facilities of DPSUs and OFs have been opened up for private industry. Trade receivables Electronic Discount System (TreDS) is under implementation in all Defence PSUs and Ordnance Factories.

The Government has also rolled out manufacture of seven identified types of ammunition in private sector backed by long term contracts, tenders for which have already been issued.

More than 10,000 MSMEs across the country makes 80 per cent of the components, aggregates and assemblies of complex weapon systems and aircraft, providing the backbone for the Industrial ecosystem. The base of MSMEs and private sector enterprises has also increased due to de-licensing of large number of items previously under the licensing ambit. For production of items which is still under license, 424 companies have been given approval, doubling the number over the last four years.

Approval in Principle has been given to 34 procurement programmes under a separate Make-II sub-category which has several incentives for industry.

Indicating that the Defence Procurement Programme is now more open to Industry initiatives which were earlier considered 'unsolicited', the Minister disclosed that suo moto suggestions to the armed services had resulted in approval for four projects.

Sitharaman also updated the gathering of top honchos from the global Defence & Aerospace industry about the investment commitment of ₹3,200 crore to the two Defence Industrial Corridors launched by the Government in Tamil Nadu and Uttar Pradesh.

She made a mention of the K9 Vajra 155 mm/52 calibre self-propelled Howitzer, Advanced Towed Artillery Gun System of the same dimensions and calibre, high altitude UAV, production of the Scorpene class submarines, development of two indigenous anti-tank guided missiles, upgradation of L-70 air defence gun, design, development and production of the Light Combat Aircraft Tejas, Akash missile system and integrated air command and control system as successes of the Indian Defence Industrial complex, comprising both the public and private sector.

The Defence Minister also spoke of artificial intelligence and robotics as areas where industry could participate in defence capacity building for the future.

Civil Aviation Minister Suresh Prabhu pitched India as a market which required 2,300 passenger aircraft over the next 20 years, and highlighted the huge expansion in civil aviation, and the drive to make air travel affordable to the common man as the cornerstone of government policy.

Karnataka Chief Minister H.D. Kumaraswamy said his state government would go all out to promote defence and aerospace industrial hubs in the state.

A coffee table book titled *Trail Blazers: Shaking up the Skies*, profiling the achievements of start-ups in this sector, and another book, *Indian Aerospace Taking Off* were released on the occasion.

The Surya Kiran Aerobatics Team (SKAT) was conspicuous by its absence from the flying display after the inaugural ceremony. The IAF flew its aircraft in a Missing Man formation in homage to Wing Commander Sahil Gandhi, who was killed in the mid-air collision between two Hawk aircraft of the SKAT on February 19 during rehearsals for Aero India.

The American F-16 and the French Rafale fighters provided the international flavour to the flying display. A restored DC-3 Dakota of World War II vintage drew nostalgia, but it was the marathon hop by the American B-52 bomber from Guam to Diego Garcia to fly by Aero India which was truly the highlight of the inaugural flypast. •

SKAT Cancels Aerobatics Display at Aero Indian After the Aircraft Crash

Aero India 2019 got off to a tragic start with a fatal mid-air collision between two Hawk aircraft during rehearsals by the Indian Air Force's Surya Kiran Aerobatics Team (SKAT) a day ahead of the inaugural. The wings of the two aircraft collided during the Mirror Image manouvre.

Wing Commander Sahil Gandhi, the pilot of one of the aircraft involved in the collision, died in the crash in the vicinity of the Yelahanka airbase. The pilot of the other aircraft ejected, and was seriously injured in the descent.

The SKAT subsequently cancelled its aerobatics display at Aero India.

"These are operational risks which we carry," said Air Marshal R.K.S. Bhadauria, the Air Officer Commanding-in-Chief of the IAF's Training Command. "The SKAT is one of the very few aerobatics teams in the world operating 9 aircraft. There are associated risks when aircraft are flown 4-to-5 metres from each other. Some maneouvres involve greater risk. The margin of error is very low. We try to balance risks with safety concerns. The inquiry will establish whether this (accident) was the result of human error or technical error," he said. Responding to a question on the spate of recent IAF crashes, the Air Marshal said there should not be any doubts about airworthiness of aircraft.

Defence Minister Nirmala Sitharaman also said she would prefer to wait for the reports of the courts of inquiry before commenting on the issue.

A two-minute silence was observed to pay homage to the deceased pilot, Wing Commander Gandhi, at a press conference by the Defence Minister on February 19. •

PUBLISHER AND EDITOR-IN-CHIEF
Jayant Baranwal

SENIOR CONTRIBUTORS
Air Marshal B.K. Pandey (Retd)
Lt General Naresh Chand (Retd)
Lt General P.C. Katoch (Retd)
Rear Admiral S.K. Ramsay (Retd)

GROUP ASSOCIATE EDITOR
Vishal Thapar

CHAIRMAN & MANAGING DIRECTOR
Jayant Baranwal

PLANNING & BUSINESS DEVELOPMENT
Executive Vice President: Rohit Goel

SALES & MARKETING
Director: Neetu Dhulia
General Manager Sales: Rajeev Chugh

CREATIVE DIRECTOR
Anoop Kamath

LAYOUT DESIGNERS
Vimlesh Kumar Yadav
Sonu S. Bisht
Research Asst-Graphics: Survi Massey

ADMIN & COORDINATION
Bharti Sharma

ASST–ADMIN, HR & INFRA
Pooja Tehlani

SP'S WEBSITES
Sr Web Developer: Shailendra Prakash Ashish
Web Developer: Ugrashen Vishwakarma

SP GUIDE PUBLICATIONS PVT LTD
A-133, Arjun Nagar,
(Opposite Defence Colony)
New Delhi 110003, India

Tel: +91 (11) 24644693, 24644763, 24620130
Fax: +91 (11) 24647093

E-mail: info@spguidepublications.com

Owned, published and printed by Jayant Baranwal on behalf of SP Guide Publications Pvt Ltd.

Printed at Kala Jyothi Process Pvt Ltd, Hyderabad

www.spguidepublications.com

SP GUIDE PUBLICATIONS

SP's
A JOURNEY OF EXCELLENCE
SINCE 1964

Join us at Aero India, Hall E, stand E2.20.

ALPHA
BRAVO
COLLINS

We are Collins Aerospace. With our customers we chart new journeys and reunite families. We protect nations and save lives. We fuse intelligence and partnership to tackle the toughest challenges in our industry. And every day, we imagine ways to make the skies and spaces we touch smarter, safer and more amazing than ever.

UTC Aerospace Systems and Rockwell Collins are now Collins Aerospace.

TOGETHER, WE ARE REDEFINING AEROSPACE

Collins Aerospace

collinsaerospace.com

"It is expected that in another four years, new RPAs will be inducted to meet the operational requirement of IAF"

Chief of the Air Staff A**ir Chief Marshal B.S. Dhanoa** discloses the IAF's plans to acquire combat drones in an interview to **Vishal Thapar** of ***SP's ShowNews***. Two indigenous programmes – Ghatak and Tapas – will give India a UCAV. The IAF has placed a Minimum Order Quantity (MOQ) for the TAPAS BH-201, which was earlier called the Rustom-II. It is likely to be developed by August 2020. India's entire unmanned fleet is being upgraded.

***SP's ShowNews* (SP's): Is the IAF closer to acquiring UCAVs than it was in the past? What is the progress of the indigenous programme?**
CAS: IAF is progressing the case of upgrading the existing UAV fleet. Also, the Medium Altitude Low Endurance Remotely Piloted Aircraft (TAPAS, earlier called Rustom-II) is being developed by DRDO. The platform is to be developed as a weaponised platform. Indigenous Unmanned Combat Aerial Vehicle (UCAV) programme, "Ghatak", with DRDO is at D&D stage and is being developed by ADA. Further, IAF is seeking UAVs with multi-role capabilities and is exploring various options.

SP's: By when can the IAF be expected to move beyond the Searcher-Heron capability for unmanned airborne surveillance?
CAS: IAF has placed a Minimum Order Quantity (MOQ) TAPAS BH-201 (earlier called Rustom-II) which is likely to be developed by August 2020. Once the mass production of TAPAS BH-201 starts, it will be inducted in the IAF in next 3 to 4 years. IAF is also exploring the possibility of procuring RPAs through Buy & Make (Indian-IDDM) routes. It is expected that in another four years, new RPAs will be inducted to meet the operational requirement of IAF.

SP's: The signing of the S-400 deal was seen as a bid positive. What are the principal Air Defence priorities, and is the modernisation blue print getting reflected in acquisitions?
CAS: Defence of the Indian Air Space and keeping it secure from enemy aerial intrusion is one of the main priorities of the IAF. The procurement of the S-400 system is a major step in that direction. The IAF has prioritised and achieved a credible air defence by synergising the integration of sensors, weapon systems, secure communication and real time data transfer.

SP's: What is the priority for airborne weaponry? Does the IAF have the comfort of adequate war reserves?
CAS: The IAF places priority on long range weapons, for ground attack and in air to air engagements. These weapons need to have additional attributes of precision and ability to operate 24 hours in all weather conditions. The aim being to destroy targets well before they manifest a threat to our aircraft, troops and vital installations. In terms of comfort of availability, the delegation of powers to the Vice Chief for ensuring faster procurement process would allow the air force to reach a level of comfort.

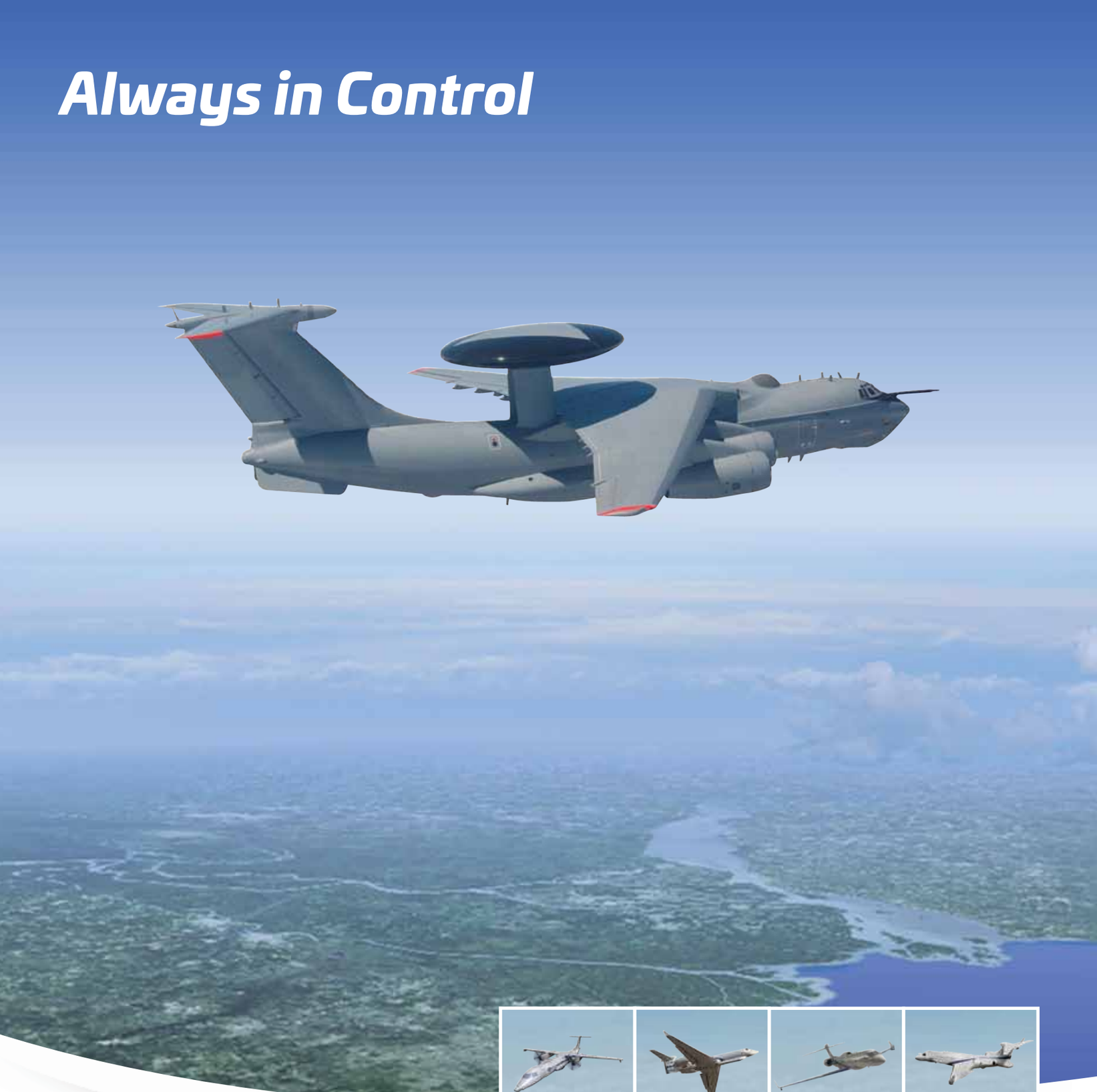
SP's: What will be the role of the IAF in the manned space mission, Gaganyaan?
CAS: The Human Space Flight Programme is being managed by ISRO. Human Space Flight Centre and Project Director have been appointed. IAF will be closely involved in selection and training of Gagannauts.

SP's: Do you realistically see bid Defence-Aerospace contracts going to the private sector in the near future? Or does the emergence of the Indian private section in Defence and Aerospace need more political consensus?
CAS: There have been several initiatives taken towards self-reliance such as offsets and policy changes in providing preferential acquisition under Make-II. Building an ecosystem require gestation period. The initiatives towards building a strong private industry are showing visible effects. Indian private players are increasingly partnering with global industry houses. DPP 2016 has laid focus on simplifying the defence procurement to give boost to 'Make in India'. Make procedure has been given an impetus with revision of procedure in January 2018 and the participation of private sector has shown an upward trend. As the Make process gathers critical mass, the bulk of acquisition in future would be through Buy IDDM route and private sector will play a major pivotal role in it. Chapter VII of DPP lays emphasis for development of defence industrial base through 'Strategic Partnership Route'. •

"IAF is also exploring the possibility of procuring RPAs through Buy & Make (Indian-IDDM) routes."

(Continued in* SP's ShowNews *Day 3...)

Always in Control




Maritime Patrol


Signal Intelligence


Airborne Ground Surveillance


Airborne Early Warning

Special Mission Aircraft - Superior Intelligence Collection and Battle Management

- Long-endurance, high altitude jet or advanced turbo-prop platforms
- Onboard and ground C4I centers for mission control, situation awareness and intelligence dissemination
- Advanced communication systems for net-centric operations

Meet us at
AERO INDIA 2019
Hall B: B2.1, B2.2

ELTA Systems Ltd.
www.iai.co.il • market@elta.co.il

IAI
Creating a Difference

F/A-18 Super Hornet: Addressing India's Fighter Requirements

As operational theatres become increasingly connected and digital, India's future fighter fleet will need to be compatible with the upcoming aircraft and battle systems of India's armed forces.

By **SP'S CORRESPONDENT**

Fighter aircraft of the future will need to possess two key attributes – networked and survivable. The next generation of aircraft, will need to connect into a network, plugging into an information stream shared across its fleet. This means integrated and varied sensors, large computers, big data networks, and advanced displays to help aircrew manage all of the available information.

Survivability is often confused with stealth, but stealth is just one element. Next generation aircraft will need to balance stealth with lethality – rails at range. Future fights will require increased magazine depth and sophisticated air to air sensors to deal with advanced threats. Survivability means that future fighters need to have increased range to push the threat further away.

F/A-18 SUPER HORNET

Another aspect of survivability is reliability, especially in a ship board environment. Carrier aircraft need to be tough, easy to launch, easy to land, and easy to maintain. This is increasingly important in a time when deployments are longer and farther away than ever before. Ease of maintenance will only become more important as sensors and systems continue to grow in sophistication and complexity.

With multi-role capabilities, advanced technologies with room to grow and low acquisition and sustainment costs, the F/A-18 Super Hornet is the clear choice for India. With designed-in stealth, an AESA radar and many other advanced technologies that are ideal for mission requirements of the armed forces, the F/A-18 Super Hornet is the most advanced aircraft of its kind in operation today and will provide operational benefits to the existing and future force structure of the Indian armed forces.

F/A-18 SUPER HORNET: A COMBAT PROVEN FIGHTER

Boeing's Super Hornet is a proven platform that offers the best of the attributes of the fighter of the future – networking, survivability and reliability. Introduced in 2007, the F/A-18 Super Hornet is the world's preeminent carrier capable aircraft and best suited for India's naval fighter requirements – designed from day one for carrier operations. The Super Hornets are fully compatible with the Indian Navy's aircraft carriers. Extensive simulation has shown that the Super Hornet is capable of conducting STOBAR operations with a meaningful weapons and fuel load.

The platform will continue to evolve with the development of the next-generation Block III Super Hornet. The Block III configuration adds capability upgrades that include enhanced network capability, longer range, reduced radar signature, an advanced cockpit system and an enhanced communication system. The fighter's life also will be extended from 6,000 hours to 10,000 hours.

The combat proven F/A-18 Super Hornet is defined to meet the customers' flight plan to evolve to outpace future threats. The Block III Super Hornet will be the preeminent strike fighter off U.S. Navy carrier decks for decades to come, outpacing the future threat.

The Super Hornet is highly capable across the full mission spectrum and is a true multi-role aircraft, able to perform virtually every mission in the tactical spectrum, including air superiority, day/night strike with precision guided weapons, fighter escort, close air support, suppression of enemy air defenses, maritime strike, reconnaissance, forward air control and tanker missions.

This coupled with designed-in stealth and the right payload capacity, makes the Super Hornet the ideal fighter of the future for the Indian Air Force.

The Super Hornet's benefits of being a twin-engine aircraft help provide the warfighter a margin of safety that does not exist in a single-engine platform. A single-engine aircraft is likely lost due to engine malfunctions or loss of thrust while a twin-engine platform can lose an engine and still safely return to base or carrier.

Every Super Hornet has a buddy refueling capability that can extend time on station, range, and endurance. Additionally, the Super Hornet can provide close and deep air support through the Active Electronically Scanned Array (AESA) radar and reliable data links.

One look at the decks of the U.S. Navy's aircraft carriers and the Royal Australian Air Force's fleet and you'll see advanced, combat-proven strike capability. The Super Hornet is the multi-role solution for the Navy and international Air Force customers.

EASE OF MAINTENANCE

The F/A-18 Super Hornet not only has a low acquisition cost, but it costs less per flight hour to operate than any other tactical aircraft in U.S. forces inventory. Part of its affordability is because the Super Hornet is designed to need far less maintenance; this translates into high mission availability. Ease of maintenance (supportability) results in lower maintenance man-hours per flight hour.

Plus, the Super Hornet does not require any scheduled depot-level maintenance and the engine does not require any scheduled maintenance between overhauls.

Further, Boeing's active production line and robust supply chain allow the company to offer the most affordable platform.

This low cost of operation, low maintenance requirements and twin-engine based survivability allow the Super Hornet to fly to and back from harsh environments.

F/A-18 SUPER HORNET MAKE IN INDIA

Boeing has had a presence in India for more than seven decades and is committed to expanding that partnership by producing Super Hornets in India, further developing India's aerospace ecosystem.

In 2018 Boeing announced a partnership with Hindustan Aeronautics Limited (HAL) and Mahindra Defence Systems (MDS) for manufacturing the F/A-18 Super Hornet in India for its armed forces and pursuing the joint development of future technologies. The partnership will transform India's aerospace and defense ecosystem, further building on its 'Make in India' success.

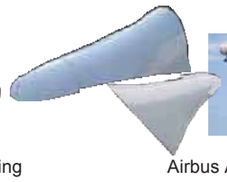
Boeing's proposed 'Make in India' plans for the Super Hornet are not about moving a production line but rather building an entirely new, state-of-the-art production facility that can be utilized for other programs like India's Advanced Medium Combat Aircraft programme. Future production with Indian partners will also involve maximizing indigenous content and producing the F/A-18 in India for its armed forces to create a 21st century aerospace ecosystem.

With advanced technologies and multi-role capabilities, the Super Hornet is perfectly suited to meet the needs of the Indian Navy and Indian Air Force now and in the future. •

ShinMaywa
Brighten Your Future

Commercial Aircraft Components





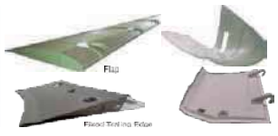

Embraer E170/E190- Flap track fairing and Fillet Fairing Fairing

Airbus A380, A330ceo/neo Wing Root




Boeing 777Main Wing Spar

Boeing 777 Wing-to-body Fairing

Gulfstream G550(GV-SP) Flaps and other parts

ShinMaywa Industries India Private Limited
Flat No.1010,1011 and 1012, 10th Floor, Narain Manzil, 23 Barakahmba Road
New Delhi-110001
mail@shinmaywa-india.co.in

MH-60R - A Capable Multi-role Helicopter

India has issued an official Letter of Request (LoR) for 24 multi-role MH-60R under the US Department of Defence (DoD) Foreign Military Sales (FMS) programme.

By **GROUP CAPT A.K. SACHDEV (RETD)**

Chinese designs a' la 'String of Pearls' have exercised the minds of Indian strategic community ever since the term was first used in 2005 and the Indian Navy has been endeavouring to gear up to the threat of an increasingly aggressive China. The recent sighting of a Chinese submarine in the Indian Ocean region served to highlight the concern the Navy senses in the context of Chinese deployment in the Indian Ocean being on the rise. China's decision to arm Pakistan in the future with eight submarines, is an adjunct to the "all-weather friendship" the two nations partner in as a joint challenge. The government has indeed approved 56 ships and submarines besides 32 being under construction in Indian shipyards including an aircraft carrier Vikrant, P-15B Class Destroyers, P17A class Stealth Frigates, P28 ASW Corvettes, Offshore Patrol Vessels and 'Scorpene' class submarines. Naval aviation also continues to suffer an acute shortfall of helicopters; the numbers are far short of the requirement and the existing helicopters getting on in operational age and lagging behind leading edge technologies. The shortfall of the comparatively smaller Naval Utility Helicopters (NUH) has been addressed through an Acceptance of Necessity (AoN) for 111 helicopters to be procured through the Strategic Partnership model. Simultaneously, efforts are on to procure a larger multi-role helicopter to meet the Indian Navy's shortfall in that category.

MH-60R MULTI-ROLE HELICOPTER

ADDRESSING THE NAVY'S SHORTFALL

For more than a decade, the Indian Navy has been trying to phase out its legacy Westland Sea King fleet as also attempting to upgrade at least a part of the holding. Its first fleet of Sea King Mk 42s and Sea King Mk 42As that were deployed on INS Vikrant aircraft carrier, was phased out in the 1990s, but the latter machines (Mk 42Bs) which were inducted in 1987 on board INS Viraat and also operated off Nilgiri and Godavari-class frigates, are still in service and are urgently in need of replacement. Since the year 2000, the Indian Navy has been trying to replace the Sea Kings initially with an MRH requirement of just 16 helicopters. However, in August 2017, a requirement for 123 Naval Multi Role Helicopters (NMRH) was formalised and the acquisition process initiated through the issue of a Request For Information (RFI).

The NMRH requirement is divided into two variants: a standard multirole version and a special operations one. The standard version will replace the Indian Navy's in-service Sea Kings both Mk 42B and UH-3H received from US as part of a package with a naval vessel, and be deployed on missions that include anti-submarine warfare, anti-surface warfare, electronic intelligence, SAR, external cargo carriage and limited casualty evacuation. On the other hand, the special operations variant will be specifically equipped for its Marine Commandos (MARCOS) in maritime interdiction during anti-piracy operations, combat search and rescue (CSAR) and humanitarian assistance and disaster relief. The Indian Navy has drawn up a list of kit that it wants on the Special Operations version of the helicopter it chooses, including two pintle-mounted guns in the cabin, data-link, weather radar, automatic identification system (AIS), tactical air navigation system (TACAN), IFF, EOD, FDR, CVR, ELT, SATCOM, software defined radio (two V/UHF & one HF set), rescue hoist, deck lock system, integrated self protection suite for continuous monitoring, warning and countermeasures dispensing against infrared, radar and laser-guided and standard fittings for day and night flying manned by crew of four persons. The proportion of the two versions is yet to be decided. The 123 NMRH helicopters will operate off aircraft carrier INS Vikramaditya, the two upcoming indigenous aircraft carriers (Vikrant and Vishal), the three Shivalik-class stealth frigates, the follow-on P17A frigates as well as current and future destroyer types namely Delhi class, Kolkata class and Visakhapatnam class. Likely contenders include the Lockheed Martin Sikorsky MH-60R, Airbus Helicopters H225M (earlier EC 725) and NH90 produced by NHIndustries owned by Airbus Helicopters, Leonardo, (formerly AgustaWestland) and Fokker Aerostructures.

Meanwhile, the warming up of defence ties between Indian and the US since Donald Trump's taking charge as US President, has slowly led to his administration liberalising the sale of high-end technologies to India. In an effort to capitalise on this opportunity and fast-track the acquisition of critically needed NMRH, India has issued an official Letter of Request (LoR) for 24 multi-role MH-60R under the US Department of Defence (DoD) Foreign Military Sales (FMS) programme. When and if fulfilled, the deal for around $1.88 billion, will meet a fraction (but a critical one) of the Indian Navy's shortfall in anti-submarine and anti-shipping MRH.

DOES MH-60R FIT THE BILL

In the 1990s, the US Navy developed a Helicopter Master Plan that called for the replacement of seven different types with two helicopter configurations. One of these was originally conceived as a remanufacturing programme for the SH-60Bs and SH-60F Seahawks, but in 2001, the US Navy opted for an all-new production programme — the MH-60R. The first MH-60R flew in 2001 and the last of 324 MH-60Rs ordered by the US Navy is scheduled to roll off the assembly line in 2020. However, the production lines are expected to continue into the mid-2020s to cater to export requirements. Qatar, Korea, Denmark and Saudi Arabia are already customers of this platform. This is a providential happenstance for the Indian Navy as the MH-60R is undoubtedly the most capable Anti-Submarine Warfare and anti-surface warfare helicopter in the world today. It is equipped with four weapon pylons permitting carriage of four torpedoes, an integrated AQS-22 airborne low frequency sonar with concurrent dipping sonar and sonobuoy processing capability, a second generation integrated AAS-44 forward-looking infrared system for expanded night vision, Hellfire targeting capability and a new APS-147 multi-mode radar with long/short-range search inverse synthetic aperture radar imaging and periscope detection modes. The MH-60R also has enhanced fuel capacity and a folding rotor. All these features make it an object of desire for the Indian Navy. The fact that the Indian Navy needs such a helicopter desperately, makes the 22 NMRH deal even more gratifying for the service.

CONCLUSION

In the 2018 Indo-US Naval exercise Malabar, joint ASW operations were practised and the US Navy had deployed the MH-60R during the exercise giving the Indian Navy a first-hand experience of working with the helicopter. While the 123 NMRH requirement stands independent of the 24 MH-60R deal and is expected to follow the usual pattern of bureaucratic wrangling, inordinate delays and possible sudden death, the 24 MH-60R procurement process is under way and will hopefully be consummated in about two years' time. Needless to say, the Indian Navy is keeping its fingers crossed and eagerly awaiting the addition of a very capable helicopter to its ageing aviation fleet. •

Empowering the Nation's Defence Forces

भारत इलेक्ट्रॉनिक्स
BHARAT ELECTRONICS

QUALITY, TECHNOLOGY, INNOVATION

CII EXIM Bank Business Excellence Award Winner & Role Model Organisation

Stay connected. Stay Secure. With BEL.


Weapon Locating Radar


Software Defined Radio - Manpack


Hand-Held Thermal Imager with LRF


L-70 Gun Upgrade


Schilka Weapon System Upgrade

Visit us at
Hall - E
AERO INDIA 2019
BENGALURU
from 20th-24th February, 2019

PRODUCT PROFILE

- Radars
- Missile Systems
- Naval Systems
- Tank Electronics & Gun Upgrades
- Defence Communication
- Electro Optics
- Non - Defence Products
- Electronic Warfare & Avionics
- Network Centric Systems
- Professional Components

A Navratna Defence PSU

MAKE IN INDIA

Bharat Electronics Limited
Registered & Corporate Office:
Outer Ring Road, Nagavara, Bangalore-560045

Phone:+91-80-2503 9300 | Fax: +91-80-25039305
Toll Free 1800 425 0433 | CIN: L32309KA1954GOI000787
www.bel-india.in

15 YEARS OF CELEBRATING THE MAHATMA

"Pratt & Whitney is highly focused on making engines that meet the operators' needs"

Palash Roy Chowdhury, Managing Director - India, Pratt & Whitney (with inputs from Amit Pathak, General Manager, Customer Training, Pratt & Whitney, India) talks to **Neetu Dhulia** of ***SP's ShowNews***

...Continued from SP's ShowNews Day 1

***SP's ShowNews* (SP's): How is Pratt & Whitney supporting the community development?**

Palash Roy Chowdhury (Chowdhury): Pratt & Whitney has long supported the advancement of science, technology, engineering and mathematics (STEM), with 60+ e-Learning Centers established in India since 2011. The company has funded e-Learning Centers throughout the country to help educate elementary school age children with the goal of inspiring the next generation of engineers and aviation enthusiasts. Pratt & Whitney recently inaugurated two e-learning centers in Hyderabad and Vishakhapatnam.

The e-learning centers are equipped with modern facilities, tools and technology to support both teachers and students. These resources include computers, wireless internet, digital projectors, display screens, audio systems, software, subscriptions and furniture.

SP's: In October last year, Pratt & Whitney launched Industry Capability Enhancement program at its customer training center in Hyderabad. Please tell us about the program and its purpose?

Chowdhury: We launched this unique program with a purpose of supporting medium and small-scale enterprises serving global aerospace majors through precision manufacturing and highly specialized engineering services from India. The program was specially designed to help industry participants develop expertise on aircraft propulsion systems and identify ways to improve productivity while meeting quality goals, and plan for scalability thus ensuring more efficient, reliable and cost-effective supply base. The program curriculum was designed in consultation with the local industry and we look forward to expanding this program to benefit many more organizations going forward.

PRATT & WHITNEY'S MIDDLETOWN ENGINE CENTER

Key Benefits of Pratt & Whitney's Industry Capability Enhancement program are:

- Access to a world class aviation training facility with highly experienced faculty, state of the art instruction aids, specialized tooling and audio visual teaching aids including virtual reality (VR) technology.
- Hands on training on actual aircraft engines including component identification, disassembly and assembly.
- Exposure to United Technologies' aerospace quality requirements and processes.
- Immersion in a multi-national working environment with focus on workplace safety and best practices.

SP's: What are your expectations from aviation industry in 2019?

Chowdhury: We expect the aviation industry to continue its double-digit growth in 2019 based on sound underlying macroeconomic fundamentals such as growth in economy and the middle class, urban migration, low cost air travel enabled by new technologies & driven by favourable policies and continued growth in tourism.

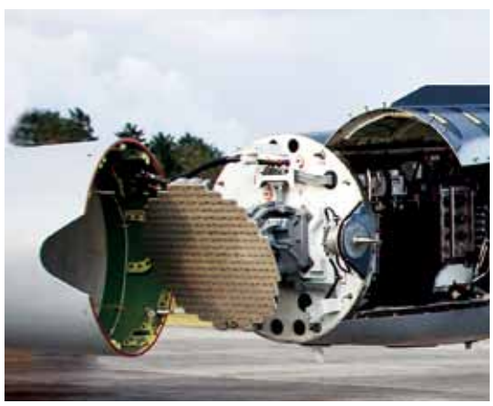
Long term sustainability of this robust progress will depend on policy support and continued investments in low cost regional airports, MRO infrastructure, cargo and general aviation including rotorcraft, and a strong focus on safety and security. Needless to say, a world class talent development framework will be an integral element of the aviation success story. •

IAI's ELTA Systems Awarded $55 million Contract for Fire-Control Radars in Asia

ELTA Systems, a division and subsidiary of Israel Aerospace Industries (IAI), has been awarded a $55 million contract for the provision of Multimode Airborne ELM-2032 Fire Control Radars to be installed on newly produced advanced combat aircraft. The radar offers a broad range of operational modes, including high-resolution mapping in SAR mode, detection, tracking, and imaging of aircraft, moving ground and sea targets. The contract is a repeat order, reflecting the customer's high satisfaction with the radar and ELTA. The radar can be installed on a variety of airborne fighters. As one of the leading radars of its type, it is operational in many countries worldwide.

Yoav Turgeman, IAI VP and CEO of ELTA, said, "The Multimode ELM-2032 Airborne Fire Control Radars is a versatile radar and addresses several mission types in a single product. Its field of regard, long detection range and accurate tracking provides the pilots with full situation awareness, and its accurate information is used by the aircraft's systems. We are excited about winning this contract and are grateful that our customers consider ELTA's radars as best in its class." •

YOAV TURGEMAN, IAI VP AND CEO OF ELTA



MULTIMODE AIRBORNE ELM-2032 FIRE CONTROL RADAR

ALPHA DESIGN TECHNOLOGIES

Make in INDIA
Make in ALPHA

2019
AERO INDIA
The Runway to a Billion Opportunities

VISIT US @ Hall B

Stall Nos. B 2.5, B 2.6, B 2.7, B 3.8A & B 3.11B

Alpha Design Technologies Pvt Ltd

09, Service Road, HAL II Stage, Indiranagar, Bangalore - 560008
Tel: +91-80-4255 6909 Fax: +91-80-2521 6541
E mail: alphacorp@adtl.co.in **Website: www.adtl.co.in**

SeaGuardian
Persistent Maritime ISR

By **SP'S CORRESPONDENT**

SeaGuardian is the maritime version of the MQ-9B SkyGuardian from General Atomics Aeronautical Systems, Inc. (GA-ASI). MQ-9B is the world's most advanced Remotely Piloted Aircraft (RPA) and has been selected as a sole source RPA for the UK Royal Air Force (RAF) as the Protector RG Mk1, as well as for the country of Belgium.

The MQ-9B leverages the mature system architecture of the legacy MQ-9 and the more than five million flight hours across all GA-ASI platforms, while incorporating enhancements that support mission capability, global industrial expertise, and its goal of achieving unfettered access to national and international airspace.

SeaGuardian provides state-of-the-art sensors with unparalleled ISR and interdiction capabilities for a wide range of operational and threat environments at Beyond Line of Sight (BLOS) ranges, at altitudes over 40,000 feet and in inclement weather conditions.

Nine external hardpoints on MQ-9B offer unmatched configurability to meet diverse mission sensor and weapon requirements.

In the Intelligence, Surveillance, and Reconnaissance (ISR) configuration, the standard SeaGuardian is equipped with a high-definition Electro-optical/Infrared (EO/IR) sensor and a high-performance 360° multi-mode maritime patrol radar (MPR) to support maritime domain awareness (MDA). Additionally, the MQ-9B delivers EO/IR Full Motion Video (FMV), Synthetic Aperture Radar (SAR) imagery, Inverse Synthetic Aperture Radar (ISAR) capability, Automatic Identification System (AIS) and Ground Moving Target Indicator (GMTI) data identifying potential threats in real-time from stand-off ranges.

SEAGUARDIAN

With a range of 6,000-plus nautical miles, SeaGuardian boasts endurance of more than 40 hours. GA-ASI flew an MQ-9B for 48.2 hours on 2,721 kg of fuel in May 2017. Providing greater endurance at lower operating cost, SeaGuardian is ideally suited to complement manned maritime patrol aircraft in performing wide area maritime surveillance. •

Boeing Appoints Salil Gupte
as New Business Leader in India

Boeing recently announced the appointment of Salil Gupte as president of Boeing India, effective March 18. He will be based in New Delhi, serve as Boeing's senior executive in India, and report to Marc Allen, President of Boeing International.

Gupte, who was Vice President of Boeing Capital Corporation, a wholly-owned subsidiary of The Boeing Company, succeeds Prat Kumar, who was appointed Vice President and Program Manager of Boeing's F-15 fighter aircraft programme in November 2018.

Gupte will advance the development and execution of Boeing's strategy in India, integrate business activities across Boeing Commercial Airplanes, Boeing Defense, Space and Security, and Boeing Global Services, lead Boeing's growth and productivity initiatives in India, and manage Boeing's partnerships with India's government and business stakeholders. He will lead a team of over 3,000 employees and joint venture personnel located in New Delhi, Bengaluru, Hyderabad, Mumbai and Chennai. His leadership will extend to cover Boeing's large supply chain presence in India, its engineering and technology center in Bengaluru, and Boeing joint venture with Tata in Hyderabad.

SALIL GUPTE, PRESIDENT, BOEING INDIA

At Boeing, Gupte has played a leading role in Boeing Capital Corporation, which manages a $3 billion portfolio of aircraft and other assets while supporting all Boeing businesses with innovative financing solutions, working closely with customers across the enterprise. He also has experience in Commercial and Defense supply chain, overseeing manufacturing, sourcing, and fulfilment activities for Boeing products.

Gupte joined Boeing in 2009 in the services strategy and business development team of Boeing Commercial Airplanes. Previously he was with Citigroup and Goldman Sachs, as an investment banker in the aviation and infrastructure sectors. Gupte earned his MBA from Stanford University, and a Bachelor's degree in Economics from Cornell University.

"Salil is an accomplished business leader, with a terrific set of commercial and services experiences," said Marc Allen, President of Boeing International. "In leading the Boeing India team, he will build on Prat Kumar's great work of growing Boeing's business and partnerships in India and supporting the development of a thriving aerospace and defense industry for India."

"I'm thrilled to be joining my colleagues at Boeing India during such an exciting time, when the business is growing exponentially and we are building the future of global aircraft manufacturing, services, supply chain, engineering, technology and innovation, right here in India," said Salil Gupte, President, Boeing India. •

Astra Microwave Products Ltd.
On A Winning Wavelength

YOUR PARTNER FOR MAKE IN INDIA

Over 25 Years of Excellence

PIONEERS IN STRATEGIC ELECTRONICS

RESEARCH & DEVELOPMENT | HIGH-VOLUME PRODUCTION

STATE-OF-THE-ART INFRASTRUCTURE | TOTAL QUALITY MANAGEMENT

✓ **Completed 27 years as a strategic supplier of critical electronics to major defense and space customers in India & abroad.**

✓ **Total 6 facilities across Hyderabad and Bangalore with a total employee strength of 1200.**

✓ **ISO 9001, AS9100, ISO 14001, ISO 27001& OHSAS 18001 Certifications.**

Astra Microwave Products Ltd.
Regd. Office: ASTRA Towers, Survey No. 12(P),
Kothaguda post, Kondapur, Hitech City, Hyderabad 500084, Telangana, India.
Tel +91 40 46618000/8001 | Fax +91 40 46618048/8383
www.astramwp.com

IAI's ELTA Systems Unveils Next-Gen Drone Guard Counter Unmanned Aircraft System

ELTA Systems, a division and subsidiary of Israel Aerospace Industries (IAI), has unveiled a new and enhanced configuration of its Drone Guard system which detects, identifies and disrupts the operation of UAS and small drones. With hundreds of units already operational across the world, the new modular configuration has added a Communication Intelligence (COMINT) system for more precise detection, classification and identification based on broadcast frequency and unique communication protocol analysis and verification for neutralizing threats. Furthermore, the Drone Guard's 3D Radars, Electro-Optical (EO), and Jammer systems have all been upgraded with bolstered capabilities.

DRONE GUARD CUAS

The use of commercially available UAS and small drones has increased dramatically over the past few years as these platforms have become a potential threat to sensitive facilities, crowds, high profile individuals and other aircraft, due to their small size, slow velocity, and low altitude flight. Small drones can be further used for hostile applications such as unwanted intelligence gathering, smuggling and even as weapon carriers.

ELTA has responded to these challenges with new and enhanced Drone Guard capabilities. In addition to the current radar, EO and jamming capabilities- a hostile threat can now also be detected, classified, identified by means of the enhanced COMINT system. The system can effectively jam or disrupt the drone's control channel and navigation, by supporting an array of communication protocols that can 'fend off' a single drone or even a swarm of drones from the guarded premises.

Yoav Tourgeman, IAI VP and CEO of ELTA, said, "The Drone Guard, with its new addition of COMINT capabilities, is a proven operational system for civilian and military applications that can meet the growing threats of hostile UAS and small drones. ELTA designed the Drone Guard to be modular, so that customers can choose the best combination that meets their operational and budgetary requirements in the most cost-effective manner. We at ELTA are dedicated to continue to develop the Drone Guard system to counter evolving threats and provide maximum security for our customers." •

AMPL: Supporting India's Aerospace and Defence Sector

The large scale modernisation of India's defence forces is on the anvil, and the next decade is likely to see an exponential growth in the strategic electronics sector. Emerging technologies are going to reshape modern warfare by harnessing the power of electronics. This, in turn, will make the Indian strategic electronics (SE) sector, mainly comprising aerospace and defence, a vibrant industry. India is the one of the largest aerospace and defence (A&D) market globally. AMPL is playing a major role in developing complex and strategic systems within the country. The following are the area in which AMPL has focussed to be a leader to take up the IDDM products: Research & Development; Mass Manufacturing; Elaborate and comprehensive Test Facilities and System Integration and Testing.

AMPL BENGALURU FACILITY

RESEARCH & DEVELOPMENT

The first and foremost requirement for achieving self-reliance under IDDM is to invest in R&D. Astra, has a well-established team of senior R&D professionals who have two decade-plus experience with government research organisations such as DRDO and ISRO. It has good relationship with many domestic and global OEMs. The promoters of the company are Technocrats with 30-35 years of R&D experience and have previously worked with these organisations. A strong technical team and relationship with key customers have helped Astra successfully develop new products/sub-systems for defence/space related programmes.

During the global restrictions on supply of some of the key components to the defence and space departments, AMPL has risen to the need of the hour with unflagging enthusiasm and a capacity to rapidly absorb new technological breakthrough into the scheme of operations. This has in turn enhanced the capability to deal with a growing market with ever changing technological requirements. Sensing this need, a Component Design Centre along with Backend processing of the wafers for Monolithic Microwave Integrated Circuits (MMIC), was established. This comprehensive facility has been able to turnout a chain of MMIC components indigenously.

AMPL has recently started a new R&D centre in Bengaluru which will focus on developing systems.

MASS MANUFACTURING

AMPL believe that the finished product is only as good as the manufacturing facility, which is why AMPL ensure that every item of equipment used meets the most demanding global standards of precision and performance. This in turn ensures the matchless quality of every product that leaves the premises.

AMPL has already made huge investment on infrastructure, facilities and trained manpower for mass manufacturing of RF & Microwave components, Super components and subsystems, for both the Indian market as well as the Export market based on the offset programme fulfilment.

ELABORATE AND COMPREHENSIVE TEST & MEASUREMENT FACILITY

Test and Measurement is the foundation on which all successful designs are built. The exhaustive Test facility includes, RF & Digital test equipment for testing at component, subsystem levels as well as during the bulk manufacturing. Automated test Equipment for testing of very large numbers of Transmit/Receive modules for both domestic market and export market has also been created. Military and Space qualification is another major requirement met with the facilities like the Environmental tests, HALT/HASS and the EMI/EMC facility. This combined with high end facilities that includes Hermetic and Laser Sealing equipment combined with gross and fine leak testing ensures that products meet stringent requirements of hermetic sealing.

SYSTEM INTEGRATION & TESTING

AMPL Bangalore Unit has created the unique System Integration and Test facility like the Near Field Test Range (NFTR) for calibration and collimation of Active Phased Array Radars, & System Assembly Hall with built-in 10 tonne EOT crane and a host of most modern assembly tools and fixtures. These facilities are useful and are mandatory for Design Development and Manufacturing of Radar systems & EW systems.

With these types of Knowledge Centre and the Key facilities, AMPL is fully prepared to take up the projects for Aerospace & Defence sectors. •

LCA: IAF's Great Gap Filler

Clearly, the Light Combat Aircraft (LCA) Tejas will significantly add to the operational capability of the IAF and will be a great gap filler in its combat fleet.

By **AIR MARSHAL ANIL CHOPRA (RETD)**

As far back as in 1969, the Indian government accepted the recommendation by its Aeronautics Committee that Hindustan Aeronautics Limited (HAL) should design and develop a fighter aircraft around a proven engine, but the project fell through due to inability to procure the selected 'proven engine' from a foreign manufacturer. The 'Long Term Re-Equipment Plan 1981' noted that the MiG-21 fleet would be approaching the end of its service lives by the mid-1990s and that by 1995, the IAF would deficient by 40 per cent of the aircraft needed to match up with its projected force structure requirements. In 1983, it was decided to have an Indian combat aircraft. The designated Light Combat Aircraft (LCA) Tejas programme's other main objective was an across-the-board advancement of India's domestic aerospace industry. The question being asked after many decades, in 2019 is, has the purpose been achieved and can the LCA Tejas meet the current capability gap in the IAF?

DESIGN CAPABILITY OF THE LCA TEJAS

The government's 'self-reliance' goals for the LCA Tejas included the three most sophisticated and challenging systems: the fly-by-wire (FBW) flight control system (FCS), multi-mode pulse-doppler radar (MMR) and afterburning turbofan engine. The IAF's Air Staff Requirement for the LCA Tejas were finalised in October 1985. Aeronautical Development Agency (ADA), the designer, has been fairly successful in designing and fabricating a good FBW system. With some help from abroad, they have been able to fine-tune good control laws. LCA Tejas test pilots find the handling characteristics very good. Over 20 aircraft have been built till date including the technology demonstrators and prototypes. After the maiden flight in 2001, the LCA Tejas has had 18 years of accident free record. The Gas Turbine Research Establishment (GTRE) could not succeed in making the Kaveri engine and India was forced to go in for the F404-GE-IN20 engines from the United States (US). The development of the Kaveri engine for the LCA Tejas was discontinued formally in 2014. The more powerful GE-F414 engine will power the LCA Tejas Mk2. HAL's Hyderabad division and the Electronics and Radar Development Establishment (LRDE), began the development of the Multi Mode Radar (MMR) in 1997. However, this project was abandoned in 2006 as it fell well short of requirements. The first 20 production Tejas Mk 1 have been equipped with hybrid version of the EL/M-2032 radar; but the LCA Tejas Mk 1A will be equipped with an improved version of the EL/M-2052 AESA radar. It can thus be seen that only partial indigenisation goals have been met with.

DESIGN AND DEVELOPMENT STATUS OF THE LCA TEJAS

The LCA Tejas achieved Initial Operational Clearance -I (IOC-I) status in January 2011. IOC-II, the full and final IOC, came in January 2015. The Final Operational Clearance (FOC) requires certification for integration of Derby and Python BVR missiles; the GSh-23 gun; air-to-air refueling capability; angle of attack increase from 24 to 28 degrees; the braking system enhancement and replacing the existing nose cone radome by a quartz model to increase the current radar range of 45 to 50 km to more than 80 km. The FOC campaign began in December 2013. Clearance for production of the FOC aircraft was accorded in December 2018, though the formal FOC is expected by mid-2019. To make good the many shortfalls the DRDO and HAL promised improved LCA Tejas Mk 1A version with reduced weight, electronic warfare equipment, better air-to-air combat capability, aerial refueling and improved ease of maintenance.

Meanwhile in 2016, the Indian Navy announced that the naval version of the LCA Tejas was overweight for carrier operations and was considered as not suitable for the Indian Navy. The IAF also has pointed out a number of shortcomings in the LCA Tejas Mk I to the government. The IAF has stated that the LCA Tejas has insufficient flight endurance, smaller payload capacity, increased maintenance hours and higher costs for maintenance compared to other contender aircraft. As such, a new fighter aircraft from abroad was required for the IAF. HAL has sought ₹1,000 crore for the Design and Development (D&D) of LCA Tejas Mk1A, which is expected to be cleared shortly. It has also given the commercial proposal for 83 Mk1A aircraft at ₹483 crore ($67 million) a piece which is considered excessive and much more than what it charges IAF for license-built Su-30 MKI. The issue is still being discussed. The LCA Tejas Mk1A is likely to fly earliest in 2021 and begin induction around 2023. It is imperative that the larger sized LCA Tejas Mk2 flies by 2023 and is inducted in 2028 by which time all 83 LCA Tejas Mk1A would have been hopefully inducted.

PRODUCTION STATUS

The LCA Tejas Mk1 (IOC) entered service with No. 45 Squadron IAF at Bengaluru on July 01, 2016 with two aircraft. By December 2018, 11 aircraft had been delivered, averaging a rate of production of three aircraft a year. HAL currently has a single eight aircraft a year production line, but apparently that too is underutilised. It is likely that 14 aircraft will get delivered by March 31, 2019. The first squadron will get its 16 aircraft by September 2019. Only 40 LCA Tejas Mk1 are on order, 20 each in IOC and FOC configuration. Manufacture of 20 LCA Tejas Mk1 (IOC) will be completed around March 2020. The production of 20 LCA Tejas Mk1 (FOC) aircraft will begin thereafter. The production changes between IOC and FOC aircraft are likely to be minimal. To boost production, HAL must set up a second line capable of producing eight aircraft per year of the FOC version. The new production line must start producing by early 2020. The production lines should switch to LCA Tejas Mk1A in a phased manner. In parallel, HAL must choose a private Indian partner to take on LCA Tejas Mk1A production. This should be done through a joint venture (JV). The third production line of eight aircraft a year should be with this JV. Full scale LCA Tejas Mk2 production must start around 2028.

LCA TEJAS - CRUCIAL TO IAF'S OPERATIONAL CAPABILITY

The LCA Tejas Mk I/IA is a 3.5 generation aircraft. Its operational capability based on flying envelope, weapon carriage, avionics, radius-of-action is lower than that of the Mirage 2000. Considering that it is a MiG-21 replacement and when compared to the Sino-Pak JF-17 Thunder, it is a much better aircraft, albeit behind schedule in production. Even though it is considered an indigenous aircraft, the local content of the LCA Tejas is only 59.7 per cent by value and 75.5 per cent by number of line replaceable units. It remains dependent on foreign suppliers for the Engine, Radar, EW systems and ejection seat among other items. Yet, India needs the programme to succeed for it to become a launch pad for the Advanced Medium Combat Aircraft (AMCA). With the new price tag of $67 million per aircraft, is it value for money, is a question looking for answers. The IAF proposes to have around 12 to 14 squadrons of the LCA in the long term. The budget of the IAF for capital acquisitions for 2018-19 was ₹35,770 crore. At ₹483 crore apiece, 16 aircraft a year would cost ₹7,728 crore. Adding infrastructure and weapons costs would mean total of around ₹12,000 crore a year. Such amounts would have to be met with from the budget. Once production stabilises, the LCA Tejas will start adding numbers to the depleting squadrons. The aircraft would be a good asset for local area air defence duties and also for interdiction and offensive support operations. It will also release the other larger aircraft for offensive operations deep inside the enemy territory. With eight hard-points and the ability to carry 3,500 kg external load, the LCA Tejas will be armed with a significant combinations of potent weapons. It can simultaneously carry four BVR (Derby) and two A4M (R73) missiles for the Air Defence role. It is already cleared to carry Laser Guided Bombs (LGB) for air-to-ground and also GSh-23mm gun is a proven asset. Later on, the LCA Tejas will get cleared for Kh-59 air-to-ground missile and the DRDO anti-radiation missiles. This will allow it to attack ground targets in enemy territory from stand-off ranges. Clearly, the LCA Tejas will significantly add to the operational capability of the IAF and will be a great gap filler in its combat fleet. •

BrahMos – The Supersonic Triad of Indian Armed Forces

India's BrahMos, billed as the world's fastest supersonic cruise missile comes with a fine combination of speed, precision and power

DR SUDHIR KUMAR MISHRA, CEO & MD, BRAHMOS AEROSPACE

AIR-LAUNCHED AND SHIP-LAUNCHED BRAHMOS MISSILE

By **SP'S CORRESPONDENT**

A success story of India's defence indigenisation programme, the BrahMos, billed as the world's fastest supersonic cruise missile comes with a fine combination of speed, precision and power. This highly versatile missile has been integrated and successfully test fired on platforms including the Sukhoi Su-30MKI giving a major fillip to India's 'Make in India' programme.

BrahMos is a product of the joint venture between India's Defence Research and Development Organisation (DRDO) and NPOM of Russia. BrahMos Aerospace, an Indo-Russian joint venture formed in 1998, manufactures the supersonic cruise missile that can be launched from submarines, ships, aircraft, or land.

The missile has been operationalised in the Army, Navy and Air Force. It has established itself as a major force multiplier in modern-day complex battlefields with its impeccable land-attack, anti-ship capabilities and multi-role and multi-platform abilities. The Company has established a robust Missile Industrial Consortium (MIC) which has grown manifold over the years.

The BrahMos weapon system has already logged several milestones to its credit. It notched a record when an enhanced version of the BrahMos cruise missile with an Extended Range (ER) was successfully test-fired on March 11, 2017. The formidable missile system once again proved its mettle to precisely hit enemy targets at much higher range than the current range of 290 km, with supersonic speed of 2.8 Mach. The technology upgrade comes after India's full membership to the Missile Technology Control Regime (MTCR), which removed caps on range of BrahMos cruise missile.

The land-launched and sea-launched variants of the BrahMos are already in service with the Indian Army and Navy empowering all three wings of the Indian armed forces with flawless anti-ship and land attack capability. The missile operates on a 'fire and forget' principle and missile's terminal altitude is as low as 10 metres. The air-launched version of the missile has lesser weight and additional rear fins which add aerodynamic stability while separating from the aircraft. The successful test firing of the air launch version completes the tactical cruise missile triad for India. The armed forces now have a multi-platform, multi-mission cruise missile that can be launched from land, sea and air.

The Indian Air Force's Su-30MKI multi-role fighter jets armed with BrahMos air-launched variant are expected to increase the export potential of the weapon. Several South East Asian and Latin American countries have expressed interest in buying the weapon system. BrahMos has also developed and successfully tested a missile intended for submarines. A smaller version of the missile named BrahMos-NG is under development which can be fitted in much more numbers in air platforms and is also planned for the Indian made Tejas aircraft which will make it one of the most desired platforms plus weapon combination for many countries. A hypersonic version of the missile is also presently under development with a speed of Mach 7-8 to maintain the leadership BrahMos possesses in the cruise missile arena. •

Lockheed Martin Unveils 'F-21' Fighter Jet for India, From India

Advanced capabilities and unmatched industrial benefits for India

Lockheed Martin further emphasised its commitment to India by unveiling the F-21 multi-role fighter for India. Specifically configured for the Indian Air Force, the F-21 provides unmatched 'Make in India' opportunities and strengthens India's path to an advanced airpower future.

The F-21 addresses the Indian Air Force's unique requirements and integrates India into the world's largest fighter aircraft ecosystem with the world's pre-eminent defence company. Lockheed Martin and Tata Advanced Systems would produce the F-21 in India, for India.

"The F-21 is different, inside and out," said Dr Vivek Lall, Vice President of Strategy and Business Development for Lockheed Martin Aeronautics. "The new [F-21] designation highlights our commitment to delivering an advanced, scalable fighter aircraft to the Indian Air Force that also provides unrivaled industrial opportunities and accelerates closer India-US cooperation on advanced technologies."

This unprecedented 'Make in India' opportunity combines the strength of the world's largest defence contractor with India's premier industrial house to deliver a historic win-win for India and the United States.•

DR VIVEK LALL, VICE PRESIDENT OF STRATEGY AND BUSINESS DEVELOPMENT FOR LOCKHEED MARTIN AERONAUTICS WITH A MODEL OF F-21 FIGHTER AIRCRAFT WHICH HAS BEEN PROPOSED FOR IAF

Safran to Build a New Plant in India to Make Parts for the LEAP engine

During a visit to India for the Aero India Show, Philippe Petitcolin, Chief Executive Officer of Safran, and K. Chandrashekar Rao, Chief Minister of Telangana, announced that Safran Aircraft Engines would build a new plant in Hyderabad to make parts for the LEAP turbofan engine from CFM International.

Supported by the Telangana State, Safran will invest 36 million euros in this new plant, which will cover 13,000 sq m (140,400 sq ft), including 8,000 sq m (86,400 sq ft) of workshops, in the Special Economic Zone of GMR near the airport. Construction is set to kick off in June 2019, and will aim at delivering the building and producing the first parts in early 2020. The plant will have about 50 employees by the end of the year to launch operations, and will reach a workforce of 300. All employees will benefit from a complete training programme. The plant will be based on Safran's highest standards for industrial processes and machinery, including real-time monitoring of production parameters, and the latest integrated inspection methods.

LEAP ENGINE

"We're delighted to open a new chapter in our long history with the Indian aerospace industry, thus reasserting Safran's commitment to our 'Make in India' strategy", said Philippe Petitcolin, CEO of Safran. "Aerospace continues to be a significant driver of India's growth, and we want to fully support this dynamic by bolstering our investments and training programmes in the country."

"We are delighted that Safran has selected Hyderabad to establish its Safran Aircraft Engines manufacturing plant, thus joining the league of other global OEMs who are already manufacturing and exporting from Telangana," said K.Chandrashekar Rao, Chief Minister of Telangana. "Aerospace is a focus industrial sector for Telangana and the State Government is providing maximum support to encourage the industry."

When the plant hits cruise speed in 2023, it will be able to deliver 15,000 parts per year to support the LEAP's sustained production rate. CFM is set to deliver 1,800 engines this year, rising to 2,000 starting in 2020. The new-generation LEAP entered service in 2016 and powers more than 700 Airbus A320neo and Boeing 737 MAX commercial airliners, including 54 operated by Indian airlines.

Safran has operated in India for some 65 years, and now has over 600 employees at seven companies which provide design, production and support services for aerospace and defense, plus a maintenance training center in Hyderabad for CFM engines. Opened in 2010, this center can train more than 500 technicians a year.

Safran had already announced in 2018 the construction of a Safran Electrical & Power factory to produce LEAP engines harnesses and Rafale fighter electrical wiring interconnections systems. Also located in the Special Economic Zone, this 4,000 sq m factory will be delivered by mid-2019 and will have 250 people. Operations have already gotten under way in temporary premises with 33 employees, 19 of whom were technicians identified from the State of Telangana and trained through partnership between Telangana Academy of Skill and Knowledge and Safran Electrical & Power.

With this new Safran Aircraft Engines plant in Hyderabad, Safran is expanding its local footprint, while also leveraging synergies with the Indian aerospace industry. •

Airbus' Eye in the Sky to be World's First 'Manufactured and Industrialised in India' Aircraft

Underlining its commitment to thrust the 'Make in India' initiative and upgrade its relation with India, the global aerospace leader, Airbus announced the details of it's key aircraft C295, the first to be manufactured as well as industrialised in India in partnership with the Indian automotive giant, Tata. The quickly reconfigurable aircraft with strong landing gear, and state-of-the-art avionics system promises to combat multiple roles while being the complete suite of survival equipment.

A global leader in aeronautics, space, defence and related services and a renowned name in the aviation sector, Airbus announced its one step forward to add to the 'Make In India' initiative. Seeing the initiative as a fruitful opportunity to bring in their industrial collaborations worldwide, and to support India in building a robust domestic defence industrial base, Airbus made crucial announcements in its press conference during the Aero India Show 2019. Displaying its multi facility aircraft, C295, Airbus has claimed it to be the first aircraft on a global platform that would be fully manufactured and industrialised in India. Being asserted as the reliable workhorse, the C295 has the capacity to hold 71 troops, 49 paratroopers, 5 pellets, 6 VIPs and over 24 support staff. The fully weaponised 'eye in the sky' of Airbus is also capable of intercepting electromagnetic communication and emissions. In addition, it is equipped with air-air refuelling and a capacity of 24 stretchers, 8 containers and over 7 medical attendants hence enabling its purpose in medication as well. The proposal to assemble the C295W in India is in partnership with TATA and has concluded the commercial negotiations. The aircraft aims to replace 56 ageing AVRO aircraft. Airbus is looking up to 2500 jobs that this aircraft will create and up to 8,000 skilled jobs in the supply chain. This also promises to enhance the export opportunities for India as this will be the sole factory for this aircraft.

AIRBUS C295

Almost each Airbus commercial aircraft produced today is partly 'Made in India' and these new ventures will only prove to be propellers in the advancement of India's aviation industry. Airbus is also proposing to set up facilities for producing the Panther and H225M helicopters in India in partnership with Mahindra Defence. Airbus along with Milestone Aviation Group Limited (Milestone) also announced on Wednesday about the first delivery of H145 helicopter by Heligo Charters Private Limited (HCPL), a Mumbai based non-scheduled helicopter operator. The aircraft taken on lease from the GECAS company, Milestone, will start operations soon in the state of Jharkhand. While Milestone is among the global leaders in helicopter leasing, HCPL is a leading onshore and offshore helicopter services provider to Oil and Gas industry, Corporates and VIP travel in India. Airbus' C295 and H145 are both on display at the Aero India 2019.

Airbus also announced the opening of a state-of-the-art training centre for commercial pilots and maintenance engineers in the National Capital Region of Delhi.

Highlighting its versatile and cohesive ecosystem in defence and space sector, Airbus President and Managing Director for India and South Asia, Anand E. Stanley also talked about the company's successful collaboration with DRDO on critical indigenous projects such as the airborne early warning and control system as well as the partnership about Antrix/ISRO on joint development of communications satellites for export. •

—Ayushee Chaudhary

Thales Extends Global Footprint with Launch of Engineering Competence Centre in Bengaluru

Thales continues its development in India by announcing the launch of its Global Engineering Competence Centre (ECC) in Bengaluru. The centre aims to accelerate innovation and digital transformation to serve the needs of both the Indian market and the Group's global objectives.

On the occasion of Aero India 2019, Thales Executive Board Members will welcome dignitaries from the Indian industry and government bodies at the ECC for an inauguration ceremony on February 22.

For years, the Indian Government has pursued a proactive policy to develop R&D and create high value-added infrastructure. To meet these challenges, India trains hundreds of thousands of highly qualified engineers every year and is positioning itself as the largest engineering resource in the world.

Thales is constantly searching for high value-added solutions to help customers master their decisive moments in an increasingly complex world. With almost €3 billion invested in R&D every year, the Group is a powerhouse of innovation with operations in 56 countries.

With the ECC, Thales seeks to play a major role in job creation and skill development in India as it targets to hire 3,000 engineers in the next three-five years along with its partners. It is a first-of-its-kind Engineering Competence Centre in India focusing on software and hardware capabilities in the areas of civil as well as defence businesses, serving Thales's global needs. P. Satish Menon has been appointed to head this Centre. He brings with him 30 years of expertise in the fields of engineering, R&D, and programme management.

Initially, the ECC will be dedicated to high value-added systems in the fields of air traffic management, avionics, cockpit, flight management, in-flight entertainment and connectivity systems, radar software, airborne intelligence surveillance and reconnaissance tactical management systems. The ECC will also concentrate on the creation of capabilities in advanced hardware technology such as Radio Frequency/designs for radars and communication equipment, high performance processing units and in airborne digital processing functions.

"India is an innovative country with a great pool of skilled engineers. This is why we extend our 65 year-long journey in the country and our global engineering footprint with the launch of our Group Engineering Competence Centre in Bengaluru. This Centre is uniquely positioned to serve all domains that Thales operates in and cater to worldwide markets. With our plans of hiring over 3,000 engineers in the coming years, we look forward to significantly contributing to the 'Skill India' initiative and innovation in the country." Pascale Sourisse, Senior Executive Vice-President, International Development, Thales. •

Dassault Systèmes Demonstrates Solutions to Accelerate Aerospace Design and Manufacturing

Dassault Systèmes at the 12th Edition of Aero India show, showcased how its 3DEXPERIENCE platform is enabling Airframe OEMs & Aerospace suppliers to accelerate innovation, produce faster and deliver improved designs at a reduced cost, thereby creating new business opportunities. Dassault Systèmes' demonstration at Aero India 2019 at booth AB2.19I, paves the way for companies to innovate in the era of Industry Renaissance with the help of the 3DEXPERIENCE platform. It illustrated the following steps that companies must adopt to catalyze this transformation.

Accelerate innovation: The modern Aerospace & Defense segment requires rapid design and development cycles, transforming dynamically in an agile mode and shortening time-to-market to gain an early mover advantage. Dassault Systèmes' collaborative 3DEXPERIENCE platform, combined with system engineering, prototyping, and stress-testing capabilities, help customers achieve their innovation goals. At Aero India 2019, we showcase how Airbus leveraged 3DEXPERIENCE platform to transform how they work. Airbus needed a channel for collaborating with global experts, expediting design processes that took over a year. Our 3DEXPERIENCE platform was introduced to build a ½ full-scale TRU prototype in 90 days. Meet our experts to know how we completed a full-scale prototype in just 84 days.

Reduce costs and improve design: With aircraft systems getting increasingly more complex, companies must integrate multiple new technologies to meet demands. These include changing passenger expectations, cost pressures, and uptime targets. As a result, it is now critical to remove any inefficiency in the design-to-delivery value chain or risk losing market share to competitors. Dassault Systèmes helps action significant process improvements in conceptualising, manufacturing, testing, and obtaining certification for a new aircraft. This is powered by our xCAD Collaborative Engineering expertise, OnePart & enterprise marketplace, and real-time dashboards to view the process and engineering KPIs. To aid SME suppliers, we also offer bidding process automation, real-time project monitoring, cloud-based resource scalability, and Digital Continuity through 3DEXPERIENCE platform.

All of this and more is demonstrated at Aero India 2019, helping OEMs/suppliers comply to schedule, cost, and specification objectives.

Increase production speeds for market leadership: Over the next few decades, airline fleet modernization and aircraft retirements will add to current aviation order backlogs. While companies traditionally scale up production by onboarding new resources, this can cause cost and quality issues. On the other hand, automation is only a short term solution; companies require genuine flexibility and robust technical competencies to achieve the desired production rates. At Aero India 2019, Dassault Systèmes will explore how flow simulation, MES, advanced planning & scheduling, lean dashboards, and other such methodologies could help produce faster. Instead of treating design, planning, validation, and execution as separate silos, we believe companies should adopt an integrated approach, gaining a competitive edge without compromising on quality.

Discover new areas of profitability: As aerospace companies enter a period of 'Industry Renaissance', a completely new way of working is imminent. This is led by on-demand mobility, alternative manufacturing materials, high-density batteries, embedded sensors, and other technology advancements. We could even imagine switching from ground to air mobility in order to avoid urban traffic, in the near future. Dassault Systèmes is committed to supporting disruptive projects in areas such as these. As startups forge new pathways based on 'manufacturing lab ecosystems' (instead of established operators simply expanding their portfolios) we bolster these initiatives via:

- Digital continuity from concept to flight
- Controlled execution through KPI visibility
- Scalable business solutions, on-premise or on cloud

View all of this in action as part of Dassault Systèmes' 'Reinvent the Sky' solution at Aero India 2019. •

Russian Helicopters Joins Hands with Five Indian Companies for Ka-226T Assemblage

Within the scope of 'Make in India', State Corporation Rostec's component, Russian Helicopters signed Memorandum of Understandings with five Indian companies at the first day of Aero India 2019 to localise the components of it's light utility helicopter, Ka-226T.

The first day at Aero India Show 2019 saw significant scope for the 'Make in India' initiative as the Russian Helicopters Holding Company (a part of State Corporation Rostec) signed MoUs on Wednesday with five Indian companies. Russian Helicopters has joined hands with Elcom Innovations Private Limited, Valdel Advanced Technologies, Dynamatic Technologies Limited, Integrated Helicopter Services and Bharat Forge, covering assemblies such as fuselage, blades, radio station and landing gear.

The collaboration has been to produce components for light utility helicopter Ka-226T in India. The modular design helicopter features coaxial main rotor system, maximum take-off weight of 3.6 tonnes and is capable of transporting up to 1 tonne of payload.

"We have launched a new stage of Ka-226T project: identifying the chain of manufacturers among the Indian companies. I am positive that the agreements reached today will result in a long-term mutually beneficial cooperation", noted Andrey Boginskiy, Director General of Russian Helicopters Holding Company following the signing.

Victor Kladov, Director for international cooperation and regional policy at State Corporation Rostec informed that the contract provides for the delivery of 60 Ka-226T assembled in Russia and the production of 140 units in the territory of the partner country.

"We intend to take part in a bid for the delivery of 111 Naval Utility Helicopters for the Indian Navy. The selection of Ka-226T will allow India to reduce expenditures for transportation, maintenance, personnel training due to the localisation of production in its own territory," he added.

The environment friendly, cost-effective helicopter promises to be a class apart in its flight performance, additional flight safety solutions and state-of-the-art avionics suite. Ka-226T also facilitates transportation of up to six people or modules carrying special equipment as it can easily be fitted with a transport cabin. •

INDUSTRY AND TRADE MINISTER OF THE RUSSIAN FEDERATION DENIS MANTUROV, CEO OF RUSSIAN HELICOPTERS ANDREY BOGINSKY AND INDIAN DEFENCE MINISTER NIRMALA SITHARAMAN

—Ayushee Chaudhary

KC-390. THE TRUE FIRST RESPONDER.

INTRODUCING THE MOST VERSATILE, EFFECTIVE AND COST-EFFICIENT MULTI-MISSION TRANSPORT IN THE SKY.

Building on our 48-year heritage of producing the most ruggedly reliable, low-maintenance aircraft, the KC-390 delivers the lowest life cycle cost and longest maintenance intervals in the industry. Add in the fastest reconfiguration time, higher flight speeds and the most efficient use of cargo space and you can see why there's no better aircraft for tough scenarios. Mission efficiency that saves money. Reliability that saves time. Performance that saves lives.

EMBRAER

CHALLENGE.
CREATE.
OUTPERFORM.