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# SHOWNEWS

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

snapshots



B-52 STRATOFORTRESS BOMBER FLEW FOR THE FIRST TIME AT THE SHOW, SHOWING ITS SPECIAL AND MAGNIFICENT APPEARANCE



DR VIVEK LALL, HEADING THE USIBC DELEGATION WITH DEFENCE MINISTER NIRMALA SITHARAMAN



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



## UAVS SCALE HIGH @ THE PREMIER DRONE OLYMPICS

The first of its kind Olympics held for the future, eyed unmanned aerial vehicles or drones, saw the remotely controlled devices display rescue skills, visual formations and much more giving a wonderful contest to the larger than life aircraft.

By **AYUSHEE CHAUDHARY**

Among the several firsts that the 12th edition of Aero India witnessed, the Drone Olympics was a major highlight. Organised for the first time in India during the second day of the Aero India 2019, Drone Olympics saw enthusiastic participation from contestants and viewers alike. The international level competition of unmanned aerial vehicles (UAVs) was organised by the Government of India as a nudge to UAV manufacturing enthusiasts and provide them a unique platform to not only display their technologies but also find a space to connect with buyers from around the world.

The competition was also held, keeping in mind the brisk evolution of drones in military as well as civil aviation spheres. From battlefield surveillance, to photography, mapping, remote delivery, and eyeing targets, drones are becoming the most sought after gadgets that hold immense scope in the future.

The evaluation by a 10-member jury was carried on the basis of their surveillance capability, flight time, live transmission resolution, detection of targets, weight drop challenge, and formation flying capability. Out of the 121 teams that registered for the Drone Olympics, 27 were short listed for the Preliminary rounds that were held before the beginning of the Aero India show. Further nine teams were selected for the final competitive rounds that were held on Thursday. The participant teams displayed some eye-catching aerobatics and for-

mations that were a delight for the audience ranging from students of various schools and colleges to experts eagerly observing the flying drones. Taking high flights in the sky, these drones appeared as mini versions of fighter aircrafts showing their various air formations. While competing, the drones also showcased their skills in payload, lifting, dropping food packets as well as medical supply, hence enhancing the various possibilities the drones can be used in. Hence, this competition has also been quite in lines with India's Vision 2040 for the Civil Aviation Industry which also revealed a Drone Ecosystem Policy Roadmap at the Global Aviation Summit held last month in Mumbai, India. As a part of this optimistic Vision 2040, India expects a barrage in drones formulations and usage, especially in urban commuting and medical evacuation. India also hopes to become a global leader in research, design and manufacturing of drones and anti-drone systems, and the highly eager participation in Drone Olympics supports that belief. The UAV market is witnessing a highly accelerated growth rate with a constant increase in demand which is not only limited to defence and aviation sector, but also in the commercial market as toys. Not just that the unmanned vehicles are also a hope to reduce risks of life that comes in aviation if they can successfully substitute the manned vehicles in some of the highly risk encountered areas.

The drones in the competition participated under five categories and a total prize of ₹33.5 lakh was given to the winners. •



GENERAL MAUNG MAUNG KYAW, COMMANDER-IN-CHIEF (AIR), MYANMAR AIR FORCE, BROWSING THROUGH SP'S MILITARY YEARBOOK BEING PUBLISHED SINCE 1965. WAS OF GREAT PRAISE AND APPRECIATION FOR THE EFFORTS EVIDENTLY VISIBLE IN THE YEARBOOK. JAYANT BARANWAL, EDITOR-IN-CHIEF OF THE YEARBOOK IS DESCRIBING ON THE RANGE OF PUBLICATION ACTIVITIES TO THE CHIEF.

## HAL Banking on Order for 20 More Sukhoi Fighters Till Tejas Gains Momentum

By **VISHAL THAPAR**

**H**industan Aeronautics Limited (HAL) expects an additional order of one squadron of about 20 frontline Sukhoi-30 MKI fighters to keep its fighter production lines going till it starts manufacturing 83 Light Combat Aircraft Tejas Mark 1A fighters by 2023. HAL Chairman and Managing Director (CMD) R. Madhavan made these announcements at Aero India to dispel the impression that it's facing an existential dilemma after the production run of its cashcow, the Sukhoi Su-30MKI comes to an end in 2020-21.

Madhavan and his top brass also sought to play down the financial distress at HAL, claiming that there was only a problem of "cash flows" which will be sorted out soon. "We hope to get an order for another squadron of Su-30MKI. We have made a proposal to the Government," the HAL chief announced.

Madhavan and his Director (Engineering R&D) Arup Chatterjee also laid out a blueprint for the future of fighter production, which has been HAL's mainstay for decades. They expressed belief that it is best placed to build India's next multi-role fighter, the process for acquiring 114 of which has commenced. Another 57 are required by the Navy. HAL has already entered into a tripartite arrangement with Boeing and Mahindra to offer the F/A-18 Super Hornet.

"We expect the order for 83 Mark 1A LCA Tejas fighters in one or two months," the HAL CMD further announced. The problem is that the Mark 1A variant has not yet been developed. But HAL believes that this is not a big hurdle, now that Mark 1 has been certified for combat capability with a Final Operational Clearance (FOC). The Mark 1A variant requires retrofitment of an AESA radar, and expansion of the avionics envelope.

Madhavan also dispelled doomsayers with the assertion that HAL still has an order book worth ₹65,000 crore. "With the 83 Tejas fighters and helicopter orders, we should be comfortable," he said.

HAL expects a Limited Series Production order for 15 Light Combat Helicopters (LCH) soon. "The LCH orders will go up to 180," Madhavan claimed. He also expects additional orders for the Advanced Light Helicopter Dhruv. Then, there are plans to upgrade the 45 MiG-29K deck-borne fighters of the Indian Navy. HAL's is aiming for certification of its Basic Trainer Aircraft HTT-40 this year. There's a requirement for 70 trainers for the IAF. •

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## “The induction of the Apache and Chinook helicopters this year will be a quantum leap for the IAF’s capability”

For the first time, the Chief of the Air Staff **Air Chief Marshal B.S. Dhanoa** publicly admits that the IAF does not have funds to make payments for all the committed liabilities, which explains the default in payments to vendors like HAL. Payments towards committed liabilities have been “rationalised” because of shortage of funds. Dues will be paid once additional funds are provided by the Government.

(...Continued from SP's ShowNews Day 2)

**SP's ShowNews (SP's): Is India's military modernisation agenda getting adequately funded? What steps has India's military leadership taken to get this issue addressed?**

**CAS:** There has been a shortfall in the Budget Estimate 2018-19 for modernisation of IAF. The Ministry of Defence (MoD) has been appraised of the shortfall and will be addressing the issue.

**SP's: With the IAF squadron strength depleting, and in a procurement environment defined by delay and political contest, what is the vision for building up the fighter fleet to the desired numbers?**

**CAS:** The issue of drawdown in the strength of the fighter squadron in the IAF is being given due emphasis. To meet the requirement of fighter aircraft of IAF, induction of the balance of Su-30 MKI aircraft from HAL is under process and will be completed by 2020. Induction of LCA into the IAF has commenced. Induction of Rafale aircraft will commence from September 2019. Additionally a case for procurement of LCA Mk1A is under progress for which the RFP was issued in December 2017. Further, a RFI has been issued for Multi-Role Fighter Aircraft under 'Strategic Partnership' Model.

**SP's: What are the biggest priorities for the selection of India's new fighter, the RFI for which has been issued in 2018? Will the selection goalposts for the new fighter be different from the MMRCA's?**

**CAS:** A large number of the new fighter would be made in India by a Strategic Partner. Indian Production Agency (IPA) would be recipient of the extensive transfer of technology from the foreign OEM to enable production of fighter aircraft in the country. The procurement will be progressed as per the guidelines of the DPP-2016 Chapter VII. The process would have a set of requirements reflecting current needs of the IAF.

**SP's: What are the India's options for a fifth-generation fighter?**

**CAS:** IAF along with DRDO is working towards the indigenous development of a fifth generation fighter aircraft programme called the Advance Medium Combat Aircraft (AMCA), and IAF is providing active support to DRDO.

**SP's: How do you visualise the future of AMCA?**

**CAS:** IAF along with DRDO is working towards the development of an indigenous fifth generation fighter aircraft programme called the AMCA. IAF is providing full support to ADA, DRDO towards this programme. We are actively working together with DRDO on the programme.

**SP's: Why didn't the FGFA/PAK-FA programme lead to its intended outcome?**

**CAS:** The FGFA programme has been on for the last 10 years and preliminary design Phase has been completed. The case is presently with the MoD.

**SP's: In the background of continuing delays, does the LCA programme need help? What can be done to salvage the programme?**

**CAS:** LCA is a concurrent design, development and production programme. The deliveries of the LCA in IOC configuration are in progress. Government of India has approved the ramping of the production rate of LCA from 8 to 16 aircraft per year. FOC has been planned to be achieved in two phases. IAF is also in the process of placing an order for LCA Mk 1A aircraft. The pace of induction needs to be speeded up, towards which MoD and HAL are taking collective steps.

**SP's: Has the IAF defaulted on its payments to HAL, as alleged?**

**CAS:** The allocations towards committed liabilities towards various vendors

have been rationalised due to the limited/shortfall in the Budget Estimate of 2018-19. The dues will be paid on additional allocation of funds. Some of the media reports in this regard have been highly exaggerated.

**SP's: Could greater involvement of the IAF in HAL lead to better satisfaction levels with HAL?**

**CAS:** HAL is the sole military aircraft manufacturer in the country and the IAF and other defence services rely heavily on HAL for aircraft and associated equipment. The responsibility of R&D projects lies with DRDO/HAL and IAF has been fully embedded and supporting in major D&D projects and is closely involved in D&D activities, Flight Testing, Technical Expertise and Project Monitoring. However, delayed fructification of R&D projects and operationalisation of equipment leads to capability deficit, which affects the full spectrum capability of IAF.

**SP's: What is the status of the Avro replacement programme?**

**CAS:** Contract negotiations are in progress in the Avro Replacement programme. In this programme, 16 aircraft will be delivered in 'fly away' and 40 aircraft will be manufactured in India by a private industry. The manufacturing of this aircraft will give impetus to 'Make in India' initiative. This is a win-win arrangement for the Private industry and the Services.

**SP's: Where does the process to acquire mid-air refuellers stand?**

**CAS:** We are moving ahead with procurement of additional six Flight Refuelling Aircraft (FRA). An RFI was issued in Jan 2018 for FRA. At present ORs are being finalised. Case would be progressed further as per the provision of DPP-2016.

**SP's: The IAF made an impressive airlift demonstration to Ladakh recently. What are the future airlift requirements of the IAF?**

**CAS:** The IAF requirements for the future include the replacement of 56 Avro aircraft by C-295 aircraft. Of these 56 aircraft, 16 would be delivered in fly away condition and the rest would be manufactured within the country. Six new FRAs are to be inducted in the IAF in the near future. They are to cater to our capability building as the IAF looks after 26 Receiver Squadrons of the IAF and Indian Navy presently.

**SP's: The IAF is set to induct iconic helicopters this year – the Apache and the Chinook. Will these aircraft give the IAF helicopter wing its biggest capability upgrade? Where does the helicopter wing go from here? Does the IAF require the Apache and Chinook in larger numbers?**

**CAS:** The induction of the Apache and Chinook helicopters this year will be a quantum leap for the IAF's capability to project force and provide heli-lift supplies. Going by the capabilities that these platforms afford and inductions in the recent past this may be termed as one of the biggest capability upgrade. The IAF will aim to assimilate and absorb this technology and operationalise these platforms at the earliest.

Force levels in terms of rotorcraft are adequate to meet the current requirements. Present and future requirements are dynamic in nature. Our fleet expansion and capability development plans are continuously evolving. Modernisation and diversification plans are in place to meet the challenges of the future.

A modern air force needs to have several components such as multi-role fighters, helicopters, transport aircraft, weapons, missile defences, radars, communications, UAVs, networking, force multipliers as well as training. This is to make the air force potent and balanced. The acquisition of new platforms is a continuous process to meet the present and future challenges and to enhance the capability of the IAF. The capability upgrade enables the IAF to handle all operations in an efficient manner. •

# Major Landmark: LCA Tejas Gets Long-delayed Final Operational Clearance

Decks cleared for production of combat ready variant

## FIRST TO BREAK



By **VISHAL THAPAR**

**T**hirty-six years after the commencement of the programme to build a light indigenous fighter, the Light Combat Aircraft 'Tejas' was on February 20 accorded a Final Operational Clearance (FOC) with which it earns its spurs as a combat-capable fighter.

The achievement of this significant milestone was first reported by *SP's Aviation* in an exclusive report on February 11 (<http://www.sps-aviation.com/news/?id=369&catId=1&h=Major-Landmark-India-s-LCA-Tejas-fighter-gets-long-delayed-Final-Operational-Clearance>). But the Defence establishment made the declaration officially at a ceremony on Day 1 of Aero India 2019.

The handing over of the FOC Certificate and Release to Service Document (RSD) to the Chief of Air Staff was done in the presence of the Defence Secretary, Defence Research and Development Secretary, HAL Chairman and Chief of CEMILAC (Centre for Military Airworthiness and Certification).

The development process towards the FOC has given the fighter capabilities for Beyond Visual Range Missile firing, Air-to-Air Refuelling and Air-to-Ground attack besides expanding the flight envelope. Due to expansion in the capability requirement during the long development process, the requirement of the IAF has shifted to the Mark 2 level, which involves redesigning the aircraft to incorporate a new, more powerful engine, the GE-414. That landmark appears distant at the moment, but the FOC for the Mark 1 gives momentum to the indigenous fighter programme.

This also clears the decks for commencement of production of the second lot of 16 Tejas fighters in the FOC configuration by HAL. The first lot of 16 fighters are in the Initial Operational Clearance (IOC) configuration, which provided limited combat capability. The IOC standard was accorded in December 2013. Twelve of the IOC lot have been delivered to the IAF and inducted into the IAF's 45 Squadron. The remaining four single seater Tejas fighters are likely to be delivered by March.

An elated Dr Satish Reddy, head of the India's Defence Research and Development establishment, described the milestone as the "best ever moment for any aeronautical engineers and a landmark day for the country's scientists, industry and the air force".

Air Chief Marshal B.S. Dhanoa gave a thumbs up to the aircraft. Asked if the Tejas

could now be considered a combat ready platform, he said: "You saw how much the aircraft could fly, the number of sorties it could generate in exercise Gagan Shakti in April 2018. In the recently-conducted Vayu Shakti firepower demonstration, we showed you as to how accurately these aircraft could dispense weapons on the target. It can not only sustain a very high sortie rate, but can also carry on very accurate weapon delivery."

He said an RFP was already issued for procurement of 83 more Tejas fighters in the Mark 1A configuration. Getting to the Mark 1A level is the next stage in the development process. "Not only that we will have to take LCA Mk 2. Which in the days ahead will replace the Jaguar, Mirage and MiG-29. After that, we will go to Advanced Medium Combat Aircraft," the Air Chief said.

Although of vital national importance, the LCA Tejas programme is a way behind schedule, it was earlier reported by *SP's Aviation*. The huge delay has made the IAF vulnerable due to the rapid depletion in its fighter squadron strength due to the phasing out of older MiG aircraft. The LCA was meant to be a replacement for the ageing MiG-21.

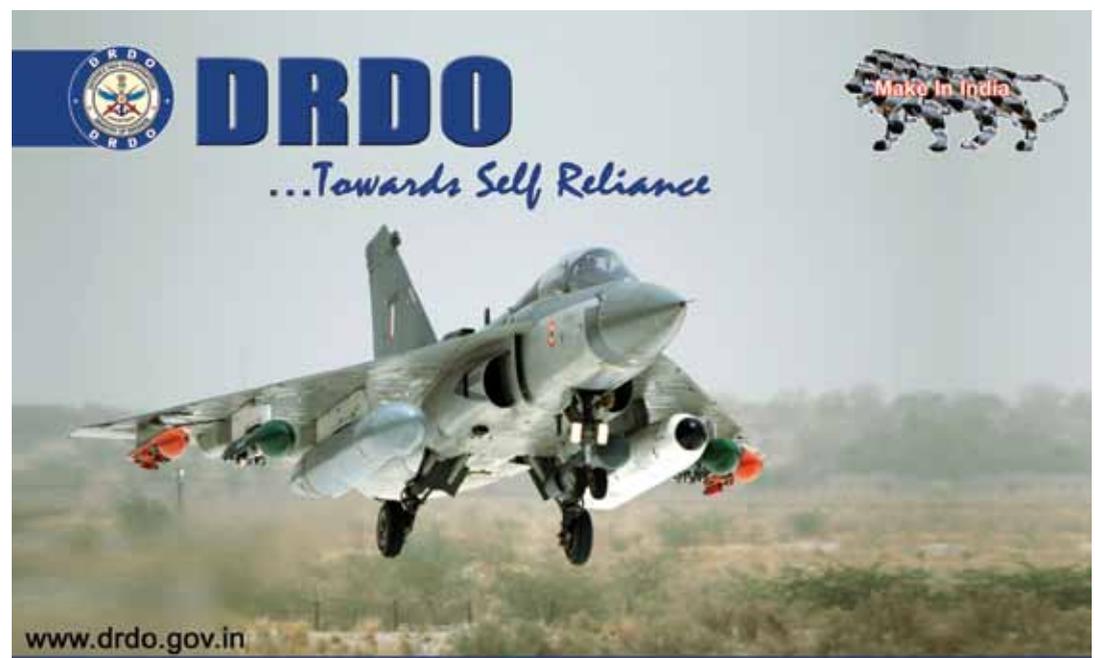
Two contracts were signed between the IAF and HAL for procurement of 20 Initial Operational Clearance IOC standard aircraft (16 IOC fighters and 4 IOC trainers) on March 31, 2006, and another 20 FOC standard aircraft (16 FOC fighters and 4 FOC trainers) on December 23, 2010. Delivery of the first lot was to be completed by December 2011, and the second lot by December 2016. These deadlines were contingent upon the development agency achieving the IOC and FOC on time.

At the time of the first contract in 2006, the target for the IOC was December 2008, and the FOC by December 2013. But both the IOC and FOC came five years late respectively, and that too for the single seater variant. To date, there's no word on both the IOC and FOC for the twin-seater trainer version.

More delays at the production end resulted in the first IOC LCA being delivered as late as 2016-17. HAL has delivered 12 so far, and aims at completing the delivery of the remaining four by March-end this year.

"The production of 8 trainer aircraft (4 each in IOC & FOC contracts) would be taken up only after design clearance from ADA (the development agency)," Government told Parliament earlier this month.

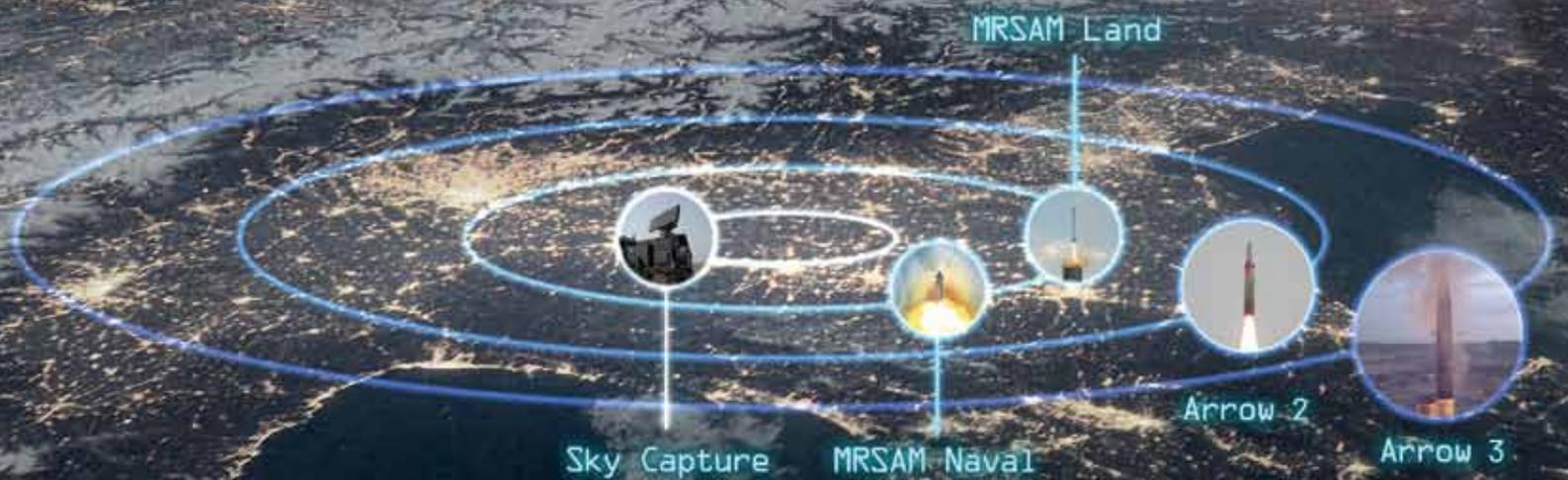
An investment of 1381.04 crore was approved as far back as March 2017 to double the LCA Tejas production capacity at HAL from eight a year to 16. •



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## Indian Army Chief General Bipin Rawat Flies in LCA-Tejas

A day after it got combat ready credentials with a Final Operational Clearance (FOC) clearance, India's indigenous fighter aircraft Tejas got a ringing endorsement from the Indian Army Chief, General Bipin Rawat. He was flown in a twin-seater variant, and expressed delight after the half-hour sortie. "Flight in LCA Tejas was an experience of a lifetime. From what I could witness, avionics are very good, it's targeting is very good. It's a wonderful aircraft if it gets added to inventory. It will increase our air power," the Army Chief said.

Principal Scientific Advisor to Government of India Prof Vijay Raghavan also flew in the two-seater LCA-Tejas at Air Force Station Yelahanka, Bengaluru on Thursday, February 21, 2019.



CHIEF OF THE ARMY STAFF GENERAL BIPIN RAWAT IN THE COCKPIT OF TWO-SEATER LCA-TEJAS DURING HIS SORTIE AT AERO INDIA 2019 IN AIR FORCE STATION YELAHANKA, BENGALURU ON THURSDAY, FEBRUARY 21, 2019.

## Kalyani Group and Belcan Announce Partnership

Kalyani Group and Belcan, LLC announced partnership and will work together in the design and development of helicopter engines and transmission systems in defence and aerospace and collaborate on advanced manufacturing practices and digital manufacturing & Internet of Things solutions.

"This collaboration allows Kalyani Group to dovetail the metallurgical and manufacturing excellence of its flagship company Bharat Forge Limited with cutting edge design and engineering capabilities of Belcan, LLC to deliver high quality products and services to our customers," said Rajinder Singh Bhatia, President & CEO (Defence & Aerospace), Bharat Forge Limited.

"The growing aerospace and defence industry in India presents many attractive opportunities for Belcan, and we are pleased to partner with Kalyani Group to leverage our combined strengths to develop our business capabilities across the region," said Lance Kwasniewski, CEO of Belcan. •



BABA KALYANI

## Make in India for the World Bharat Forge and AMG Partners

A new partnership in world-class manufacturing operations in India was announced on February 21 between Bharat Forge and AMG Partners, USA. AMG Partners and Bharat Forge will work to identify global advanced manufacturing technologies for the purpose of joint development, licensing and world-class manufacturing operations in India.

"We are excited about our collaboration with AMG Partners and look forward to investing in and bringing advanced manufacturing of Aerospace and Defence technologies in India. We are looking forward to contributing to the 'Make in India' initiative of our Hon'ble Prime Minister," said Rajinder Singh Bhatia, President & CEO (Defence & Aerospace), Bharat Forge Limited.

AMG Partners Founder Shirish Pareek said "I have been very impressed with the vision of Bharat Forge and their focus on being an advanced defence manufacturing leader. We are honoured to be supporting them." •

## AMPL – Make in India Initiative

Astra Microwave Products Pvt Ltd (AMPL), a Public listed company based at Hyderabad, India, has been spearheading the design, development and manufacturing of RF and Microwave components, Super components, Systems and related technologies to Space and Defence sectors.

Over the years, Astra Microwave Products Pvt Ltd, has risen to the demands of the strategic electronics market with a capacity to rapidly absorb new technological breakthrough with a strong and committed in-house R&D team. This has in turn enhanced the capability to deal with a growing market with ever changing technological requirements. The major capabilities and contributions to the state-of-the-art Active Phased Array Radar systems to the defence and space segments has been in the development and automated mass manufacturing of antenna arrays, transmit-receive modules, excitors-receivers etc.

Sensing the need of Fabless Semiconductor Design Centre, along with Backend processing of the wafers for Monolithic Microwave Integrated Circuits (MMIC), AMPL has established the comprehensive facility and has been able to turnout a chain of MMIC components indigenously. An export wing of the company Aelius Semiconductors Pte. Ltd (Aelius) has started functioning from Singapore.

Astra Microwave has already been manufacturing sub-systems for many foreign organisations under the offset programme. Starting work with built to print basis, Astra has also been given some opportunities to products on built to specifications. As they have already been delivering high end modules in high quantity meeting the quality and delivery benchmarks and this combined with their strong presence in the Indian market, makes the company ideally poised to go on further and become a strong player in the IDDM, Buy and Make Indian category of Defence Procurements.

AMPL has posed itself as the design and/or manufacturing partner for foreign OEM's looking to Make their

Products in India and supplying to the swiftly increasing demands of defence forces in India for modern equipments. With offsets taking a backseat in the Policy domain of the Government of India and the present Government policy of 'Make in India', many of the future defence procurements are expected to move in this direction. The Hyderabad based firm is therefore well placed in positioning itself as a partner for manufacturing strategic electronics for major foreign OEM's that are eyeing the high capital spending of the Indian Armed Forces. Moving on in this direction, AMPL has formed a JV company along with Rafael, Israel for the tactical Communication Products and has been registered as the Astra Rafael Communications Ltd (ARC), Hyderabad.

AMPL has expanded its operations to Bangalore with focus on the Radar systems. It has created Planar Near Field Antenna Test Facility for testing the Active Electronically scanned Array Radars. AMPL has an office in Delhi to work on the futuristic requirements of the Indian Ministry of Defence, eyeing opportunities to produce smaller defence systems in collaboration with foreign equipment manufacturers. The company has invested heavily into infrastructure and has been supporting the Defence Research Development Organisation (DRDO), Indian

Space Research Organisation (ISRO) and the Defence Public Sector Units for Strategic Electronics that form part of radar systems, electronic warfare systems, telemetry systems and satellite systems. Having worked in various programs of Indian Defence, supplying strategic electronics in the form of sub-systems and components, the company is already working in the high technology domain.

The company believes that with their technological ability on the sub-system level combined with the expertise of foreign OEM's, they can support the requirements of the Indian Armed Forces under the 'Make in India' programme. It is only logical then, that Astra Microwave poses themselves as an ideal partner to Foreign OEM's for "Making their products In India" •



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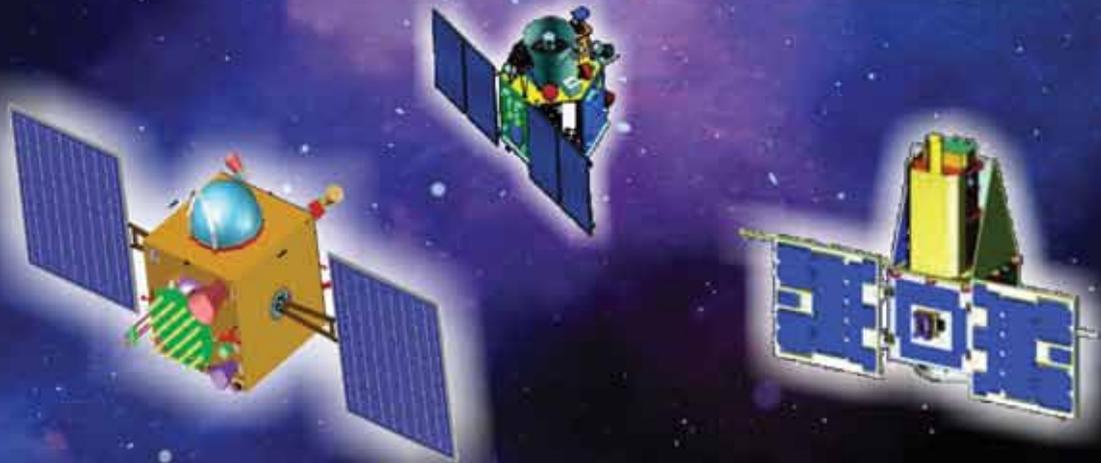
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# Embraer Defense & Security at Aero India: Tactical Transport Aircraft, VIP and Surveillance Jets



KC-390 TACTICAL TRANSPORT AIRCRAFT



PRAETOR 600 IN FLIGHT

By **SP'S CORRESPONDENT**

**B**razil's Embraer presents at Aero India 2019 its Defense & Security portfolio of products aiming to grow in a potential market that has seen an already Embraer presence over the years: jets operating as VIP transport for the Indian government, around 20 business jets across various models operated by companies in India, the DRDO NETRA AEW&CS developed on an ERJ145 platform, two existing Embraer Authorized Service Centers in multiple locations in the country, and Star Air as the most recent ERJ145 operator.

Embraer celebrates its 50th anniversary in 2019 with a worldwide-recognized history of achievements, courage, innovation and success. Headquartered in Brazil, it has businesses in commercial, executive and agricultural aviation, defense & security, and services & support. Every 10 seconds an aircraft manufactured by Embraer takes off somewhere in the world, transporting over 145 million passengers a year.

With a growing presence on the global market, its Defense & Security products and services are present in more than 60 countries.

The KC-390, which may become an interesting alternative to fulfil Indian Air Force needs, is a tactical transport aircraft designed to set new standards in its category while presenting the lowest life-cycle cost of the market. This multi-mission aircraft will be delivered to the Brazilian Air Force (FAB) in 2019. Also, the A-29 Super Tucano, light-attack aircraft and advanced training, is a world-renowned and selected by 15 Air Forces, including the United States Air Force (USAF).

Embraer also offers a portfolio of products for VIP transportation and Surveillance.

**Legacy 600** - an aircraft in which high speed, generous cabin, great comfort, low operational cost, high reliability and superb safety come together to form the best value. IAF signed a contract for four aircraft in 2003. The jets were delivered in 2005 and are in operation since then, intensively flying authorities and foreign dignitaries. One Legacy 600 was also acquired by the Border Security Force to serve Home Ministry authorities. The aircraft was delivered in 2005 and has been providing a good service in the last 14 years.

**EMB 145 ISR Family** - The ISR (Intelligence, Surveillance, and Reconnaissance) aircraft family are all derived from the platform of the ERJ145 regional jet, which is one of today's most successful airplanes, with more than 1,100 delivered and 20 million accumulated flight hours. The IAF operates three EMB 145 AEW&C. India's EMB 145 AEW&C has important capabilities, such as an in-flight refueling system, a significantly greater electrical and refrigeration

capacity, and a set of structural changes that allow the installation of advanced mission systems that were developed by India's Centre for Air Borne Systems - (CABS), in conjunction with the Defence Research & Development Organisation (DRDO). With a perfect blend of efficiency and economics, the airplanes of the EMB 145 ISR family are versatile and reliable. Its main mission is to detect, track, and identify targets within its patrol area, and to transmit that information to friendly forces, so as to supply them with a precise and ample vision of the field of operations.

**Phenoms 100 & 300** - A large set of products allows Embraer to provide the ideal aircraft for any kind of mission. Designed for high utilization and availability, the Phenom 100 MEPT is a capable platform to support all multi-engine pilot training tasks with single-pilot workload philosophy, low operating costs, observer seat and military communication. It has been the multi-engine training tool of choice of renowned training institutes on the civilian and defense sectors. The Phenom 300 MEDEVAC is an excellent solution derived from the Phenom 300 aircraft with modifications to make it suitable for medical evacuation services. There are a number of Phenom 100 and Phenom 300 operating in India in the private sector and, as expected, those two small jets can also be very attractive for government utilization, replacing with advantage small turboprops.

**New Praetors 500 & 600** - Embraer launched in 2018 the new Praetor 500 midsize and Praetor 600, the only midsize and super-midsize business jets with full fly-by-wire technology and active turbulence reduction, introducing unprecedented range into their categories.

The Praetor 600 will be the farthest-flying super-midsize business jet, which allows nonstop flights between London and New York. The Praetor 500 will be the fastest midsize aircraft, capable of reaching Europe from the west coast of the U.S. with a single stop. With four passengers and NBAA IFR Reserves, the Praetor 600 will have an intercontinental range of 3,900 nautical miles (7,223 km) and the Praetor 500 will lead the midsize class with a continental range of 3,250 nautical miles (6,019 km).

The Praetor jets are currently under development with two Praetor 600 prototypes in flight tests as well as one production-conforming aircraft, and one production-conforming Praetor 500 in its maturity campaign. The Praetor 600 is expected to be certified and enter service in the second quarter of 2019, followed by the Praetor 500 in the third quarter of 2019.

**Integrated Solutions** - Embraer Defense & Security also offers a complete line of integrated solutions such as C4I (Command, Control, Communication, Computers and Intelligence Center) applications, leading edge technologies in the production of radars, air traffic control and communication systems, and integrated systems for border monitoring and surveillance. •

# IAI Unveils New Loitering Munition- Mini Harpy

The tactical loitering attack missile combines radiation broadcast detection and is electro optically guided

Israel Aerospace Industries (IAI) has unveiled the Mini Harpy, a newly-developed loitering munition. Based on unique IAI development and technology, the Mini Harpy combines the capabilities of the Company's two flagship loitering missiles, the Harop and the Harpy, offering detection of broadcast radiation with electro optical capabilities. The Mini Harpy is on display for the first time at Aero India 2019 (Hall-B booth #2.1-2.2).

The Mini Harpy covers a broad area of interest and responds to a broad range of threats and launching scenarios:

- Neutralizing of radiation emitting threats such as radars and additional systems.
- Electro-Optical Threat detection: high quality video footage for the operator.
- Launching from a broad range of mobile land platforms as well as marine platforms.
- Multiple tools per area unit.

The Mini Harpy is a tactical system designed for field or marine units. It can be launched from land, marine and helicopter borne platforms, providing complete independence in intelligence collection for an updated situational picture and closing the attack circle at low cost. The loitering missiles are launched towards the target area. They loiter the sky until the threat is detected. Upon detection, the systems locks in on the threat and attacks it for a quick, lethal closure. The system was designed to provide operators with control up to the last moment, including cessation of attack at any stage. Electrically powered, it is extremely quiet, carries shaped charge of approx. 8 kg, operates in mission range of 100 km for duration of two hours and 45 kg in weight.

Boaz Levy, General Manager and Executive VP of IAI Systems, Missiles &



Space Group, said, "in an age of asymmetrical warfare and fast moving targets that 'blink' for a few seconds at a time, the use of loitering missiles provides strong capabilities for closing the circle of war. Rather than relying on precise reference point, the system we developed loiters the air waiting for the target to appear and then attacks and destroys the hostile threat within seconds. The Mini Harpy is unique in its beam detection and optical capabilities, a combination of two of our loitering missile systems that sold thousands of units in Israel and abroad."

IAI is considered a pioneer in loitering missiles with its Harpy, Harop, Green Dragon and Rotem missiles. •

## Raytheon Appoints Ravi Nirgudkar as President, Raytheon India

Raytheon Company has recently appointed Ravi Nirgudkar as the President of Raytheon India. Ravi is based in the company's New Delhi office. Ravi will focus on growing Raytheon's long-standing partnership with India and collaborating with local partners to meet global defense needs and expand contributions to the growth of India's indigenous defense capability.

Ravi has over 25 years of experience in international business development and program management, including 19 years with Raytheon's Intelligence, Information and Services and Space and Airborne Systems businesses.

Ravi has an MBA in programme management from George Washington University in Washington, D.C., and master's degree in electrical engineering from Mississippi State University. He is also a certified domestic and international capture manager and a Six Sigma black belt.

Raytheon has been a trusted partner of India for over 60 years, delivering innovative and affordable solutions to the government of India. The company fully supports India's 'Make in India' strategy to help safeguard and modernise Indian military forces. •



## BEL's 'Make in India' Initiatives

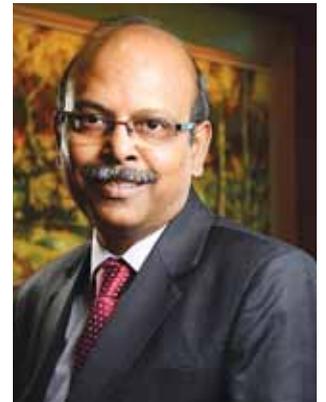
In an interaction with SP'S ShowNews BEL CMD, M.V. Gowtama, Chairman and Managing Director (CMD) of BEL talked about his company's 'Make in India' initiatives.

The CMD said: "Be it the efforts that the Company has been putting in to engage in collaborative R&D — in addition to augmenting its own R&D set up — its recent attempts to outsource work from Indian private industries and MSMEs, or the path breaking decision to go in for public-private partnerships to execute huge missile programmes, BEL is leaving no stone unturned to ensure that it is in sync with the Government's larger goal of indigenisation and self-reliance.

"A case in point is the Akash Missile System, which is testimony to BEL's commitment to the 'Make in India' initiative. Barring a few electronic components, every bit of Akash, has been indigenously developed with BEL as the nodal agency, in partnership with companies from both the public sector and private sector.

"89 per cent of BEL's sales revenue accrues from indigenous technology. BEL is focusing more on core areas and R&D and all non-core areas are being outsourced to Indian industries including MSMEs. BEL has released an Outsourcing and Vendor Development Policy. 'Make in India' Display Cells have been established at all the Units of BEL and Nodal officers have been nominated for outsourcing and vendor development.

"BEL is investing heavily in developing the ecosystem in defence. The Government has created two defence corridors, one in UP and the other in Tamil Nadu. We have our own industries located in these corridors. In UP, BEL has a Unit in Ghaziabad. In Tamil Nadu, BEL has a Unit in Chennai." •



# Boeing Offers Block-III Super Hornet Fighter to India with a 'Path to AMCA' pitch

By **VISHAL THAPAR**

Boeing will field the new Block-III variant of the F/A-18 Super Hornet both for the Indian Air Force (IAF) and the Indian Navy.

"The value proposition of the Block-III offer is to drive the industrial eco-system in India to the path of (India's futuristic fifth-generation) Advanced Multi-Role Combat Aircraft (AMCA)," Thom Breckenridge, Vice President International Sales, Boeing Defense, Space and Security announced at a press conference at Aero India 2019 on February 21.

The "evolutionary" Block-III variant is under development to meet the requirement of the US Navy, and shall be ready soon with "revolutionary capabilities," he said.

The IAF is in the process of formulating quality requirements for its next multi-role fighter, and will run a global competition to acquire 114 fighters made in India under the Strategic Partnership Model. The Indian Navy is in the market with a requirement for 57 ship-borne fighters for its second indigenous aircraft carrier programme.

The 'Path to AMCA' is through building up brand new capability with a 'Factory of the Future' and not just shift an existing production line to India, Breckenridge said, promising that the impact will be "transformational".

The Super Hornet will be pitched against competing new offers from the world's leading fighters in India's Multi-Role Fighter Aircraft (MRFA) Programme, which is likely to be re-run of the earlier aborted MMRCA competition.

The Block-III variant will feature conformal fuel tanks to extend the range by over 100 miles, an AESA upgrade, data fusion, advanced cockpit system, flat panel display, reduction in operating costs per flight hour and extended airframe life up to 10,000 hours.



NEW BLOCK-III VARIANT OF BOEING F/A-18 SUPER HORNET

Breckenridge said Boeing's investment in building up a supply chain in India would give the Super Hornet offer an edge. "Boeing has accelerated 'Make in India' by quadrupling its sourcing from India to \$1 billion last year," he said, arguing that the world's largest aerospace manufacturer was best positioned to drive a fighter programme through indigenous production in India.

"Seventy per cent of the value of the plane is sourced from suppliers," he informed, while elaborating on Boeing's industrial partnerships in India. "Key components of the F/A-18 are being produced at HAL since 2008. We have 160 suppliers in India across various programmes. Chinook (helicopter) parts were being sourced even before the contract for the sale to India. Every single fuselage of every single Apache attack helicopter sold anywhere in the world is built at Hyderabad by Tata Boeing Aerospace Limited," he said.

Boeing lead for the fighter competition also flaunted partnerships with HAL and Mahindra to make the case for a better industrial offer. "We're very confident of HAL," he said, dismissing the grave reservations expressed by France's Dassault during protracted negotiations for serial production of the Rafale at HAL under transfer of technology under the aborted MMRCA programme.

Making a case for after-sales reliability, Boeing also announced that performance-based logistics contracts for the IAF's C-17 fleet and the Navy's P-8I had ensured a mission availability rate of 85 per cent. It is also setting up a facility at Rajali to train Indian Navy pilots for the P-8I. Extended Range new variants of the Harpoon missile have also been offered to India for the P-8I fleet and the IAF Maritime Jaguars. •

## Israel Aerospace Industries in India

By **AIR MARSHAL B.K. PANDEY (RETD)**

On the opening day of Aero India 2019, Air Marshal B.K. Pandey (Retd) of SP Guide Publications had the opportunity for a brief interaction with Eli Alfassi, Executive Vice President, Marketing, IAI. During the interaction, the senior functionary of IAI elaborated on the range of activities of the company that covers production of a variety of systems and sub-systems in the domain of the military as well as in the domains of the civil aviation industry and space exploration technologies. The business ventures of the company are handled by four groups, three of which deal with the military systems and space exploration. The fourth group is dedicated to the civil aviation industry.

IAI has been involved in providing as well as developing military systems to the Indian Armed Forces. While some of the systems may have been bought off-the-shelf, some others have been developed jointly with companies in the Indian aerospace industry. The largest programme that has been in the domain of air defence systems, has been the development of both land-based and naval versions of the medium-range surface-to-air missile (MRSAM) systems for the India Army, the Indian Air Force (IAF) and the Indian Navy. This weapon system has been developed by IAI in collaboration with the Indian Defence Research and Development Organisation (DRDO) with the programme launched in 2006. The programme attained full scale production 2017 imparting the much needed momentum to the NDA Government's 'Make in India' programme.



ELI ALFASSI, EXECUTIVE VICE PRESIDENT, MARKETING, IAI

The other domain wherein there has been a high level of support by IAI to the Indian Armed Forces is that of Unmanned Aerial Vehicles (UAVs). The Indian Armed Forces have been supplied with a variety of UAVs by IAI beginning with the Searcher Mk I in 1990. This was followed by Searcher Mk II, Heron and the Harop or Harpy 2, the last being an unmanned combat air vehicle (UCAV) developed by the MBT division of IAI.

The IAF has received support by way of airborne radar mounted on top of the fuselage of the Russian IL 76 heavy lift transport aircraft to convert it into an Airborne Warning and Control System (AWACS) platform. Three of these platforms have been operational in the IAF for some time now and there is an urgent need for more AWACS platform to enhance air defence surveillance capability of the IAF. In the domain of radars, the fleet of Jaguar aircraft of the IAF that are currently being upgraded under the Darin III programme, are being equipped with the Elta AESA radar which will definitely enhance the operational capability of this ageing platform.

The light combat aircraft Tejas for which orders for 123 aircraft have been placed with Hindustan Aeronautics Limited (HAL) by the IAF, will also be equipped with this advanced Elta AESA radar. Apart from these, there has also been collaboration between IAI and the Indian Space Research Organisation (ISRO) in the domain of space exploration.

Given the extensive engagement and impressive progress so far in the collaboration between India and Israel, there is a strong possibility of fresh opportunities in the future. •

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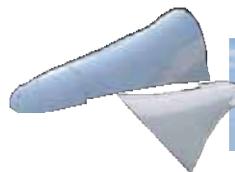
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# JOURNEY OF WONDER 50

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