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AERO INDIA 2019 The Runway to a Billion Opportunities

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

INSIDE

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

PROMISE AND UNCERTAINTY

The massive business opportunity showcased at Aero India 2019 is clouded by political squabbling and visible limits to India's Defence spending capability

PRIME MINISTER NARENDRA MODI AT THE AERO INDIA 2015 AIR SHOW AT YELAHANKA AIR-FORCE STATION IN BENGALURU

By **VISHAL THAPAR**

The 12th edition of India's biggest air show, Aero India 2019 opens at Yelahanka, Bengaluru, on February 20, amidst all the elements that define India as a military and civil aviation power house: Heightened border tensions triggered by a terrible terrorist attack underlining its hunger for military hardware; the size of its market underscored by the commencement of the $3 billion procurement process for 111 Naval Utility Helicopters; imminence of a $2 billion order for 24 Naval Multi-Role Helicopters and another one for 15 Light Combat Helicopters; momentum to processes to acquire 254 fighter aircraft for the Indian Air Force (IAF) and Navy, and declaration of a Final Operational Clearance for the indigenous Light Combat Aircraft Tejas; and market estimates of the requirement of 2,300 aircraft in 20 years for the civil aviation market.

The flip side highlighting the uncertainties of the Indian market are also in full display: A raucous political dogfight over the Rafale fighter deal which is getting messier in the run-up to the high stakes general elections in April-May 2019; India's only aircraft manufacturer declaring that it's broke because the Government isn't paying it dues aggregating to almost $3 million; the Government struggling to fund its military requirements as evident in its recent budgetary allocations.

The Government has been attempting to streamline the Defence Procurement Process (DPP) for speed of acquisition, ease of business and a push to the 'Make in India' agenda. Industry – both domestic and global – is waiting for far reaching initiatives like the Strategic Partnership Model to unveil. "We need greater clarity about this concept," shrugs Mats Palmberg, Saab's Vice-President and the lead for the Gripen Campaign for the IAF's newly christened and gradually unfolding Multi-Role Fighter Aircraft (MRFA) competition for 114 fighters, echoing the industry viewpoint. Foreign OEMs will have to partner an Indian entity which is selected by India's Ministry of Defence through a competitive process for supplying fighter aircraft and helicopters. Both Indian companies and foreign OEMs are bracing and positioning themselves to cope with the new rules of the game.

MAKE IN INDIA: TENTATIVE START

When Prime Minister Narendra Modi visited Aero India in 2015, there was a tremendous sense of expectation around his 'Make in India' agenda. In his inaugural speech, he made a mention of home grown companies to make a case for building up top-end capability. For India to emerge as a bigger power on the global scene, it must have a credible defence and aerospace industrial complex of its own.

Four years down the road, the results are mixed, and the progress slower than expected. Foreign OEMs have been tentative on the 'Make in India' plunge. For-

Continued on page 2...

eign Direct Investment (FDI) in defence and aerospace has been a rather modest $62.7 million since 2014, according to figures presented by the Government to Parliament.

But the progress isn't without its silver linings. The Government has claimed that big defence deals have been leveraged for offsets business worth more than $5 billion for local industry in the last few years. Also, some new players have created a buzz with their agenda and partnerships. For instance, the Adani group has forayed into defence and aerospace. It has made a beginning by acquiring Tier-I capabilities through the acquisitions route, as it seeks to build up credentials to bid for the Strategic Partner status. The group has picked up a stake in Alpha Design Technologies, among some Indian and foreign acquisitions. It has also tied up with Israel's Elbit to make airframe for Hermes MALE drones at a facility in Hyderabad.

The drone partnership with Israel is moving ahead. There are reports of purchase of more Harop drones, and even a game-changing hush-hush deal for Heron TP missile firing drones. This has left a signature on the industrial front too. Lohia, the Kanpur-base engineering group, has made a bold return to defence and aerospace by buying up the Israeli company Light and Strong, which has a key competence in composites for drone airframes. A parallel manufacturing facility is being set up at Kanpur.

HAL: THE COOKIE CRUMBLES

While there's been mixed results on the 'Make in India' front, it is the cash crunch for defence procurements which is emerging as the big downer. This has resulted in defaults in payments to the Indian public sector, and the affiliated supply chain. The Hindustan Aeronautics Limited (HAL) Chairman R. Madhavan threw the proverbial cat among the pigeons in January 2019 by declaring that India's aerospace behemoth was broke, and forced to borrow working capital from the market. He made the stunning disclosure that the Ministry of Defence hadn't paid its bills to HAL since September 2017, and that the accumulated arrears would go up to over $3 billion by March 2019. Pending dues from the IAF alone were to the tune of ₹15,700 crore in December 2018 for products and services already delivered.

Far more disconcerting was the existential crisis that HAL perceived for itself following the scrapping of the MMRCA procurement – which would have given it an order for building 108 fighters after the culmination of the Sukhoi-30 MKI production cycle – and India's pullout from the Fifth Generation Fighter Aircraft (FGFA) programme with Russia, which also involved joint development work and production of about 125 fighters. HAL saw its bread and butter business – serial production of fighters – suddenly being yanked away from it. Its anxiety was further aggravated by the Strategic Partnership Model, which will force it to compete with the far nimbler private sector for business.

REALITY CHECK: SHRINKING BUDGETS

The macro picture about the cash crunch emerged more clearly with the presentation of the interim Budget for 2019-20. While the capital allocation for new procurements in totality was pegged at ₹1,03,380 crore, it emerged that both the IAF and the Navy haven't been allotted enough capital funds to meet even their committed liabilities for platforms and equipment already contracted. The IAF faces a budgetary deficit of ₹8,110.36 crore against its committed liabilities of ₹47,413 crore for capital allocations for 2019-20. The Navy's allocation is short by ₹2,304.57 crore for its committed liabilities of ₹25,461 crore. This means that unless more funds are made available in the regular budget after the elections, the IAF and Navy do not have money for any new acquisitions at a time of political uncertainty and heightened tensions with India's western neighbour.

Defence Finance expert and Industry watcher Amit Cowshish says he isn't surprised that the bubble has burst. "It's been coming for a long time. The signals were here 10 years ago. We can't be planning beyond our means," he says.

Although he's optimistic that the budgetary allocation for Defence will be increased after the polls, he cautions that there will no dramatic hike because of intensely competing demands for the social and development sectors. "India's defence establishment needs to manage with less. It must rationalise expenditure. We have to live with this reality of budgetary limits," Cowshish, a veteran of procurements in the Ministry of Defence, counsels.

THE NEW AERO INDIA: MORE STYLE & SUBSTANCE

While there's a tryst with reality over the size of pockets casting its shadow on Aero India, the bi-ennial airshow is breaking new ground on social media, with exciting new agendas and a novel marketing pitch. The show tagline – 'The Runway to a Billion Opportunities' – has created a favourable buzz, as has the new logo – built around the outline of the indigenous LCA Tejas fighter – drawn appreciation.

The Defence Minister and the Secretary Defence Production Secretary are personally promoting the event on social media like never before, with the latter publicly taking ownership of the event. Also, for the first time, all bookings have been made online. "Collections from online bookings have crossed ₹110 crore," an official of the Ministry of Defence told this reporter. Tickets being sold online are cheaper. An Aero India app hopes to make life easier for participants. Besides listing exhibitors along with their locations, there will be maps, schedules and updates. It even has a QR Code-based feedback system on cleanliness and house keeping.

The jury is out on the reduced number of exhibitors – 371. But the organisers claim that more space has been sold at the air show, which is reflected in two additional halls as compared to the previous edition. There are 61 aircraft on display. On the ground, it is HAL's show, organising it on behalf of the Ministry of Defence.

There are also Industry gripes at the costs of participation at Aero India 2019. Many point out that its more expensive than even the marquee Paris Air Show.

The organisers are hoping that Industry will take this in its stride, as new elements are being added to the show. Each of the five days has a theme. The second day is the Start Up Day and the third Technology Day, as organisers look for new ways to make the show more meaningful. There much interest at the 'Drone Olympics', which is aimed at talent and capability spotting for Industry. A students pavillion is also dovetailed, and aims at catching them young. The fourth day has a Women's theme to showcase achievements by women in the aerospace sector. There are a series of seminars to link up OEMs with MSMEs. A CEOs Round Table with high level participation is intended to be the show stopper.

So, welcome to Aero India 2019. Have a great show! •

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Embraer KC-390: The Multi-mission and Tactical Transport Aircraft

Embraer's booth at AeroIndia 2019 is located at 1.7 &1.8 at Hall F

By **SP'S CORRESPONDENT**

Embraer's KC-390 is a tactical transport aircraft designed to set new standards in its category while presenting the lowest life-cycle cost of the market. It can perform a multitude of missions such as transport and deployment of cargo and troops, air-to-air refueling (as tanker and as receiver), medical evacuation, search and rescue, aerial firefighting, night and day, all weather, operating from unpaved runways.

The Brazilian Air Force (FAB) hired Embraer in 2009 to undertake that project of developing this aircraft. Under this program, industrial partnerships were also established with Argentina, Portugal and Czech Republic. Embraer's KC-390 may become an interesting alternative to fulfil Indian Air Force needs. The new airlift features state-of-the-art systems such as integrated digital cockpit, fly-by-wire control systems with active sidesticks, break-by-wire, OBBIGS, health monitoring, and prediction system. This multi-mission tactical airlift is fast, reliable, rugged and affordable to operate and maintain.

Embraer's KC-390 first prototype has performed its first flight in February 2015 and the aircraft is now in the flight test campaign, which is progressing extremely well, matching the performance and capability goals predicted with the latest engineering tools. Since the start of the campaign, on 26 October 2015, the KC-390 presented a very high availability, logging an unprecedented flight rate in the program, with nearly 2,000 flight hours to date.

The KC-390 is poised to obtain its Final Operating Capability (FOC) and making its official delivery to the Brazilian Air Force as the launch customer in 2019. This follows a series of key milestones in 2018 such as the Type Certificate from Brazil's Civil Aviation Agency (ANAC), First Production Aircraft complete and flying, and continuation of the FOC.

Embraer also performed the aerial refueling drogue extension, for high and low speed conditions, initial cargo airdrop and paratroops assessment in a joint effort with the Brazilian Air Force and the Brazilian Army, using lateral doors and cargo ramp. The program has covered the full flight envelope of the aircraft reaching cruise speed of Mach .80 and operational ceiling of 36,000 feet. These tests were an important part of the military certification requirements.

Equipped with International Aero Engines V2500 turbofan engines, the latest avionics, a rear ramp, and an advanced cargo handling system, the KC-390 is capable of carrying up to 26 metric tons of cargo at a maximum speed of 470 knots (870 km/h), with ability to operate in austere environments, including unpaved or damaged runways. The aircraft can carry pallets, helicopters, armored wheeled vehicles, and troops (80 soldiers or 66 paratroopers). The performance of the KC-390 is benefited by a modern fly-by-wire control system with integrated technology that lowers the workload of the crew and increases the safety of its operation.

Furthermore, the KC-390 can refuel other airplanes in flight, with the installation of two removable internal fuel tanks. The aircraft can also be refueled in flight, thus providing greater flexibility for longer missions. An advanced self-defense system increases the aircraft survival capability in hostile environments. •

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"RPA that provide the multi-mission capability of GA-ASI systems are only going to grow in importance"

SP's ShowNews posed a set of questions to **Robert Schoeffling**, GA-ASI International Strategic Development, who is attending Aero India 2019. General Atomics Aeronautical Systems, Inc. (GA-ASI) is exhibiting in Hall E, Stand # E2.4. Excerpts from the interview:

SP's ShowNews **(SP's): Can you give us an overall understanding of what solutions General Atomics offers to various markets in the world?**
Robert Schoeffling (Schoeffling): General Atomics (GA) and its affiliated companies constitute one of the world's leading resources for high-technology systems ranging from the nuclear fuel cycle to electromagnetic systems, remotely operated intelligence, surveillance and reconnaissance (ISR) aircraft, airborne sensors, and advanced electronic, wireless and laser technologies. At Aero India, GA is showcasing key products from its Aeronautical Systems line-up, as well as products from its Electromagnetic Systems (EMS). To address India's maritime and overland coverage area, General Atomics Aeronautical Systems Inc. (GA-ASI) is featuring the Avenger for the Indian Air Force, MQ-9B SkyGuardian for the Indian Army and the SeaGuardian for the Indian Navy. These aircraft are the next generation of GA-ASI aircraft, which are designed to provide unsurpassed endurance, sensor and weapons payload capacity, efficiency and reliability, and Beyond Line of Sight (BLOS) operability.

SP's: How would you elaborate General Atomics in terms of technological advancements in today's fastest evolving aerospace and defence world?
Schoeffling: GA-ASI's innovative high-tech solutions have spawned an ever-growing line of versatile, reliable, cost-effective, and combat-proven aircraft. SeaGuardian, the maritime variant of the MQ-9B SkyGuardian in development, is a highly sophisticated aircraft built on the experience gained with the company's battle-proven Predator Remotely Piloted Aircraft (RPA) and is a major evolutionary leap forward in overall performance and reliability. Today, the MQ-9B is being built from the ground up to meet global airworthiness standards. Both hardware and software upgrades were made, such as improved structural fatigue and damage tolerance to include more robust flight control software. Additionally, other enhancements allowing operations in adverse weather including icing conditions have been made that will meet international airworthiness standards, which includes the ability of the aircraft to survive bird and lightning strikes.

SEAGUARDIAN

SP's: Which are the key markets that are served by General Atomics today?
Schoeffling: There are currently five countries operating GA-ASI RPA with another two on contract. We are also looking forward to the United Kingdom being the launch partner for the MQ-9B SkyGuardian under the Protector RG Mk1 program. We believe there is significant interest worldwide in our aircraft due largely to countries recognizing the savings that come with unmanned systems. As defense budgets continue to shrink and militaries look for ways to economize, RPA that provide the multi-mission capability of GA-ASI systems are only going to grow in importance.

SP's: It is believed that Aeronautical Systems Division of General Atomics offers the cutting-edge technology through its collection of unmanned aircraft. Can you elaborate a little on this front in regards to MQ-9B?
Schoeffling: What sets the MQ-9B SkyGuardian and SeaGuardian apart from other aircraft is first, the aircraft is highly modular and is easily configured with a variety of payloads to meet mission requirements. Secondly, they are capable of carrying multiple mission payloads across nine hardpoints and includes a state-of-the art Detect and Avoid (DAA) system for operations in non-segregated airspace. The SeaGuardian configuration, with its maritime patrol radar, provides unmatched ability to support open-ocean and littoral surface surveillance for border patrol, coast guard, and disaster relief missions.

SP's: Is it possible for you to give us some idea as to which all are the sectors that are being served by your host of unmanned systems – for example which all sectors within military forces, border-centric forces, civil aviation if applicable?
Schoeffling: MQ-9B provides persistent situational awareness across vast domains. It does this without putting aircrew at risk and at a significant cost effectiveness over manned aircraft alternatives. Its multi-mission capability makes it a valued asset in a variety of scenarios – from environmental protection, to Humanitarian Assistance/Disaster Relief (HA/DR), to Maritime Domain Awareness (MDA), to Search and Rescue (SAR) to overland and overwater Intelligence Surveillance and Reconnaissance. (ISR).

SP's: We believe you are offering SeaGuardian to Indian Navy. Will appreciate if you can elaborate on the key features SeaGuardian by General Atomics Aeronautical Systems?
Schoeffling: SeaGuardian offers persistent surveillance with advanced sensors which allow real-time monitoring of the areas of interest around the clock. SeaGuardian's unsurpassed range, endurance and sensor and weapons payload, coupled with all-weather capability, provides much needed flexibility to military commanders allowing rapid decision and reaction time.

SP's: Indian Air Force, according to our understanding, also has shown some interest in one of the combat UAVs by General Atomics Aeronautical Systems. Can you advise which UAV is that and what all does capabilities it brings along, to assist the air forces?
Schoeffling: We are excited that there is interest across the Indian Military Services for MQ-9B. In particular, we have worked very closely with the Indian Navy to meet their requirements. Ultimately, this will be a Foreign Military Sales (FMS) procurement and questions regarding the negotiations would best be directed to the Government of India or USG.

SP's: There are many global companies which do specialise in unmanned systems. How will you differentiate your unmanned systems and if you can indicate on some key unique features of your systems versus the others?
Schoeffling: We are proud that, as a company, we have both a strong existing product line like the Predator, which recently achieved the historic industry milestone of five million flight hours, while continuing to innovate with new capabilities such as the ability to operate in controlled and uncontrolled airspace just like manned aircraft. •

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Lockheed Martin F-16 Still the Best Bet

The Indian Air Force (IAF) has always been keen on a single-engine combat aircraft as these offer distinct advantages over twin-engine aircraft.

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

The air dominance of the future will rely on long range airborne radars and sensors complemented by long range jam-proof missiles that will allow well Beyond the Visual Range (BVR) combat. Stealth and supercruise will be added features of the fifth generation fighters. Most current fourth-plus generation fighters produced since early 1970s, have more or less stabilised attributes in terms of maximum speed, 'g' and rate of turn. As such platforms with more recent airframes do not offer any significant advantage over older ones, the Indian Air Force (IAF) has initiated the process for acquiring 114 new medium multi-role combat aircraft (MMRCA) and the responses to its Request for Information (RFI) were received in July 2018. There are seven contenders for the MMRCA class, 4.5 generation aircraft namely American Lockheed Martin's F-16 Block 70 and Boeing's Advanced Super Hornet F/A-18E/F, the Rafale from Dassault Aviation of France, the JAS-39E/F Gripen from Saab of Sweden, the Su-35 and MiG-35 from Russia as well as the Eurofighter from European consortium. It will be interesting to make a prognosis of the unfolding competition.

IMPORTANT AIRCRAFT ATTRIBUTES

The IAF has always been keen on a single-engine combat aircraft as these offer distinct advantages over twin-engine aircraft. Single-engine fighter aircraft are cheaper, easier to maintain, have quicker turn-around between missions and can complete five missions in a 24-hour cycle vis-a-vis three missions by larger twin-engine combat aircraft. Light fighters generally feature high thrust-to-weight ratio, high maneuverability and higher reliability. The selected aircraft should see the IAF through for next 40 years. It must have the state-of-art avionics, weapons, high degree of survivability and adequate potential to upgrade the avionics and weapon systems. India should be able to get world-class technological support for India's indigenous production of aircraft engine, active electronically scanned array (AESA) radar, stealth and electronic warfare equipment for the Advanced Medium Combat Aircraft (AMCA), a fifth generation platform. It should be low in cost so that the IAF could get much more from its meager capital budget. It should have unrestricted 'Make in India' potential with significant options for export. India should be able to leverage the buy for geo-political support to get to the high table of international organisations that have been hitherto restricted. In view of the urgency, the acquisition process must be hastened.

COMPARING THE COMPETITION

Barring the Su-35, all the other combat aircraft on the list have been extensively tested in the truncated MMRCA competition that failed. The IAF has indicated that the next round will be incremental testing involving only the new systems. Swedish Saab Gripen JAS-39 is single-engine and more recent aircraft endowed with fairly modern technologies. Being a relatively smaller political player for India it will be easier to get a good deal from Saab. They are willing to share the source-code. However, only 250 Gripen fighters are flying world over giving little business leverage for any exports. Also, the original Saab plant in Sweden will not be shut down. Nearly 30 per cent aircraft systems are sourced from the United States (US), which can have complications later. The F-18 is a twin-engine aircraft which had lost to the of F-16 in the USAF fighter competition in the 1970s. Like the F-16, the aircraft has gone through significant airframe redesign and systems upgrade. Boeing has significant presence in the country. Around 600 have been built till date and the US Navy is the main operator. The Royal Australian Air Force has inducted small numbers as an interim replacement of the F-111. Canada is the only other contender to replace its old F-18 Hornets. Some other F-18 operators plan to move on to other aircraft. The MiG-35 is essentially a further develop-

Lockheed Martin is world's biggest defence contractor which continues to produce the top-end fighters of the world

ment of MiG-29M/M2 variant. Since the IAF has already imbibed many of its technologies in the MiG-29 upgrades, it may not remain a serious contender. Similarly, the Su-35 is an improved variant of the Su-27. The IAF's Su-30 MKI has imbibed some of the technologies already and more will come in the Su-30 upgrade programme. India will be having 14 squadrons of Su-30 MKI. With the US government's Countering America's Adversaries Through Sanctions Act (CAATSA) already in place and India having already ordered the Russian S-400 air defence systems and four naval frigates, Russian aircraft are less likely to be contenders. Little over 600 Eurofighter aircraft are flying, mostly in small numbers in some European and West Asian countries. These aircraft are maintained by a consortium of Airbus, BAE Systems and Leonardo through joint holding company. Four European countries are partners in its production which brings in its own dynamics. Earlier, the Eurofighter had lost out to the Rafale on the commercial bid, therefore, the Rafale will have an advantage over it. The Rafale is already a known entity to the IAF whose personnel have already begun training on it and the aircraft are set to begin arriving in 2019. Unfortunately, the aircraft has got into a serious political slugfest which hopefully would get resolved soon. The aircraft is likely to lose to the single-engine aircraft in terms of cost which will be an important factor. If the IAF is forced to choose a twin-engine aircraft for increased numbers and commonality with Indian Navy, then the Rafale will be the better bet among the twin-engine contenders.

ADVANTAGE F-16

Other than the JAS-39 Gripen, the Lockheed Martin F-16 is the only other single-engine contender. Lockheed Martin is world's biggest defence contractor which continues to produce the top-end fighters of the world. More recent being the F-117 and F-22 and being inducted in all major Western Air Forces the F-35 Lightening II. Over 4,500 F-16s have been produced over the years and have been flown in 27 countries. Nearly 2,250 are still flying and service life extension programme will keep the jets flying beyond 2050. If selected, India can get huge business worlzngine aircraft, the F-16 will have an advantage. The latest variant Block 70/72 was first showcased on February 15, 2012 at the Singapore Airshow. The Block 70 will exploit the aircraft's long combat experience and introduce new front-end technologies and enhanced battlespace awareness avionics. The enhanced features include the AN/APG-83 Scalable Agile Beam Radar (SABR), AESA radar, an upgraded mission computer and architecture, an advanced data-link, targeting pod and weapons, precision GPS navigation and the Automatic Ground Collision Avoidance System (Auto GCAS) and improvements to the cockpit, many fifth generation capabilities identified by the USAF and several international customers. On offer are also many weapons including latest versions of the AIM-120 AMRAAM. The aircraft is powered by GE F110-132A engine. Taiwan, South Korea, Bahrain, Greece and Slovakia have opted for the upgraded variants. Lockheed Martin has a joint venture company with Tata Advanced Systems Limited (TASL) located in Hyderabad which has proven expertise through manufacture of airframe components for the C-130J airlifter and the S-92 helicopter. In 2017, Lockheed Martin signed a letter of intent with the Indian defence firm TASL to manufacture the jets in India if the Indian government accepts their tender. The new production line would supply jets to India as well as for export. Early September 2018, Lockheed announced that they would build F-16 aircraft wings in India and that would not be contingent upon the company winning the contract in India for the planes. Those apprehensive about the Pakistan Air Force (PAF) also having around 100 F-16s, should know that the Block 70 is a clear generation ahead of the older Block 52s with the PAF. Beyond pure merit, after recent special India specific CAATSA waivers, America would expect India for the first time to buy a US fighter. The two countries have signed the Logistic Exchange Memorandum of Agreement (LEMOA) and more recently, the Communications Compatibility and Security Agreement (COMCASA). This may also give a tilt towards American aircraft. In return, the US is likely to continue to support India for membership of international nuclear and security bodies including the Nuclear Suppliers Group (NSG) and the UN Security Council. It is hoped that the Request for Proposal (RFP) will be issued early enough to kick-start the competition formally. •

"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***

***SP's ShowNews* (SP's): How do you foresee the future of India's Aviation market?**
Palash Roy Chowdhury (Chowdhury): It was just last year that the number of people traveling by air within India surpassed the number of people traveling by train, so we are at the beginning of India's future as one of the world's leading aviation market. India is the world's seventh largest aviation market today and projected to become third largest by 2022. Intra-India air travel connects business centers with each other, and with secondary and tertiary markets, and will rely extensively on narrowbody aircraft that fly multiple cycles per day. In order to compete and grow, airlines have to operate reliable, dependable flights at a competitive price, and our engines help them do that.

SP's: What is your view on the UDAN scheme?
Chowdhury: We have seen how beneficial regular air service is to a local economy. It grows jobs and opportunities, and as more people move to urban areas, it helps keep them connected to their families, and brings the world to a previously underserved or unserved region. India's UDAN initiative is inspired. Supporting this growth is good for India. Incentivizing air travel and air connectivity through government action is vital to the local economy, but it must eventually support itself. A key deciding factor for operators of regional flights is whether they can cover the cost of operating their schedule. Pratt & Whitney is highly focused on making engines for this market segment that meet the operators' needs, through very efficient and durable engines. We are a leader in this market, supporting cargo, passenger and private air service.

(TOP) P&W CTC IN HYDERABAD; (ABOVE) PRATT & WHITNEY'S GEARED TURBOFAN PW1100G-JM ENGINE TESTING IN THE NEW STATE-OF-THE-ART A10 TEST STAND

SP's: By when do you think the recent issues with IndiGo and GoAir will be resolved?
Chowdhury: More than 95 per cent of the fleet in India have completed retrofits and we expect 100 per cent completion in the first part of 2019. These retrofits provide significant improvements in engine reliability and time on wing.

All jet engine programmes, from the oldest programmes still flying to the very latest in technology, are never static. Over the course of its life, usually 30 years or more, changes are made to the engine to increase performance or extend its durability. We are now in that stage with the GTF; continual improvements will be made to the engine.

Separately, all engine programmes are monitored to ensure performance. In this case, Pratt & Whitney is examining the accessory gear box and we will communicate with operators should further action be required. This part of the engine powers electronic systems on board, and is not used for flying the plane.

SP's: What are the measures taken by Pratt & Whitney to ensure its customers don't face critical situations due to unavailability of spare engines or other operational issues with the neo engines?
Chowdhury: Pratt & Whitney more than doubled the number of engines serviced through our MRO facilities last year (compared to the year prior) and will continue to increase capacity in our shops. More MRO facilities are on-line as well, including ESA in Singapore, which inducted its first GTF engine in January 2019.

SP's: How many Pratt & Whitney GTFs have been delivered or ordered by the Indian airlines?
Chowdhury: More than 350 Pratt & Whitney GTF-powered A320neo aircraft have been ordered by Indian airlines. Nearly 100 GTF-powered A320neo aircraft have been delivered to airline operators in India (IndiGo and GoAir) to date. The GTF engine in India has powered 650,000 flight hours; over 200,000 flights; saved 32 million gallons of fuel and avoided some 344,000 tonnes of carbon emissions to date.

SP's: Elaborate on Pratt & Whitney's skill development initiatives in India.
Chowdhury: As a company that is deeply embedded in India, we firmly support the 'Make in India' campaign that has provided significant impetus to India's economic growth since its launch. We believe that 'Make in India' will only be successful if Skill India succeeds. Skill development will be a cornerstone of aviation growth. Pratt & Whitney recognizes the country's world-class engineering and technical capabilities as well as market opportunities it offers. Keeping the talent in mind, we have undertaken the below mentioned initiatives to support Skill Development in India:

- Pratt & Whitney has invested in a world class training center at Hyderabad, India which opened in September 2015. This is only the third such Pratt & Whitney training facility in the world, the center has been approved by aviation regulators such as Directorate General of Civil Aviation (DGCA) and European Aviation Safety Agency (EASA) to impart trainings on PW1100G-JM and V2500-A5 engines to aircraft engineers and technicians from Pratt & Whitney's customers in the region. Currently the training center has a capacity of 5,000 student days per year and is well equipped with actual aircraft engines, specialised tooling as well as state of the art audio/visual teaching aids including "Virtual Reality" based demonstration systems. In partnership with state governments and leading universities, colleges, the center has successfully conducted specialised short-term training program for the benefit of the faculty and students, thereby supporting the development of skilled talent pool for the growth of the industry in India.
- Since its launch the Pratt & Whitney training center has already completed over 5200 student days of training and has emerged as a leading centre for aviation skill development in the region. We have imparted trainings to 30 operators representing over 20 nationalities.
- We are working with over five state governments as well as leading universities to offer world class aviation trainings there.Currently the center is offering its courses targeted towards students from Telangana, Tamil Nadu, Maharashtra, Gujarat and Haryana. These partnerships are aimed at facilitating the growth of an aviation ecosystem in the country through development of an industry ready talent pool in support of the massive growth in the aviation sector in India. •

Continued on* SP's ShowNews *Day 2...

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The Year of Heron TP

Strengthens 'Make in India' commitment

By **SP'S CORRESPONDENT**

The proliferation of drones in conflict areas highlight the role of large unmanned aircraft systems (UAS) have in modern conflicts.The USA, China and Israel are currently the sole providers of large UAS, platforms that offer long mission endurance, mission versatility and longer missions. One of the largest, most advanced systems is the Heron TP from Israel Aerospace Industries (IAI).

Equipped with the most advanced avionics, line of sight and satellite communications and multiple mission payloads, Heron TP climbs up to 45,000 ft, high above commercial air traffic routes, where it can operate on missions spanning over 30 hours, carrying 1,000 kg of payloads. The robust structural design features double boom, twin-tail design that are most suitable for such missions, offering better antennae separation, optimal coverage and a stable platform necessary for precision signal measurements.

NEW MISSION CAPABILITIES

Heron TP is well configured to carry multiple payloads in a large internal payload bay, universal payload attachments and underwing hardpoints. Such payloads include electro-optical systems, SAR and maritime search radars, COMINT and ELINT systems and persistent surveillance systems designed for operation from standoff range.

In addition to the payloads integrated into the aircraft, Heron TP can also carry mission payloads in underwing pods. Such EO pods can deliver in real-time, a 3D image of the ground scene, other sensors designed for persistent surveillance, provide continuous coverage of large areas, monitoring all movements over time, enabling analysts to follow objects of interests by specific parameters, such as vehicles type, shape and color, define life patterns and identify anomalies from such patterns.

Another new capability supported by the Heron TP is maritime anti-submarine surveillance, integrating maritime surveillance radar, EO payload, magnetic anomaly detector (MAD) and sonobuoys that are dropped to the water and transmit sonar data to the aircraft. With this equipment, the Heron can detect submarines underwater and track them at periscope depth. On these missions, Herons are launched from land bases but can be controlled from ships at sea. At twice the speed of other drones and long mission endurance, the TP can cover larger areas, deep at sea. Flying higher than other drones and using EO payloads covering extremely long range, Heron TP significantly enhances mission capabilities of maritime surveillance and ASW, in its ability to move quickly to new positions and recognise targets without descending to a lower altitude, or from a stand-off range.

A GOOD YEAR FOR HERON TP

Operationally deployed with Israel's Air Force (IAF) since 2011 Heron TP has performed countless missions extended farther and longer than any other manned or unmanned aerial combat system. "90 percent of our activity covers the northern theater, where we are required to provide persistent surveillance and real-time intelligence" 210th squadron leader, Lt Colonel S. said, "Heron TP enables us to operate farther and extend our vision even longer". In 2018 the IAF took delivery of additional Heron TPs that significantly increases the UAV fleet size and contribute to increase operational flight hours by 70 per cent.

Heron TP is a multi-mission and multi-payload RPAS integrating cutting-edge technologies from IAI and other sensor manufacturers. The aircraft is designed and built to endure the harshest weather conditions and conforms to the highest safety and reliability standards.

Heron TP's development is the result of IAI's over 40 years of experience in developing RPAS for 50 satisfied customers with more than 1,700,000 cumulative flight hours.

In two years, Germany will become the second operator of Heron TP, following the award of €1 billion contract to Airbus in June 2018. The contract funds operational leasing of five Heron TP drones, for a period of nine years. The new systems will replace the Heron I currently in service and will introduce new capability, addressing the German requirements. The project will have a two-year set-up phase, followed by an operational phase lasting a further seven years.

According to Airbus, under the terms of the basic contract, the Bundeswehr will receive five aircraft equipped for reconnaissance missions and capable of carrying weapons, four sets of ground segments, training environments and all system operational services. The basic contract also includes preparing the drones for their use in future countries of operation.

"This project will provide the Bundeswehr with an even more efficient system that will better protect soldiers in a wide range of threat situations as well as the at-risk civilian population," said Jana Rosenmann, Head of Unmanned Aerial Systems at Airbus. "The modular concept will allow us to provide the Bundeswehr with the capabilities it needs on time for the years to come."

"We are committed to deliver fully operational system certified to operate in all environments," IAI Malat VP Marketing, Avi Bleser said. The MALE HERON TP system will get military certification from the German Armed Forces aviation authority in accordance with STANAG 4671 allowing the system to be used around the world. This is supplemented by the integration of collision avoidance capabilities. Airbus is already a Heron TP design organisation approved by the German Armed Forces aviation authority and will also become the approved Heron TP manufacturing and maintenance organisation for the project.

A month after the German announcement, the Indian government approved a $400 million procurement of Heron TP platforms to augment the fleet of Heron I operated by the Indian Air Force. Similar to the German configuration, these platforms will offer enhanced mission capabilities, addressing an urgent Indian requirement for unmanned weapon carrying platforms. India already operates a large fleet of Heron I and Searcher UAVs also made by IAI, for surveillance and intelligence gathering. The Indian Navy also operates Heron I on maritime surveillance missions. The new Heron TP platform will further extend these capabilities to fly missions higher, farther and with heavier loads, and more versatile payloads. With extensive presence in the Indian market IAI have entered into several joint ventures in the country, exploring joint production of its drones with India. •

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Pioneering a Powerful Partnership with India

Rolls-Royce to showcase technology prowess and India partnership at Aero India 2019

Rolls-Royce will be showcasing its powerful India partnership and technological prowess at the upcoming Aero India 2019 in Bengaluru this February. Located at the UK Pavilion, in Hall A, Rolls-Royce will demonstrate its support of current programmes and future opportunities in India.

Rolls-Royce has been steadily building its capabilities in India, across engineering, manufacturing, supply chain, digital and customer support to support local growth. The Aerospace Engineering Centre in Bangalore has over more than engineers contributing to global aerospace engine programmes. Rolls-Royce's R2 Data Labs, an acceleration hub for data innovation with a facility in Bangalore, develops data applications that unlock design, manufacturing and operational efficiencies and creates new service propositions for customers.

Rolls-Royce is proud of its 80-year relationship with the Indian Armed Forces. With India's focus on modernisation and indigenisation of its Armed Forces, Rolls-Royce is committed to sharing innovation, capability and knowledge through its enduring and cooperative partnerships.

KISHORE JAYARAMAN, PRESIDENT, ROLLS-ROYCE – INDIA & SOUTH ASIA

Pankaj Kaushik, Vice President India (Armed Forces & Govt.), Rolls-Royce – India & South Asia, said: "As India continues to develop its capabilities in aviation industry, Rolls-Royce believes that this is the right time to step up discussions on its products & technology and fully participate in the evolving sector in the country. Aero India 2019 offers a platform to present our full range of power and solutions for aviation to support the growth needs of the industry. As a leading industrial technology company, we continue to expand our presence strategically, through collaborations with companies like Hindustan Aeronautics Limited (HAL), TCS, and QuEST. We are committed to further strengthening our partnerships , to enable India to benefit from our innovative products, solutions and technologies. In line with our vision to pioneer the power that matters to our customers, we are well-positioned to offer our strong portfolio of more efficient and cleaner products and solutions and play a key role in India's growing aviation sector."

Louise Donaghey, SVP India and South Asia, Rolls-Royce, said, "Rolls-Royce has had a long and distinguished history in India since 1932. With India's focus on strong economic and infrastructure growth, Rolls-Royce is well positioned with its broad range of products and services to meet the needs of our customers and help India achieve its long-term growth vision. We are part of India's future as a centre for innovation and manufacturing. We are proud to be a leading provider of power to the Indian Armed Forces, and our commitment to support India to achieve its goals of indigenisation and self-reliance remains as strong as ever."

Rolls-Royce has been working closely to ensure that India is uniquely placed to support both its future requirements and the development of advanced technological solutions across global markets. •

Lockheed Martin to Participate in Aero India Exhibition 2019

Company showcases selection of aircraft, precision systems, local and global programmes at biennial event

Lockheed Martin is looking forward to meaningful engagement with their customers, partners, and peers in India and the global defence industry in Bengaluru this February, during Aero India.

The programmes Lockheed Martin shall be presenting include the peerless C-130J Hercules (of which India operates 11, one of which made headlines around the world for achieving the daunting feat of landing at the highest landing strip in the world in the Himalayan Mountains – Daulat Beg Oldi – in 2013), the F-16 fighter jet, an equally impressive and proven platform for which Lockheed Martin previously announced future potential production of wings in India in partnership with Tata Advanced Systems; helicopters the S-92, MH-60R, CH-53K and S-76; Javelin – the world's most versatile precision weapon system, as well as the INDAGO unmanned aerial system (UAS) which presents payload options and advanced ground control software that helps users accomplish a diverse set of missions.

Lockheed Martin shall be involved with the upcoming Start-Up Showcase, and the Women in Aviation event and Women's Day – activities and occasions that sync with their social responsibility efforts in India, which Lockheed Martin believe are critical to progress and capability development at a grassroots level – and through their investment and involvement in the India Innovation Growth Program, participating in a number of Innovation-related activity including the Drone Olympics and 2019 Aero India Start-up Workshop and Showcase. •

IAF'S C-130J HERCULES LANDING IN DAUKAT BEG OLDI LOCATED IN THE HIMALAYAS

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Boeing to Showcase Advanced Capabilities at Aero India 2019

- Exhibit best-in-class defence capabilities and services, including F/A-18 Super Hornet, KC-46A tanker, AH-64 Apache, CH-47 Chinook, and P-8
- Showcase partnership to modernise India's armed forces
- Highlight commitment to 'Make in India'
- Record-setting domestic passenger traffic and a robust domestic economy will drive the need for 2,300 new commercial airplanes in India, valued at $320 billion

(TOP) THE FIRST CH-47F (I) FOR INDIA; (ABOVE) THE FIRST AH-64E APACHE FOR INDIA.

Boeing will showcase a range of platforms, support and training capabilities at Aero India 2019, including the F/A-18 Super Hornet, KC-46A Pegasus tanker, AH-64E Apache, CH-47F Chinook, and the P-8 at Hall E Booth 3.1.

During the show, Boeing will focus on the partnerships with its defence and commercial customers, and highlight strategic investments in developing India's aerospace ecosystem, with the theme 'The Future is Built Here.'

Featured at the show will be two US Navy F/A-18E Super Hornets and the P-8A, and the US Air Force's C-17 Globemaster III. Boeing will showcase an AH-64E Apache Heavy Attack Demonstrator (HAD) Cockpit Simulator to highlight training capabilities. On display will be the models of the latest Boeing commercial airplanes, including 737 MAX, 777X and the 787 Dreamliner.

"Boeing has been closely supporting the modernisation and mission-readiness of the Indian armed forces with advanced products and services, and we look forward to continued discussions on their future requirements," said Michael Koch, Vice President, Boeing Defense, Space & Security in India. "Boeing's advanced capabilities for India include the 'Make in India' F/A-18 Super Hornet fighter, KC-46 aerial refuelling tanker, AH-64E Apache attack helicopter, P-8 long-range maritime surveillance, and services.

"We are proud of our long history and partnership with India and to be a part of its growing aerospace industry," said Dinesh Keskar, Senior Vice President, Asia Pacific and India Sales, Boeing Commercial Airplanes. "The Indian economy is projected to grow by nearly 350 per cent over the next two decades to become the third largest economy in the world, which will fuel the continuous growth of India's commercial aviation market – resulting in the need for 2,300 new airplanes for India. Boeing's new, fuel efficient airplanes such as the 737 MAX, 777X and the 787 Dreamliner will bring innovation to the market and unbeatable fuel efficiencies, aiding airlines in India to prosper."

Boeing's exhibit will also showcase aspects of its partnership with India, including the rapidly growing engineering and technology centre in Bengaluru, the joint venture with Tata Advanced Systems in Hyderabad, its extensive 'Make in India' supplier network, and skill development and start-up innovation HorizonX programs. •

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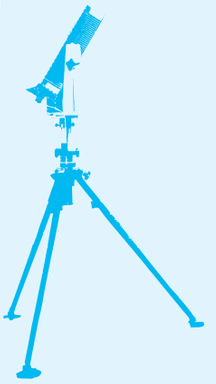

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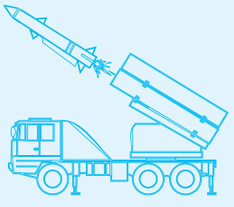

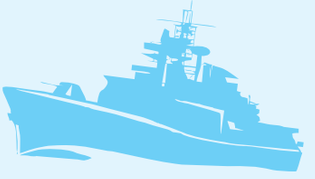

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Su-57 and MiG-35 – UAC's New Products for Russia – and India

In 2018 **United Aircraft Corporation** (UAC) signed contracts to supply Su-57 and MiG-35 fighters to Russian AF. UAC President **Yury Slyusar** speaks on the matter.

***SP's ShowNews* (SP's): One of the most awaited aircraft from Russia is the Su-57. When will the military receive these 5th generation fighters?**
UAC: We signed the first contract with the Russian Ministry of Defense and will start supplying these aircraft this year. These will be serially produced aircraft that will be inducted into the air force. In the near term we see delivery of more than a dozen of these aircraft. In terms of involving India in this program we are still open to have India as a partner. However, considerable time has passed since first decisions were made and we have moved further down the development cycle. So, since the aircraft will soon become operational, some new way of working together should be found.

SU-57 FIFTH GENERATION FIGHTER

SP's: It was discussed that the Su-57 will not be manufactured in large quantities. Is it because it is expensive?
UAC: The best answer to this is the contract we have signed. The Su-57 has superior and quite different capabilities, which calls for a smooth transition to 5th generation aircraft. So, gradually, some current 4th generation aircraft will be replaced by 5th generation aircraft. Starting to deliver 5th generation aircraft in large quantities from the start is not feasible. This is the main reason not the finances. I believe that the Su-57 and the MiG-35 are best in class in terms of price/capability criteria with their flight characteristics, combat performance and value.

SP's: Speaking of MiG-35 – what are the plans for this new aircraft?
UAC: We are preparing to deliver first MiG-35 aircraft to the Russian MoD this year. The aircraft has further developed and increased its capabilities, it has become more mature. MiG-35 has the full set of characteristics of a 4++ generation aircraft and fully corresponds to MMRCA 2.0 requirements. UAC is absolutely ready not only to supply these aircraft in flyaway condition, but also to transfer technology and documentation necessary for local production by an industrial partner in India.

SP's: What about the Su-30MKI upgrade?
UAC: Russia is ready to upgrade the Su-30MKI that forms the backbone of the Indian air fleet. The aircraft can and should be upgraded to meet modern requirements – it has great potential. Russia is ready to offer the latest options that are available in the market. It is obvious that the Indian Air Force as the customer has the discretion to determine the modernization concept. So far this is the largest cooperation project between Russia and India in defense aviation that by no doubt has a long and bright future. •

Alpha Design Technologies Showcasing New Products / Technologies

Alpha Design Technologies along with its new Promoters Adani Defence Systems and Technologies Limited are showcasing large number of projects / products / technologies in their Stalls (Hall "B" Stand No. 'B2.5, B2.6 and B2.7') and Adani's stall Hall 'B' Stand No. 'B3.8A and B3.11B').

Following are the show pieces:

Medium Altitude High Endurance (MALE) Unmanned Aerial Vehicles (UAV) Hermes 450 & 900 (through JVC between Adani & Elbit)

HERMES 450 UAV

Mini Unmanned Aerial Vehicles (Mini-UAV) Skylark for Army (undergoing User Trials at Ladakh) and Sky Striker for Exports (through JVC between ADTL and Elbit).

Thermal Imager Fire Control System (TIFCS) for T-72 tanks and Thermal Imager Stand Alone Kit (TISK) for BMP-II Infantry Combat Vehicles (ICV),

New version of TIFCS for BMP-II which is fitted on a Dummy BMP-II ICV.

Advanced and Long Range LORROS (Long Range Reconnaissance and Observation System) already in service with Army and BSF and improved version of LORROS with Remote – controlled Pan & Tilt Mechanism for usage in High Altitude & Border Areas.

New version of low weight Hand Held Themal Imager Sight with combined Day / Night Sight, Eye Safe Laser Range Finder and GPS.

Laser Target Designators for Army and Airforce.

Software Defined Radios (SDR) for Army and IAF in various configurations – Hand Held, Manpack, AFV (Tank) and Airborne versions with full interoperability.

RF Seeker for Missiles to find / seek targets and to ensure hitting of the same.

Large number of EW modules / subunts for EW, ESM & ECCM Systems.

SPACE: ISRO's IRNS (i) which is the first medium sized Satellite made by Indian Production Organisation and is now "up in the sky above"! Also showcasing large number (more than 1000 No's) Satellite Ground Receiving Terminals manufactured by ADTL, integrated, installed at all the Nine States of North East, SAARC Countries, Andaman & Nicobar Islands, etc. Our foray into Rocket Science is also exhibited.

DTL's subsidiary Company, Alpha-Tocol is manufacturing high end airframe portions, such as Ailerons / Flaperons / Engine Mounts for more than 100 Su-30 Mk 1 which have been inducted by IAF after productionisation through HAL Nasik.

Also showcased are the Rear Fuselage assembly for LCA Mk II fighter aircrafts, which will be part of 80 LCA Mk II fighter Aircrafts through HAL.

Simulators for Mi-17V5 Helicopter and MiG-29 Upgrade.

Upgradation of Mi-17V5 Helicopter and Cheetah and its applicability to Light Combat Helicopter (LCH), Light Utility Helicopter (LUH).

Probably ADTL and Adani stalls are largest, the most attractive and have newest projects / products / technologies needed immediately for Indian Defence Forces, MHA and ISRO. •

Army Aviation – 2025

All major armies of the world including our adversaries China and Pakistan have a full – fledged air arm of their own, comprising all types of helicopters and fixed wing aircraft.

(LEFT) RUDRA ALH-WSI; (RIGHT) KA-226T.

By **LT GENERAL B.S. PAWAR (RETD)**

Today helicopters are an integral part of the land, sea and air operations of modern armies and are being increasingly employed in sub conventional operations (counter insurgency and counter terrorist operations) the world over. A typical military helicopter force should have all class of helicopters ranging from light observation to utility/lift (light, medium & heavy) including for specialized roles (attack/armed), as per the operational requirement of a country's armed forces. The operational diversities of the Indian Military coupled with variety of terrain (from sea level to Siachen Glacier) underline the need for state of art, modern technology helicopters capable of operating both by day and night, in a complex battlefield environment of future.

The Army's air arm the 'Army Aviation Corps' completed 32 years of its existence on November 1, 2018. From operating the Auster/Krishak two seater fixed wing aircraft as part of erstwhile Air Observation Post (AOP) units, to the induction of light observation helicopters (Chetak/Cheetah) in early 1970s, the birth of the Corps in 1986 and the induction of the Hindustan Aeronautical Ltd (HAL) manufactured twin engine Advanced Light Helicopter (ALH) and its armed version the 'Rudra' in 2002 and 2013 respectively, has been a challenging journey. However its growth has been nowhere near what was envisioned in 1963 by the then Chief of Army Staff Gen JN Chaudhary – today it lacks the requisite firepower, manoeuvre and assault capability in terms of attack and lift helicopters.

A survey of military aviation organizations, worldwide reveals the inadequacies of the Army Aviation. All major armies of the world including our adversaries China and Pakistan have a full-fledged air arm of their own, comprising all types of helicopters and fixed wing aircraft. The Pak Army Aviation boasts of an inventory consisting of all class of helicopters, including attack and fixed wing aircraft. In contrast, the Indian Army Aviation remains a reconnaissance and observation force with a few light utility helicopters and armed helicopters like the Rudra. At present the army aviation assets are inadequate for the size of the Indian Army and the tasks it is required to perform. The expansion of the Aviation Corps is therefore imperative. The Army Aviation should possess a mix of light fixed wing aircraft and all categories of helicopters including attack/gunships for various roles like reconnaissance, surveillance, combat fire support, airborne command posts, combat service support, special operations and logistics.

However, despite its stunted growth and curbed status, this fledgling arm of the Indian Army continues to receive accolades for its performance, be it the Kargil conflict, the ongoing Counter Insurgency Operations or the

unrelenting operations in the Siachen Glacier, the highest battlefield in the world. Routinely operating at 20,000 feet and above, on extreme fringes of the current helicopter's flight envelope, the Army Aviation has virtually been the lifeline of the troops deployed on the Glacier – a feat unparalleled anywhere in the world.

ROLE & EMPLOYMENT PHILOSOPHY

The primary mission of army aviation is to fight the land battle and support ground operations. Its battlefield leverage is achieved through a combination of reconnaissance, mobility and firepower that is unprecedented in land warfare. Reconnaissance, attack, utility and cargo helicopters complemented by light fixed wing and support services like the air traffic control and logistics, are all required to support the army in its range of military operations. Aviation assets are force multipliers that provide the field force commanders the capability to conduct operations across the entire range of military conflict- this versatility is the very essence of Army Aviation.

A major challenge facing the Indian Army today and in the future is Counter Insurgency/Counter Terrorist (CI/CT) operations. The protracted nature of CI/CT operations may seem to negate the need for a war fighting doctrine that emphasizes on speed and tempo. However it actually invites the pure application of terms, where speed is relative and exploits the natural advantages in mobility of security/ special forces through use of helicopters. In our context the use of helicopters for these operations has been restricted to troop carriage, logistics, surveillance and casualty evacuation. We have been reluctant to use gunships/attack helicopters because of concerns for collateral damage. While this is of concern in built up areas, in remote mountainous terrain/ jungles this option needs to be looked at by the army and assets acquired accordingly.

PRESENT STATUS

Presently the Army has in its inventory the largest number of helicopters amongst the three services (300 plus), majority being the light observation class (Cheetah and Chetak). These helicopters are obsolete and have been in service for 40 years - keeping this fleet operational itself is becoming well-nigh impossible due to its vintage and spares criticality – a fact corroborated by both HAL and the Army. The 'Cheetal' helicopter (upgraded Cheetah) fielded by HAL as an interim measure is not a satisfactory solution. However to overcome the present criticality, 30 Cheetal helicopters are planned for induction in the next 2-3 years. The Army today has few helicopters to carry out a number of extremely specialized roles in the Tactical Battle Area(TBA). While the induction of the ALH is making steady progress(though plagued by poor maintenance support and serviceability), the medium and heavy lift helicopters which form the core of the tactical lift capability, continue to be with the Airforce. A similar situation exists with regards to attack helicopter units, which despite the Government order and being an integral part of the land battle, remain with the Airforce. Their optimum employment is not possible in the present set up. The army's requirement of small fixed wing aircraft (Dornier Class), in limited numbers for roles like command and control, aerial communication hubs, logistics including casualty evacuation and communication flights has also not fructified due to objections of the Airforce – one unit per operational command has been planned. This, despite the fact that even the Coast Guard and Border Security Force have fixed wing aircraft in their inventory.

GROWTH PERSPECTIVE - 2025

The Government's decision to go in for the induction of 200 Russian Ka-226T helicopters in a Government to Government deal is welcome step and move in the right direction – as per reports the contract has been signed last year after an inordinate delay. Out of the 200 helicopters 60 will be delivered in a fly away condition and the balance 140 manufactured in India. Simultaneously, HAL has also undertaken the development and manufacture of a three ton class light utility helicopter (LUH). This is to cater to the light reconnaissance & observation class of helicopters for all three services. As per HAL the LUH is expected to complete flight certification and go into production soon. The plans are to manufacture 184 LUH in the new helicopter complex already under construction in Tumakuru, Karnataka. Overall there is requirement of almost 500 helicopters of the light observation class, with Army's requirement amounting to approximately 280-300, including the replacement of Chetak/Cheetah.

The Army Aviation has virtually been the lifeline of the troops deployed on the Glacier- a feat unparalleled anywhere in the world.

In the utility/lift category the induction of indigenously manufactured ALH commenced in 2002. Since then 80 helicopters have been inducted and operationalised and another 60-70 are planned for induction in the coming decade -these helicopters will tactical lift capability at the level of Corps.

Another variant of the ALH is the armed version called the 'Rudra', which was officially handed over to the army during the Aero India show in Feb 2013 – the first unit is already operational and another under raising. Rudra is a typical armed helicopter with an array of weapon systems including gun, rockets, air to air (Mistral) and air to ground missiles, along with a modern sighting system and integrated electronic warfare self – protection suite. However, in its present configuration it has not been integrated with a suitable ATGM, as the air version of Nag ATGM 'Helina', being developed by the Defence Research and Development Organisation (DRDO) is not yet ready. It is pertinent to note that non availability of a suitable airborne ATGM will not only impact the operational capability of the Rudra but also the Light Combat Helicopter (LCH) project of HAL. The ATGM is the main weapon system of an armed/attack helicopter and without it the helicopter merely remains a gunship, inhibiting the exploitation of its full potential.

The army is also looking to acquire a suitable helicopter in the 10-12 ton class with stealth features for its Special Operations Units as well as enhancing its overall tactical lift capability. The HAL has been looking at the feasibility of a joint venture with a foreign vendor for a 10-12 ton class multirole helicopter whose variants would also be available to the Navy and Airforce. Barring the mock-up shown in the last Aero India there is no progress in sight.

With the decision of the MoD on the ownership issue of attack helicopters in army's favour, the army had projected its own requirements of attack helicopters – 39 Apache Mk III for its Strike Corps. While initially 11 Apaches were cleared by the Government for the army, based on the tactical and operational requirements of an AH unit, its recent decision to cut this down to only six Apache's has left many military aviation professionals baffled – the employment philosophy of attack helicopters does not justify such numbers. However the US Congress approval last year for the direct commercial sale of six AH-64E Apache Helicopters, including support equipment in terms of engines, fire control radars, sensor suites, missiles, rockets, etc for an estimated cost of $930 million is a very positive development for the Army Aviation Corps– this will greatly enhance its combat potential.

Simultaneously the development of the LCH by HAL is a landmark achievement – the LCH is a state of art attack helicopter with capability to operate at high altitudes (16,000 feet) and would meet the unique requirements of the Indian Army. The LCH uses the technology of the existing ALH and its configurations except that the fuselage is suitably modified and streamlined for tandem seating. A number of development flights have taken place since its maiden flight on March 29, 2010, and HAL hopes to achieve initial operational clearance this year- hopefully. Both the Army and Airforce are the potential customers for the LCH with the Army's requirement pegged at 114 helicopters – initial acquisition of five LCH for the army has already been approved by the Government.

INFRASTRUCTURE DEVELOPMENT

There is an urgent requirement to build suitable infrastructure and have it in place to absorb the new equipment and organizations. Support services like air fields, air traffic control, met equipment, maintenance equipment etc, would also need upgrading and refurbishing. Lastly, the most important facet, the training facilities for the training of aircrew and ground crew need modernization. The importance of simulators for this purpose cannot be over emphasized. Currently the HAL in a joint venture with a Canadian firm (CAE) has come up with a full motion simulator for training of ALH pilots (civil/ military) at their 'HATSOFF' Complex in Bangalore. Keeping in mind the vast expansion plans of the Army Aviation in the coming years and induction of sophisticated state of art equipment, Simulators will be the way forward for future training methods as they are cost and time saving.

CONCLUSION

To make the army aviation a potent force capable of supporting the Indian Army operations across the entire spectrum of conflict in the TBA, it must have a mix of both, helicopters and fixed wing aircraft with helicopters available in larger numbers. The helicopter fleet should consist of attack and armed helicopters, heavy, medium and light utility (lift) helicopters and light observation helicopters. There also would be a need for specialized helicopters suitably modified for special operations. The aim is to make the force a capability based organization rather than an equipment and inventory based structure, implying commensurate induction of man, machine, organizational and infrastructural requirements. New dimensions in tactical night operations as a direct result of sensor and avionics capabilities, with the ability to operate at low levels at night will yield great dividends. Only then will the Army Aviation evolve as a potent arm of the Indian Army, whereby its combat efficiency is enhanced to the maximum extent. •

BEL to Showcase Wide-ranging Capabilities at Aero India 2019

BFSR-XR RADAR

WEAPON LOCATING RADAR

BEL is showcasing its wide range of capabilities at spanning every domaiNavratna Defence PSU Bharat Electronics Limited (BEL) is participating in Asia's premier, biennial air show and aviation exhibition, Aero India 2019, to be held from February 20 to 24, 2019, at the Yelahanka Air Force Station, Bengaluru. BEL will be showcasing its wide

BEL will showcase at the exhibition state-of-the-art products and systems spanning every domain of its business – Military Communication, Radar Systems, Missile Systems, Naval Systems, C4I Systems, Electronic Warfare Systems, Avionics, Anti-Submarine Warfare Systems, Tank Electronics, Electro Optics, Gun/Weapon System Upgrades Shelters, Unmanned Systems, Homeland Security, Life Support Systems (Atmospheric Water Generator), Cyber Security and professional electronic components. BEL will also showcase its R&D capabilities by launching/demonstrating some of its new products/technologies.

BEL's display in the area of Radar will include products/models/panels of Active Electronically Scanned Array Radar, Quick Reaction Surface-to-Air Missile Radar and other state-of-the-art radars for automatic detection of first-round location of artillery weapons (Weapon Locating Radar), border surveillance and detection of low flying targets (BFSR-XR and Aslesha).

BEL's display in the area of Military Communication will include products for Data and Voice communication between systems, Missile Data Link Unit to provide reliable uplink and downlink data from ground station to missile, High Capacity Radio Relay, Software Defined Radio – Airborne, Data Diode used to create a physically secure one-way communication channel from one network to another, Secured Tactical Computer, Rugged Panel-PC, Data Link Radio Frequency Unit for exchanging information at a much higher data rate and indigenised Ku Band Satcom for wideband Satellite Communications from vehicles in motion over rugged terrain.

Electronic Warfare and avionic products on display will include Head Up Display for Light Combat Aircraft (LCA), Identification Friend or Foe for aircraft and helicopters, Drone Interception & Countermeasure System, Satellite–AIT, EW Suite for fighter aircraft, Self-Protection Suite for helicopters, Data Link for onboard communication on aircraft, VSAT Monitoring System, Aerostat: Aerostat Balloon and Ground Control Station, LRUs for UAV, various avionic and flight control systems for LCA and Directed Infrared Counter Measure to intercept and counter threats.

Network Centric solutions on display will include C4I systems for the Army, Navy and Air Force, Compact Sensor Integration System to enable Command Centre to integrate with variety of sensors and weapon systems, Scrambler Unit, Radio Interface Unit, Integrated VoIP System Suite for seamless voice and video connectivity for ground-to-ground and ground-to-air communication, Image Analytic Engine, Integrated Data Centre, Air Traffic Management and mobile application for secure communication.

Also on display will be the complete range of Electro Optics, including EO solutions and Laser Range Finders such as Electro Optics for Coastal Surveillance, Pan & Tilt – Electro Optical Director for long range surveillance applications like coastal surveillance, border surveillance etc, Multipurpose Reflex Weapon Sight, LRF Eye Safe-10 PPM, Hand Held Laser Range Finder and LRF Module.

BEL will showcase its Naval Systems capability through Coastal Situational Awareness Radar, Diver Detection Sonar and Low Frequency Dunking Sonar. Components/Technology modules on display will include ZnS Dome for missiles, TR modules for Radar application, Batteries, Electronic Fuses for Artillery, etc.

Other innovative solutions on display will be Data Radio for Distributed Power Wireless Control System, Real-Time Train Information System, Air Borne Server, Record Replay Operator System, Image Analytic Engine, Linear Variable Differential Transducer, Comprehensive Integrated Border Management System, Smart City solutions, Atmospheric Water Generator(AWG), Mine Field Recording System, Chemical Agent Monitor, etc.

The L70 Upgraded Gun model will also be showcased at the exhibition.

The highlight of BEL's outdoor display will be the Comprehensive Integrated Border Management System, X Band Active Phase Array Radar, Advance Landing Ground Communication Terminal, Gun Shot Detection System, enclosures made from Composite, Atmospheric Water Generator (AWG), Compact Multipurpose Advance Stabilised System for day and night surveillance, reconnaissance and target tracking application.

The entire set of state-of-art equipment on offer will be a force multiplier for any Defence force and will make their "Observe Orient Decide Act" (OODA) cycle seamless and efficient.

The opening ceremony of Aero India 2019 will be on February 20, 2019. Business related visits are scheduled on the first three days. The last two days will be open for the public. •

Definitive Action Programme - Indian Coast Guard

Whilst the recast 11th development plan on a 15 years long perspective was fast tracked for approval of the Government, the consequential acquisition and procurement processes have been quite tardy which may be detrimental to the envisaged capability build plan for the nation's coastal security.

By **REAR ADMIRAL SUSHIL RAMSAY (RETD)**

While reviewing the operational preparedness and coastal security mechanism of the Indian Coast Guard (ICG) on November 17, 2018 Defence Minister Nirmala Sitharaman stressed on modernisation of Indian Coast Guard by 2022 through the Definitive Action Programme of the Ministry of Defence (MoD) which envisaged acquisition of 43 ships, 20 aircraft and other facilities. The Review Meeting of the Defence Ministry's Consultative Committee was attended by Minister of State for Defence, Dr Subhash Bhamre, MPs from Lok Sabha and Rajya Sabha, Indian Coast Guard Director General Rajendra Singh along with senior officials of MoD.

DORNIER DO-228 OF COAST GUARD

HISTORICAL PERSPECTIVE

The Indian Coast Guard (ICG) is the principal agency for enforcement of provisions of all national enactment in force in the Maritime Zones of India (MZI) and provides following services to the nation and marine community:

- Ensuring safety and protection of the artificial islands, offshore installations and other structures in India's maritime zones.
- Providing protection to fishermen and assistance to them at sea while in distress.
- Preservation and protection of maritime environment including prevention and control of maritime pollution.
- Assistance to the Department of Customs and other authorities in anti-smuggling operations.
- Enforcement of MZI Acts.
- Initiating measures for the safety of life and property at sea.

The need for a full-fledged Air Wing for Indian Coast Guard (ICG) was felt right from the time of its inception. The first ICG aviation unit to be commissioned was 800 Squadron on May 22, 1982, with two Chetak helicopters based at Goa.

The first fixed wing squadron of Indian Coast Guard was commissioned with two Fokker Friendship (F-27) aircraft on July 30, 1983. These aircraft were taken on dry-lease from Indian Airlines. These aircraft did a yeomen service to ICG through their tireless operations from Dum Dum Airport in maritime surveillance and search and rescue roles covering the entire Exclusive Economic Zone (EEZ).

The first planned induction included 12 fixed wing aircraft for coastal surveillance and six single engine helicopters to support ships at sea. The first Dornier squadron was commissioned as 750 Squadron (ICG) at Daman in January 1987.

The first full-fledged Air Station was commissioned at Daman on October 29, 1987. Since then the following air squadrons/flights have been inducted into the service and are located as shown in the box.

The primary role of these squadrons includes search and rescue and embarkation on board helicopter operating ships to undertake the following missions: Logistics and operational cover for the ICG ships at sea; pollution response; casualty evacuation; VIP commitments; reconnaissance and shadow and security patrol of offshore installations/oil rigs.

MODERNISATION OF ICG – AVIATION WING

The present force levels of the Aviation Wing of ICG comprises; 39 Dornier, Do-228 coastal surveillance aircraft, four twin-engine Dhruv Advanced Light helicopters and 19 Chetak single-engine helicopters. As per its assessed requirement in 2007-08, ICG had projected a requirement of 154 ships and 93 boats.

Since the formation of Aviation Wing in May 1982 and nearly two decades later, in a comprehensive Long-Term Perspective Plan 2002-12, the Coast Guard envisioned its aviation assets to be enhanced to 100 aircraft. Post Mumbai 26/11 and in a major revamp of the country's coastal surveillance and security apparatus, ICG had projected a force-level of 268 vessels, including 173 small patrol craft, 113 aircraft, 18 Nishant Unmanned Aerial Vehicles (UAV) and aerostat and Over the Horizon (OTH) radars by 2017. The aviation component of the projected force levels comprised; 60 helicopters, 35 Dornier, Do-228 aircraft for coastal surveillance, an increase in the inventory then existing of 24 aircraft and 11 Medium Range, Maritime Reconnaissance (MRMR) aircraft. The plan also encompassed commensurate increase in the manpower strength to man the augmented aviation assets of ICG.

As a short-term measure, Cabinet Committee on Security on February 26, 2010 accorded sanction for the acquisition of 60 surface platforms and 42 aircraft which was to be processed with stringent timelines. However, as long-term measure, the 11th development plan for 2007-12 was recast on a 15-year perspective spanning from 2007-2022.

The approved modernisation plans for ICG Aviation, broadly included 42 aircraft, prominent among them being six MRMR aircraft. The ICG version of MRMR aircraft is Multi-Mission Maritime Aircraft (MMA). In response to RFP for six MMA only two leading aircraft manufacturers, the Russian Irkut's Beriev, Be-200 and the American Bombardier Q400, whose bids were conforming to the RFP, were shortlisted for trials. However, both aircraft failed to qualify the stringent field evaluation tests.

RFP for eight helicopters for coastal surveillance and Search and Rescue (SAR), two each to be based at Chennai, Kochi, Daman and Port Blair were issued. To elicit response from a larger segment of helicopter manufacturers and the operators, a fresh RFP was issued in early 2011 to as many as 16 vendors. In response, only Sikorsky and Agusta Westland responded to the tender. While the present status of the dry-lease programme is not known, however, it is understood that there is no headway being made.

In addition, a $200 million RFP for 16 twin-engine light helicopters to be deployed on ICG ships to augment aerial patrol and surveillance, as also the SAR capabilities has been approved by the MoD. The RFP was issued to four leading helicopter manufacturing companies, namely Eurocopter, Agusta Westland, Sikorsky and the Hindustan Aeronautics Ltd (HAL). Since none of the vendors qualified during the technical evaluation, fresh RFI has been issued. Considering the urgent requirement for ship borne flights this programme deserves to be fast-tracked. Further, there are reports to suggest that RFP for procurement of additional 14 twin-engine shore-based helicopters for ICG is at final stage for approval by the Government.

PRESENT STATUS

The Defence Acquisition Council (DAC), recently chaired by Defence Minister Nirmala Sitharaman has accorded approval for the Mid Life Upgrade of 17 Dornier Aircraft of ICG at an approximate cost of ₹950 crore. The upgrades will be carried out by HAL. In order to enhance the capabilities of the fixed wing surveillance and reconnaissance aircraft, DAC has accorded approval for up gradation of Dornier Do-228 with the state-of-the-art technology, spares, Special Maintenance Tools (SMT) and Special Test Equipment (STE). The DAC also approved equipping of three aircraft with Pollution Surveillance Systems. A decade after the Mumbai 26/11 terror strikes, the Coast Guard's long-delayed modernisation plans are finally beginning to take wings. ICG plans to augment its force levels to a 190-ship and 100-aircraft by 2023. To take the modernisation plans forward ICG has projected an outlay of ₹2.09 lakh crore spread over the next 15 years. However, pragmatic or ambitious the perspectives might appear, it remains to be seen what ICG eventually gets through the 2017-2022 – Long-term Perspective Plan! It may be a mute question since over the years the annual defence budget has witnessed either no growth or has increased very marginally. •

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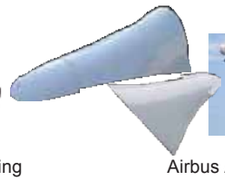


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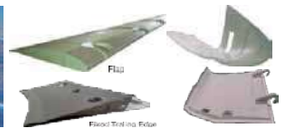

Gulfstream G550(GV-SP) Flaps and other parts

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