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

GLOBAL PARTNERSHIPS TO THE FORE

- Defence Minister flags enhanced international partnerships
- Government to encourage innovation, design and manufacturing
- Aero India takes pride of place in Asia



DEFENCE MINISTER MANOHAR PARRIKAR ADDRESSING THE DIGNITARIES AND CROWD AT THE INAUGURAL FUNCTION OF AERO INDIA 2017 AT YELAHANKA AIRBASE IN BENGALURU ON FEBRUARY 14, 2017

By **R. CHANDRAKANTH**

As the skies in Bengaluru thundered with the Rafales, Sukhois, LCA Tejas, the Surya Kirans, the choppers and other aircraft, the Defence Minister Manohar Parrikar signalled that India was at the cusp of major transformation with regard to aerospace and defence manufacturing.

The 11th edition of Aero India, the premier air show of Asia, took-off on an optimistic note that both the Indian aerospace and defence industry and also the foreign original equipment manufacturers (OEMs) were aligned with the government's policy of 'Make in India'. Testimony to that were some of the aircraft of display including HAL's Hawk-i along with BAE Systems and the Defence Research and Development Organisation's (DRDO) airborne early warning and control system (AEW&C). The take-over ceremony of the AEW&C on Brazilian-built Embraer ERJ 145 aircraft was held on the occasion. The aircraft flew as part of the inaugural display.

The aerial platform is meant to be a force multiplier that is expected to assist the Indian Air Force combat aircraft. It has the capability to detect incom-

ing fighters, cruise missiles and even drones. It is equipped with a 240-degree coverage radar and can detect, identify and classify threats in the surveillance area and also act as a command and control centre to support air defence operations.

Highlighting such cooperation while inaugurating the show, Defence Minister Parrikar said Aero India, over the years, had established itself as one of the best aero shows in Asia. Praising the event, he said that it has time and again proved to be a brilliant business, investment and display hub for national as well as international firms. "We encourage Indian companies in defence manufacturing but we would also like to encourage foreign companies. The government is working on ways to increase private player participation in defence manufacturing."

Stating that the government was going aggressive on various initiatives that would prop up the economy, including 'Make in India', 'Start-up India', the Defence Minister said that the focus had shifted to start-ups, while the government will not compromise on time-bound delivery of projects, to ensure that the armed forces modernisation was always on track.

"The government will encourage manufacturing, design as well as innovation in the field of defence manufacturing. Conditions have never been better

Continued on page 3...



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SP Guide Publications Wins Prestigious Business Aviation Award



AT THE BIZAV INDIA AWARDS 2017 ORGANISED BY BAOA IN BENGALURU ON FEBRUARY 13, 2017, SP GUIDE PUBLICATIONS WAS FELICITATED FOR ITS EFFORTS AND RELENTLESS COVERAGE OF BUSINESS AVIATION IN ITS RANGE OF PUBLICATIONS AND ITS CONTRIBUTION TO BUSINESS AVIATION. JAYANT BARANWAL, PUBLISHER AND EDITOR-IN-CHIEF OF SP GUIDE PUBLICATIONS, RECEIVED THE AWARD FROM MINISTER OF STATE FOR CIVIL AVIATION JAYANT SINHA. JAYANT NADKARNI, PRESIDENT BAOA, AND GROUP CAPTAIN R.K. BALI (RETD), MANAGING DIRECTOR, BAOA, ARE ALSO SEEN ON THE DIAS.

...Continued from page 1



DEFENCE MINISTER MANOHAR PARRIKAR WITH MINISTER OF CIVIL AVIATION P. ASHOK GAJAPATHI RAJU AND MINISTER OF STATE FOR CIVIL AVIATION JAYANT SINHA, THREE SERVICES CHIEFS AND OTHER DIGNITARIES

than now for defence manufacturing in India and I hope it will make way for better technical enhancement," he said.

There would be constant efforts to engage the foreign OEMs, who he acknowledged had contributed significantly to enhancing India's aerospace and defence capabilities. The government, he said, was taking measures to ensure that ease of doing business would improve to enhance investments, not only domestic but also international, in these sectors.

The Karnataka Chief Minister, Siddaramaiah, was conspicuous by his absence. In his place the Karnataka Minister for Higher Education and Tourism R.V. Deshpande read out the Chief Minister's speech in which he said Karnataka was a true aerospace and defence hub, considering that there were a number of companies based out of Bengaluru. The government would continue to encourage this trend.

In his welcome address Ashok Kumar Gupta, Secretary, Defence Production, said that Aero India had carved a niche for itself globally as a premier aerospace exhibition. The interest by the OEMs had increased as the government had come out with policies that were conducive for joint investments. •

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India on an Acquisition Spree

- 1,000 civil aircraft, 400 fighter aircraft, 800 helicopters in the next five years
- Synergies between civil aviation and defence

By **R. CHANDRAKANTH**

With over 1,000 civil aircraft on order, about 400 fighter aircraft and 800 helicopters requirement, besides 5,000 helicopter engines in the next five to 10 years, the aerospace and defence sector is going to boom like never before and the two sectors coming together is but natural, according to the Minister of Defence, Manohar Parrikar.

After inaugurating the 11th edition of Aero India, which for the first time is seeing convergence of the Ministry of Civil Aviation and the Ministry of Defence, Parrikar said that the convergence opened up huge opportunities for Indian companies.

THIRD LARGEST CIVIL AVIATION MARKET BY 2022

Echoing similar views, the Minister of Civil Aviation, P. Ashok Gajapathi Raju, said considering aviation growth, currently over 20 per cent, and with more aircraft coming in and the Regional Connectivity Scheme all set to take off, there would be urgent need to infuse a lot more investment, from within and without. "We are growing at a pace where we will need to invite investments from everywhere." India is expected to catapult from its ranking of nine in global aviation markets to number three by 2022.

LCA PRODUCTION RAMP UP

Manohar Parrikar said while indigenisation would be the route, there would be substantial content from the foreign OEMs as "we do not have those technologies". The percentage of indigenous content can keep increasing as we progress. He was all praise for the Hindustan Aeronautics Limited (HAL) which has kept to timelines and the aerospace major would be outsourcing work in large quantities, thus galvanising the emerging private sector. "We are ramping up LCA production and we would be adding another line of eight, from the present eight production lines." During the current calendar year, there would be decisions on C295, single- and twin-engine fighter, etc.

AEW&CS PROPOSALS

On the issue of AEW&CS (airborne early warning and control system) where India was behind China and Pakistan in numbers, Parrikar said that today DRDO AEW&CS had taken delivery of and that indigenous development

would take about six years. "We have other proposals to bridge the gap in the next two to three years." The government would take adequate steps to ensure that security was not compromised.

On the light combat helicopter (LCH), the Minister said that the request for proposal (RFP) would be issued soon once the AoL had been granted. "It is the only successful combat helicopter in the world to have flown at 24,000 feet in Siachen." The cold weather and hot climate trials of LCH were successful.

With regard to fifth-generation fighter aircraft (FGFA) in collaboration with Russia, Parrikar said there were some issues between the two and they have now been sorted out. A small team is in place and soon the project should go into advanced stages of finalisation.

India would continue to focus on its 'Make in India' policy and it was the choice of the vendor where he wants to operate from, when asked whether there would be clash between President Donald Trump's 'America First' and Prime Minister Narendra Modi's 'Make in India' initiative. "In the strategic partnership, one of the conditions is that the OEM has to get the approval of their government." As aerospace and defence come under global supply chain activity therefore this problem, hopefully, will not emerge.

NAVAL VERSION OF LCA

To a question on the LCA (light combat aircraft) requirement of the Indian Navy, he said the aircraft for the Navy had to be different due to the short stretch of runway and hard landing. The commercial production of the same would be decided once the naval version is ready and tested.

AAI REQUIRES ₹17,500 CRORE

The Minister of Civil Aviation said with aviation growth at over 20 per cent, there was going to be strain on infrastructure. "We are going to add another 55 airports to the already 75 operational airports in the next two years. The Airports Authority of India requires ₹17,500 crore in the next five years to develop airports, including air navigation systems. This investment will not be sufficient and we will have to invite investments from across the globe." Air cargo sector is in its infancy and there are enormous business opportunities in this field.

Defence and civil aviation can work together to sustain the growth, he said and mentioned how the defence kept the skies safe for civil aviation to thrive. Parrikar added that many civil enclaves had opened up for civil aviation by increasing time slots, parking bays, etc. •

Rostec Eyeing Strategic Partnerships

Rostec State Corporation is presenting the latest developments in aircraft technology, air defence and radio-electronic warfare at Aero India 2017. The Russian delegation of 350 people is at the event. Rostec holding companies — Russian Helicopters, Technodinamika, UEC, Tecmash and Shvabe is participating in the 900 sq m Russian exhibition.

At Aero India 2017 executives of Rostec State Corporation delegation are to hold negotiations with representatives of the Indian Government, heads of India's Ministry of Defence and IAF, as well as HAL, Larsen & Toubro, Bharat Forge among others. The joint Rostec and Rosoboronexport delegation is headed by the Director of International Cooperation and Regional Policy Viktor Kladov.

Rostec CEO Sergey Chemezov said: "Aero India 2017 is an important event for India's and regional aviation market. India has for many years been a strategic partner of Russia and of Rostec. Our two nations have successfully worked on multiple projects bringing Russian technology to India and producing state-of-the-art military equipment locally, most notably Su-30MKI fighter jets, T-90S tanks and the BrahMos missile. Now the Modi government adopted the 'Make in India' course aimed at localisation of production of military products in India and it involves creation of joint ventures and deep transfer of technology. In the framework of this programme we have signed an agreement to establish a joint venture for the production of Ka-226T in October 2016 at the BRICS summit. Now there is active implementation of this project. We are also working on the expansion of cooperation in various fields in accordance with 'Make in India' — in the traditional sphere of military-technical cooperation and in non-military areas such as electronics, biotechnology and composite materials."

RUSSIAN HELICOPTERS

India has traditionally been considered a special strategic partner of Russian Helicopters, part of Rostec State Corporation. More than 400 helicopters produced in Russia are registered and operated here. This year, Russian Helicopters' key exhibit in India is the Ka-226T model. In 2016 Russian Helicopters, Rosoboronexport and HAL created a joint venture to localise production of the light, multi-role Ka-226Ts and to deliver them to the Indian market. The JV resulted from an inter-governmental agreement between the two countries. In addition to the assembly, it provides terms for maintenance, operation, repairs and maintenance of these helicopters.

Technodinamika: Technodinamika is participating for the first time at the show. Technodinamika is enlarging its scope of facilities jointly with India Aerospace players for manufacture of aircraft spares and components under the Prime Minister's initiative of 'Make in India' programme. The company is successfully supplying to IAF different aggregates and spares for An-32, IL-Series and has successfully executed most contracts much before the delivery period including the ROH for 11 TA-12 APUs for IL-76 in record time.

UEC: UEC presents the PD-14 fifth-generation civil aircraft engine, AL-41F-1S combat aviation engine, VK-2500PS brand-new helicopter engine and BARK-88 engine digital control system.

Tecmash: Tecmash is presenting bullets with a Plastic Master Device for 30mm aircraft guns, and demonstrates a new-generation of air bombs. The bomb is designed for different heights from both front line aircraft and helicopters. It is especially efficient in mountain warfare.

Shvabe: Shvabe is presenting various optical systems for military and civil aviation: GOES 337M, 13SM1, OLS SON 730, SON 820 and SMS 831. •

A man with dark hair and a beard, wearing safety glasses and a dark polo shirt, is focused on working on a large, complex metal aircraft component. He is wearing white gloves. The background shows a factory environment with blue storage bins and technical drawings on the wall. The lighting is dramatic, with a strong blue and purple hue.

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Project Upgrades, Assured Orders

In a rare media interaction with *SP's ShowNews*, **Ashok Kumar Gupta, Secretary, Defence Production**, outlined his vision for defence manufacturing in India and addressed a wide range of subjects including 'Make in India', DPP 2016, defence offsets, role of DPSUs, investment in R&D, delays in procurement decisions, blacklisting and other related issues.

(...Continued from SP's ShowNews Day 1)

SP's ShowNews (SP's): India has a large inventory of ageing weapons and equipment. How do you see the 'Make in India' play out where upgrades are required?

Secretary, Defence Production (Secretary): The revised 'Make' procedure would be a significant driver for taking up upgrades of existing inventory of weapons and equipment. Under this procedure, the government has made provisions for 90 per cent funding of development cost. There is also a provision to take up development without government funding in low-risk projects. In both the cases there is assurance of orders. The upgrade projects, being low risk-low investment projects, the Indian industry will be encouraged to take up such projects on priority.

SP's: There seems to be a lot of interest from big Indian corporates who want to invest in manufacturing in the defence sector. How are you going to ensure that quality and safety standards are met by these companies who are new entrants in this sector?

Secretary: Delivery of defence equipment to armed forces by any company is subject to trials/testing and other quality checks prescribed as per terms and conditions of the contract. This ensures the quality of the item.

SP's: The defence offset policy has not led to any import of core technologies for the defence sector. Can you comment on this?

Secretary: Defence offset guidelines encourage vendors for investment in terms of technology in Indian enterprises. They also provide for acquisition of critical technology by DRDO.

- In case of transfer of technology to Indian enterprises (MSME), a multiplier of 1.5 is given.
- Technology acquisition by DRDO has a multiplier up to a factor of 3 depending upon the rights of utilisation.

The defence offset guidelines provide full freedom to the vendors in selection of avenues for offset discharge. The utilisation/exploitation of any avenue is totally at the discretion of the vendor.

SP's: The government gives some defence projects, especially for Indian Navy projects, without holding a competition to state-owned defence companies. Why isn't the government encouraging competition with state-owned companies?

Secretary: As per Defence Procurement Procedure 2016, Indian Navy carries out capacity assessment of the shipyards (both public and private sector) at regular intervals. Thereafter, based on the requirement of Indian Navy, RFP is issued to the shortlisted shipyards based on the aforesaid capacity assessment.

The present generation warships are weapon intensive where the capacity of private sector is rather limited. However, as and when the private sector develops these capabilities, RFP will be issued to them based on their capacity assessment.

Projects like offshore patrol vessels, interceptor boats, floating dock, cadet training ships, etc. besides repairs of warships have already been awarded to private shipyards. Currently, private shipyards are being considered for major shipbuilding projects like landing platform docks, fast patrol vessels, anti-submarine warfare shallow water craft, diving support vessels and survey vessels, etc.

A substantial share of defence shipbuilding is being offered to private shipyards, with ₹7,043 crore worth of committed contracts, ₹19,810

crore worth of contracts in the pipeline to be concluded in the next one or two years.

SP's: What role do you see being played by DPSUs in the near future?

Secretary: Production of defence equipment has been the key mandate of DPSUs. However, to promote 'Make in India' initiative of the government and to achieve the substantive self-reliance in defence production there is a need for change in role of the DPSUs in near future.

The OEMs of the defence and aerospace industry worldwide play the role of system integrators by outsourcing a substantial part of the manufacturing process to vendors. DPSUs also need to shift their strategy in a similar way from vertical integration business model to system integration business model. By adopting such a strategic shift, DPSUs can serve their ultimate customers in a better way. The outsourcing effort by DPSUs will add to their capacity enhancement, attain cost-effectiveness and improve competitiveness in global market.

To achieve the India's cherished objective of self-reliance in defence production, DPSUs need to not only innovate in-house but also create institutional model to foster innovation in the country. They need to aggressively engage with R&D institutes, academia, industries including MSMEs, start-ups and even individual innovators and provide them award-based grants/funds to carry out innovative development.

SP's: By when do you expect the 80:20 arms procurement ratio to become 20:80/30:70 with 80 per cent/70 per cent being domestically manufactured? Is this really practically viable?

Secretary: The requirements of defence equipment for the Indian armed forces are met either from Indian companies or through imports. The expenditure on capital procurement for the three services, from the Indian companies for the financial year 2014-15 and 2015-16 had been 60 per cent and 63 per cent respectively. In 2016-17, if we take the figure up to October 2016, it is 70 per cent.

During the last two financial years (2014-15 and 2015-16) 108 contracts with the total value of ₹1,12,736 crore have been signed for capital procurement of defence equipment, out of which 73 contracts involving a value of ₹72,303 crore were signed with Indian vendors. Additionally, 85 cases involving ₹1,60,362 crore have been accorded acceptance of necessity (AoN) by the Defence Acquisition Council under the 'Buy (Indian)' 'Buy & Make (Indian)' and 'Buy & Make' categories.

The government has been consistently making efforts to enhance the procurements from Indian companies through various policy initiatives such as according priority and preference to procurement from Indian vendors under the DPP 2016, liberalisation of the licensing regime and providing access to modern technology to Indian industry by relaxing FDI regime in the defence sector, simplification of export procedure, streamlining of defence offset guidelines, etc.

The new DPP 2016 has been promulgated for capital procurements and has come into effect from April 1, 2016. DPP 2016 has a focus on achieving the 'Make in India' vision by according priority to 'Buy (Indian-IDDMM)' and 'Buy (Indian)' categories. It also focuses on enhancement and rationalisation of indigenous content. The 'Make' procedure has been simplified with provisions for funding of 90 per cent of development cost by the government to Indian industry and earmarking projects not exceeding development cost of ₹10 crore (government funded) and ₹3 crore (industry funded) for MSMEs. •

Continued on SP's ShowNews Day 3...



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IAI Sets the Stage for Growth in India

With nearly \$4 billion in annual sales, Israel Aerospace Industries (IAI) is looking at around \$1 billion of sales per year in India, as multiple projects of large scale start maturing after years of negotiations. "We look at India as one of the most dominant markets for IAI," said Eli Elfassi, Vice President, Marketing of IAI.

"Our goal is to continue and strengthen our position in this strategic market, despite the growing competition," Elfassi added that the excellent reputation and confidence IAI have won over the years with the Indian customers are instrumental for continued success.

Over three decades of operation in India, IAI now serves all the Indian military branches and many government agencies throughout the sub-continent. As a global leader in air and missile defence, IAI's systems currently protect Indian naval vessels and are becoming part of the country's air defence system. Airborne Early Warning aircraft, ground and naval based radars are among the building blocks of major defence systems developed for use with India's and Israel's defence forces. IAI and its Indian partners are extending those mature systems, introducing more models, tailored to address specific customer requirements.

RUNNING PROJECTS

Other projects IAI deployed in India include Harop and Harpy loitering weap-



ELI ELFASSI, VICE PRESIDENT, MARKETING OF IAI

ons, Searcher and Heron unmanned aerial systems. The latest addition to IAI's offering is the UAV operation centre, providing operators at territorial command or national level with the ability to manage, control and support a large force of drones.

Satellites are another area of leadership for IAI with satellites developed and produced here are orbiting in space supporting remote sensing and communications for national security and commercial users. IAI also offers unique payloads for satellites, enabling users to conduct reconnaissance missions in day or night, and during monsoon season, regardless of cloud coverage.

Projects worth billions require significant local workshare and, over decades of cooperation with the Indian industry, IAI has excelled in developing close relations with local contractors, suppliers and partners. "Through the years, we developed a network of subcontractors and partners. We found here all the necessary technologies, there is a mature infrastructure, suppliers have the will and technical and quality levels to enter development and production of advanced systems, and

we are going to transfer more orders with time," Elfassi said.

To make the most of the 'Make in India' initiative, IAI is planning to expand its operation in India. "We plan to go beyond the JVs we already have here, and expand our partnerships to JVs established on divisional basis, with different Indian partners. This will enable us to better compete on specific opportunities and broaden the cooperation within our Indian JVs." •

Boeing Showcasing Range of Advanced Capabilities



AH-64D APACHE LONGBOW ATTACK HELICOPTER



KC-46 TANKER

Boeing is showcasing a broad range of aerospace capabilities at Aero India, the highlight being its enduring defence and commercial footprint in India. It is also demonstrating its alignment with the 'Make in India' initiative.

Boeing's exhibit in Hall E features large-scale models and interactive displays to showcase the company's advanced commercial and defence products and services capabilities of interest to India. A KC-46A Air Refueling Operator System (AROS) is on show.

Boeing subject matter experts are on hand to discuss the defence capabilities of platforms such as the F/A-18 Super Hornet, KC-46 tanker, C-17 Globemaster III, P-8I aircraft, AH-64D Apache, CH-47F Chinook, V-22 Osprey tilt-rotor aircraft and ScanEagle and Integrator unmanned airborne system. In addition, experts from Boeing's services business will be on hand to discuss training and support solutions for Indian customers.

The company will feature models of commercial airplanes such as the 777-9X, 787-9 Dreamliner, 737 MAX 9 and 737 MAX 8. •



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AEW&C DEVELOPED BY DRDO IN COLLABORATION WITH EMBRAER BEING INDUCTED DURING THE SHOW AS WAS INDICATED BY DR S. CHRISTOPHER, CHAIRMAN, DRDO



INDIGENOUSLY DEVELOPED LCA TEJAS BY ADA, DRDO AND HAL

By **R. CHANDRAKANTH**

The Defence Research and Development Organisation (DRDO) is taking pride in India's stride in indigenous defence technologies some of which are the 155mm/52-calibre Advanced Towed Artillery Gun System (ATAGS) and Medium Power Radar 'Arudhra'. In addition, to the mobile autonomous launcher based BrahMos missile system; weapon-locating radar 'Swathi'; Akash weapon system; CBRN reconnaissance vehicle; 'Netra', the airborne early warning and control (AEW&C) system and LCA Tejas — all designed and developed by DRDO.

AEW&C SYSTEM

The AEW&C is an 'Eye in the Sky'. It is a force multiplier, developed by DRDO for IAF with Centre for Air Borne Systems (CABS) as nodal agency. AEW&C system consists of multiple sensors for surveillance and signal intelligence. It helps in air defence operations and is capable of communicating using VHF, UHF, C-Band and SATCOM links for network-centric operations. Induction of AEW&C into services early in 2017 will make the country self-reliant and position India among the top five countries of the world having this capability.

LCA TEJAS

Tejas is indigenously developed by Aeronautical Development Agency (ADA), an autonomous society of DRDO and produced by the Hindustan Aeronautics Limited (HAL). It is a lightweight and multi-role four-plus-generation tactical fighter aircraft which can carry laser guided bombs and modern missiles to cause extreme damage to the target. Tejas made its international debut in January 2016 with participation in the Bahrain International Air Show. In the company of F-22 Raptors and Eurofighter Typhoons, it demonstrated impressive manoeuvres which were well appreciated. Tejas has been inducted into the 45th Squadron of the Indian Air Force in July 2016. It is a move towards self-reliance in air power requirement of the nation. Tejas is the pride of the country and a step towards 'Make in India' initiative.

BRAHMOS MISSILE SYSTEM

BrahMos cruise missile, built in collaboration with Russia, is a two-stage supersonic cruise missile with a solid propellant booster as its first stage and liquid ramjet as the second stage. The missile has a flight range of up to 290 km with supersonic speed all through the flight, leading to shorter flight time. It operates on 'fire and forget principle' adopting a variety of flights on its way to the target. The missile carries a conventional warhead weighing up to 300 kg. The missile has been inducted into the Navy and the Army and the air version of BrahMos supersonic cruise missile has been successfully developed for integration with Su-30MKI.

AKASH WEAPON SYSTEM

The medium-range (25 km) surface-to-air missile Akash is a very potent su-

personic mobile multi-directional multi-target point/area air defence system and can engage several air targets simultaneously using sophisticated multi-function phased array and surveillance radars in fully autonomous mode. Indigenous development of the system has given impetus to the defence industrial base in the country and generated business of more than ₹20,000 crore. Akash weapon system has been dedicated to the Indian Army in May 2015 and to the Indian Air Force in July 2015.

WEAPON LOCATING RADAR SWATHI

WLR is coherent, electronically scanned C-band phased array radar. The radar automatically locates hostile artillery, mortars and rocket launchers and tracks friendly fire to locate the impact point of friendly artillery fire to issue necessary corrections. The radar is designed to detect projectiles with small cross section across the battle space horizon, and has the capability to handle simultaneous fire from weapons deployed at multiple locations. The radar helps neutralise hostile guns in the tactical battle space and helps own guns for effective shelling on designated enemy targets. The radar has been developed for the Indian Army to substitute the imported system and acts as a force multiplier for artillery. Bharat Electronics is the production partner.

ATAGS

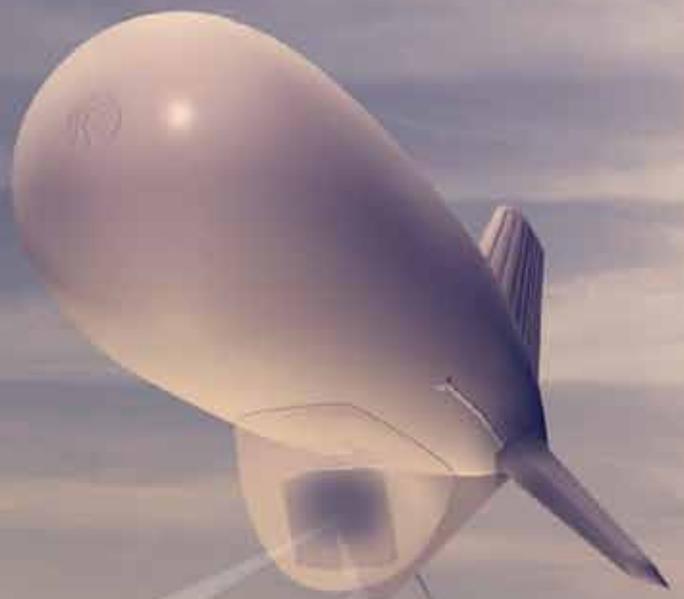
The Advanced Towed Artillery Gun System (ATAGS) is an indigenous weapon system developed by the Armament Research and Development Establishment (ARDE) with industry partners namely Bharat Forge Limited and Tata Power SED. ATAGS has excellent accuracy, consistency, mobility, reliability and automation and is capable of achieving 47-plus-km range. The armament system of the ATAGS which comprises 52-calibre gun barrel with breech mechanism, muzzle brake and recoil system has been designed and developed to fire the 155mm calibre ammunitions held by the Army with enhanced range, accuracy and precision as well as greater firepower. The system is configured with all electric drive technology for the first time in the world that will ensure maintenance free and reliable operation over longer periods of time.

MPR ARUDHRA

Medium power radar Arudhra has been indigenously developed by the Electronics and Radar Development Establishment (LRDE). Arudhra is the first indigenous rotating active phased array multi-function radar with digital beam forming technology. The radar covers 360 degree in azimuth and is capable of performing volumetric surveillance to detect and track aerial targets up to 400 km in range and 30 km altitude. This radar can survive intense ECM environment and electromagnetic interference. It is integrated with modern identification of friend or foe system to recognise enemy targets and is transportable by road, rail and air.

The showcasing of these state-of-the-art systems is a bold step in demonstrating indigenous technological strength and assuring the world that design and 'Make in India' is a reality. •

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Lockheed Martin Looking at Manufacturing F-16 Block 70 in India

Jayant Baranwal, Editor-in-Chief, *SP's ShowNews*, spoke to Randall L. Howard and Abhay Paranjape of Lockheed Martin. Excerpts:

Jayant Baranwal (Baranwal): Does F-16 Block 70 offer any kind of stealth element?

Randall L. Howard (Howard): True stealth in all aspects has to be designed within the aircraft, that's not the kind of stuff that comes with any aircraft but for F-22 and F-35. Having said that, F-16 offers a lot of general stealth, as it is a small aircraft and it has a pretty small cross section. There is coding that can be placed on the aircraft. The fighter includes a new radar system, stealth detection capability and threat detection capability; it competes very well in its class being undetectable to the radar.

Baranwal: What exactly is the offer of Lockheed Martin, also in the context of 'Make in India'?

Abhay Paranjape (Paranjape): We are not looking at just assembling India's aircraft here. We are looking at establishing the complete manufacturing base and the ecosystem here in India. We are looking at transferring our entire production from our existing Fort Worth facility to India and also exporting them from here. So what that means also is we now have a vested interest in making sure that it succeeds. Lockheed Martin is going to be selling aircraft made here to the world and we will make sure that it succeeds.

Baranwal: Which particular programme of the Indian Air Force you are aiming for with the F-16 Block 70?

Paranjape: You are very well aware that the medium multi-role combat aircraft (MMRCA) programme was about 126 odd aircraft. The Rafale is going through the final stages right now and is apparently for much smaller number. The MMRCA pro-



RANDALL L. HOWARD,
F-16, BUSINESS
DEVELOPMENT,
LOCKHEED MARTIN



ABHAY PARANJAPE,
NATIONAL EXECUTIVE, INDIA,
LOCKHEED MARTIN
AERONAUTICS

posal came out in 2007 and we are in 2016, so we definitely think there is significant number of aircraft that will be required going forward. How many, what type, what and when exactly, that is up to the Indian Air Force.

Baranwal: Can F-16 compliment the light combat aircraft (LCA) induction?

Paranjape: The induction of an aircraft into the force is obviously the decision of the Indian Air Force. You saw the briefing from Howard, as far as the capability; you can look it up as far as LCA's capabilities, the range and the type and compare that with F-16 and you can see.

Baranwal: What will be the turnaround time for the first delivery from the Indian facility post the decision? Can you give an exact timeline?

Howard: I think it is hard to give an exact timeline. The typical delivery period of F-16 is about 36 months range. The challenge we have is to train the workforce and put in place all the facilities. We have given a notional timeline to the government on the production. To be very specific in the public forum is very hard, because there are a lot of variables and dependencies. But I can say that we have done these many times and we have a proven track record of having it done successfully.

Baranwal: As per recent reports, we believe that you are expecting a potential business worth \$15 billion in India.

Howard: According to us this is a very conservative figure. We believe if the things fall in place then the potential of business is way too bigger than \$15 billion. •



F-16 Block 70: Key Features

Advanced AESA Radar Capabilities:

- Greater detection and tracking ranges,
- Multiple target track (20 + target tracks)
- High-resolution Synthetic Aperture Radar (SAR) maps for all-environment precision strike,
- Interleaved air-to-air and air-to-surface mode operations for improved situational awareness, and for operational effectiveness and survivability,
- Robust electronic protection for operations in dense RF environments,
- Greater system reliability and availability.

Centre Pedestal Display:

Enhanced data, high resolution displays to enhance battlespace awareness.

Advanced Avionics Architecture:

Digital video and high-speed data network enable capability growth.

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AN US AIR FORCE F-16 FIGHTING FALCON
DURING RED FLAG EXERCISE

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भारत इलेक्ट्रॉनिक्स लि. (बीईएल), भारत की अग्रणी रक्षा इलेक्ट्रॉनिक्स कंपनी ने सैनिकों के निर्णायक मिशनों में उनकी सहायता करने वाले उत्पादों की व्यापक श्रृंखला तैयार करते हुए देश के सशस्त्र बलों को सक्षम बनाने का अपना लक्ष्य तय किया है। एक बहु-उत्पाद, बहु-यूनिट वाली कंपनी, बीईएल को अपने उच्च परिशुद्ध उत्पाद जिसकी सभी प्रक्रियाओं में विश्व-स्तरीय गुणता सुनिश्चित की जाती है, से आद्योपांत, आवश्यकता अनुकूल समाधान प्रस्तुत करने में विशेषज्ञता प्राप्त है।



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Airbus Industrial Engagement in India

- 'Make in India' partnerships to be in focus
- H130 based dedicated helicopter ambulance — India's first — to be on static display

Airbus' industrial partnerships with Indian companies under the 'Make in India' programme is setting the tone of its participation at Aero India. "The future of Indian aerospace and defence industry rests on the realisation of the 'Make in India' vision. I look forward to having conversations around the topic at Aero India," said Pierre de Bausset, President and Managing Director at Airbus India. "We have partnered with Tata and Mahindra and are working with a host of other companies to script 'Make in India' success stories," he added.

Visitors at the Airbus stand — Hall B, Stand 2.2 — will get a first-hand account of Airbus' industrial engagement with India which yields over \$500 million (approx. ₹3,250 crore) in procurement from India annually from around 45 suppliers, generating local employment for more than 6,000 people. To illustrate the scale of co-operation, Airbus can proudly claim that each of its commercial aircraft produced today is partly 'Made-in-India'.

The potential of Airbus and India partnership is bigger and this will be exhibited in the form of scale models of the C295W military transport aircraft and the AS565 MBe Panther helicopter. As part of the Avro replacement programme of the Ministry of Defence, Airbus will support Tata Advanced Systems Limited (TASL) in setting up a final assembly line for the C295W in India, once the contract is awarded. Airbus has tied up with Mahindra



C295 MILITARY TRANSPORT AIRCRAFT

Defence to create India's first private sector champion for manufacturing military helicopters. Making India the global hub for 'Panther' manufacturing — producing Panthers in India, for the domestic market as well as for exports — is proposed under the Naval Utility Helicopter programme.

The scale model display line-up will include the EC725, now marketed as the H225M, which is under negotiation for the Indian Coast Guard's requirement for 14 shore-based helicopters as well as the fuel-efficient A320neo commercial aircraft. There are around 590 A320neo on order from India which means, on over age, one aircraft will be delivered to India per week over the next 10 years. Besides, there will be models of the H145 and H125 helicopters, Eutelsat 172B satellite, E-Scan AESA

radar and the ATR 72-600.

H130 CHOPPER AMBULANCE ON STATIC DISPLAY

Aviators Air Rescue, in partnership with the Air Medical Group Holding Inc — a leading air medical provider in the United States — became the first Indian operator to induct three Airbus H130 helicopters in a dedicated air ambulance role last year. One of these helicopters, fully kitted out with specialised emergency medical care equipment, will demo its life-saving service at the entrance of Hall B throughout the business days of the show. •

Alpha Design Technologies Upgrades

Major focus at Alpha Design Technologies Private Limited, a Bengaluru based firm specialising in R&D and manufacture defence and space related equipment and system, is regarding upgradation of older generation defence and space system, newer products and export-oriented products.

UPGRADED EQUIPMENT AND SYSTEMS

Mi-17 Helicopter upgrade: The Government of India has recently cleared this programme for upgrading 90 Mi-17 Helicopter (old versions) on Elbit Israel. Alpha is the major Offset partner and will be manufacturing all key sub-units at its Bengaluru factory such as smart displays, new cockpit, transponder, digital voice recorder (DVR), missile launch detection systems (MILDS), cables, brackets, etc.

A model of Mi-17 Helicopter with above modifications/upgradations is being displayed at Alpha's Stall.

Infantry Combat Vehicle (ICV) — BMP-2 Upgradation: These ICVs are 10 to 15 years old and they do not have modern fire control systems capable of being used during night operations. Alpha has manufactured and supplied 900+ systems which are being fitted on to BMPs at field. This upgrade with thermal imager (TI) based fire control systems and Commanders TI sight are also fitted on a dummy BMP-2 and demonstrated in the stall, which meets all the requirements of the Army for their BMP-2 upgrade programme indigenously.

Cheetah helicopter upgrade: Some 69 Cheetah helicopters used by Army Aviation Corps did not have protection from shoulder-fired missiles. This is now obviated by fitment of MILDS manufactured by Alpha and being fitted on Cheetah at forward areas. These are shown on a dummy Cheetah model at the stall.

Smart City demo: Alpha is concentrating its

efforts in developing solutions for the Smart City project to cater for the following important and critical aspects:

Active surveillance: It has 24 hours, 365 days, continuous surveillance through series of high-end day and night surveillance cameras, fully networked.

Target recognition: Any wanted/selected person can be traced from the time of his/her arrival to the time of his departure from the area of surveillance by recognising his/her stored features, comparison, recognition and tracing his/her movement by handing over the same from one surveillance camera to the other. Similarly, any vehicle along with recognition of its number plate is detected.

Networking and high-end encryption: These are in built and coordinated to be observed/checked/verified from central observation post.

Upgrade for remote control of long range reconnaissance, recognition and observation system (LORROS) and hand-held thermal imager (HHTI) sight: The Deputy Chief of Army Staff had organised a visit of some of the heads of defence private sector industries to forward areas in Kashmir six months back. Colonel Shankar (Retd) was the head of this delegation. Dur-

ing the visit to forward-most areas in Uri/Poonch/Baramulla areas, the Infantry Commanders and troops had desired remote control and display of LORROS and HHTI sights up to 5 to 10 km distance through radio communications, so that LORROS & HHTI could be controlled remotely in pan/tilt/focus and also display of areas under observation could be seen at Commander's forward bunkers. Based on this requirement Alpha's young engineers have developed the system and these are displayed in Alpha's Stall. This will provide a great advantage to forward troops. The systems will now be offered to Northern Command and after field trials, it is expected to be procured by Army/BSF in large quantities from Alpha. •





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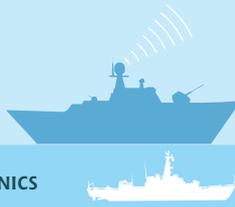
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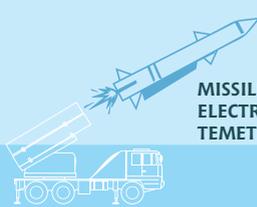
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Make in India, Core of Honeywell's Strategy

Honeywell Aerospace is a manufacturer of aircraft engines and avionics, as well as a producer of auxiliary power units (APUs) and other aviation products. Headquartered in Phoenix, Arizona, it is a division of the Honeywell International conglomerate. In an interview with *SP's ShowNews*, the Country Head, Defense & Space, Aerospace-India, Honeywell International, **Faizi Mohsini** talks about the journey in India over the last 20 years.

(...Continued from *SP's ShowNews Day 1*)

SP's ShowNews (SP's): Does Honeywell play any role in developing skill sets? If so, can you detail on the same?

Faizi Mohsini (Mohsini): As India transforms itself from a regional to a global power, the aerospace and defence sector is increasingly becoming critical in the country's long-term strategic planning. To actually achieve this aim, it is vital to have engineers and other graduates ready to meet the aerospace and defence industry needs. Hence, Honeywell is empowering the next generation of Indian engineers and pilots by training young Indian engineers in aerospace and defence and helping some engineers obtain their private pilot licence.

Today, we have more than 15,000 employees in multiple locations who are spread across seven manufacturing sites and five design centres in India. Honeywell's 6,000 Indian engineers help us deliver advanced technology solutions and tackle some of the toughest challenges faced by India and the rest of the world.

Honeywell is not only working towards building the capabilities of the existing workforce but also developing a strong pipeline of future talent.

SP's: What are your plans for the next 5 to 10 years for this market?

Mohsini: Honeywell sees India as a strategic and significant growth pillar for the organisation and we have been delivering aviation and defence based solutions to the Indian market for almost several decades. Honeywell's business objectives have always been aligned with the rapid advances in the market as well as the reformed aviation and defence policies. Today, we continue to offer our product portfolio, our strong capabilities in flight safety and efficiency

technologies and an in-country customer core team that provides dedicated technical support to airline customers.

For the coming years, the Indian aerospace sector is going to expand due to initiatives such as 'Make in India' and growth in passenger traffic. Keeping in mind the recent developments in the Indian aerospace market, Honeywell's five-year focus will be aligned with the government's aim to expand and produce locally, enhance regional connectivity and boost the MRO market. Other policies like the ease of doing business through deregulation, simplified procedures and e-governance will also enable Honeywell's future growth in the country and support government initiatives.

Technological advancements in the aerospace sector such as the introduction of in-flight connectivity to airlines is a revolutionary step made by the government. Recently, aviation authorities have also started to revive non-functional regional airports across locations in India to promote regional connectivity. Soon, this will result in an increased demand for safety optimisation as well as technological expertise. As other stakeholders like pilots and passengers become more dependent on technology, Honeywell will be able to offer technologies that are currently offered in other global markets to the Indian market as well. These futuristic offerings will include our GoDirect-suite of services and in-flight connectivity, which are currently being used by leading international airlines.

For the defence sector, the 'Make in India' initiative enables local manufacturing of defence and military products which enhances the country's localisation of defence hardware and software. For the coming years, Honeywell sees this as a great opportunity to form partnerships and relationships with local manufacturing companies in India and to deliver advanced solutions for the defence and aerospace industries. •

Aeronautics Group's Line of UAS Capabilities

Aeronautics Group, a leading UAS manufacturer, is presenting a wide range of comprehensive defence solutions and UAS platforms. Aeronautics line of UAS includes MALE UAS — the Dominator XR, Tactical UAS — the Aerostar, and state-of-the-art unmanned mini-UAS — the Orbiter family. The Orbiter family includes Orbiter 4 multi-mission STUAS, Orbiter 1K loitering unmanned system and Orbiter 2 mini-UAS and Orbiter 3 Small Tactical UAS.

With its UAS deployed in more than 55 different countries around the world, Aeronautics group provides high-end aerial solutions for the most advanced defence paramilitary and HLS missions. Integrating surveillance equipment with network information, Aeronautics' unmanned aerial systems are ideal for land, sea and air operations, and have already accumulated hundreds of thousands of operational flight hours worldwide. Together with its subsidiary, PoziDrone, Aeronautics is also operating in the field of multi-rotor unmanned aerial systems, and is currently developing a line of multi-rotor UAS for military and civil applications.

According to Amos Mathan, Aeronautics' CEO, "We are pleased to participate and present our wide range of unmanned aerial systems at Aero India. Aeronautics' comprehensive aerial solutions includes highly efficient and cost-effective UAS such as the Dominator MALE UAS and the Aerostar Tactical UAS, as well as small premium UAS such as the Orbiter family. We are currently participating in a number of tenders in India, as we see great importance in the Indian market and believe that our products are the most

cost-effective solutions for this market".

Orbiter 4 STUAS/NSUAS: The Orbiter 4 STUAS/NSUAS is an advanced multi-mission platform with an ability to carry and operate two different payloads simultaneously. With a maritime version, Orbiter 4 is continuing the evolution of the Orbiter line and the Small Tactical UAS, and delivers top mission performance with the lightest, most versatile, and most advanced covert platform available today, and is ideal for both land and maritime operations.

Orbiter 1K: It is a loitering unmanned system. Given a specific way-point, the loitering Orbiter 1K can detect and destroy a moving or a stationary target. The system can also operate on the base of a given area range: the Orbiter 1K independently scans the area, detects and destroys the target — moving or stationary.

Orbiter 2 mini-UAS: The Orbiter 2 UAS is a compact and lightweight system which offers extended endurance and range, while operated by a crew of only two personnel.

Aerostar tactical UAS: The Aerostar advanced tactical UAS is ideal for a wide range of short range and medium range ISR & artillery missions, as it is equipped with a large payload bay, and capable of carrying many types of payloads, including day and night EO/IR sensors, radars and various electronic intelligence sensors (COMINT, ELIINT).

Dominator XP MALE UAS: Based on a DA-42 twin star commercial aircraft, it has operation capability over long range. The Dominator XP offers high reliability as in a manned aircraft with significantly low maintenance costs. •

IAI Showcases Long-range Heron UAV

Israel Aerospace Industries (IAI), the largest Israeli aerospace and defence country, is introducing the long-range long-endurance (MALE) Heron TP-XP at Aero India. The Heron TP-XP is a special export version of the Heron TP which has been in service with the Israel Air Force since 2010. The Heron TP-XP constitutes a multi-mission, multi-payload strategic aircraft, integrating the most advanced technologies of IAI.

The Heron TP-XP is the latest member of the Heron family, a significant advantage to many Heron customers worldwide, based on the same operational concepts. These operational concepts are based on over 40 years of IAI accumulated knowledge and experience in UAV systems, with 1.5 million cumulative UAV flight hours and more than 50 operational clients. The Heron TP-XP is characterised by safety and reliability standards which are among the highest in the world, and is capable of operating in extreme weather conditions. This UAV also meets accepted world standards and complies with STANAG 4671.

Shaul Shahar, IAI Executive Vice President and General Manager of the Military Aircraft Group, said: "We are proud to introduce the latest IAI development in the UAV field in India, which is an IAI strategic customer. The Heron TP-XP introduces air supremacy at a higher level than currently exists in India, with an emphasis on double flight speed, high altitude and enhanced payload capability. This system is the latest derivative of the Heron TP, considered to be one of the world's leading UAVs. The possibility of offering the Heron TP-XP opens up additional opportunities by allowing us to expand the range of solutions we can offer to our customers."

IAI has many years of experience in the UAV field in India, in full partnership with local defence industries, promoting local production and transfer of knowledge and technologies. IAI is looking forward to further strengthen and



deepen the relationship. Heron TP-XP is an important element for IAI in this ongoing cooperation. •

An advertisement for the Tejas fighter jet. The background is a blue sky with a Tejas jet in the foreground, banking sharply to the right, leaving a white smoke trail. Another Tejas jet is visible in the upper left. The DRDO logo is in the top left, and the ADA logo is in the top right. Text on the right side reads: "TEJAS A FOURTH PLUS GEN FIGHTER, SMALLEST LIGHT WEIGHT, SUPERSONIC, ALL WEATHER MULTI-ROLE, AIR-SUPERIORITY DESIGNED FOR AIR - TO - AIR, AIR - TO - GROUND AIR - TO - SEA, COMBAT ROLES REVOLUTIONISING NATION'S DEFENCE Displaying the might at Aero India 2017 14th - 18th February Yelahanka, Bengaluru". At the bottom, it says "Defence Research & Development Organisation (DRDO), Ministry of Defence Aeronautical Development Agency (ADA), An Autonomous Society of DRDO".



(Top) Versatile and best in all categories of missions, the Rafale is a true force multiplier and is the right choice for the Indian Air Force; (middle, left) DRDO AEW&CS on an Embraer ERJ 145 aircraft flying over Yelahanka airbase in Bengaluru; (middle, right) Indigenously built multi-role supersonic fighter aircraft LCA Tejas preparing for a take-off; (above, left) HAL manufactured light combat helicopter over Yelahanka; (above, right) Scandinavian Skycats perform an aerobatic act on Catwalk during the Aero India 2017.

A high-angle, low-altitude shot of a Falcon 900LX aircraft flying over a coastal landscape with water and greenery. The aircraft is white with blue accents and is viewed from a perspective that emphasizes its sleek, modern design. The sky is a clear, light blue.

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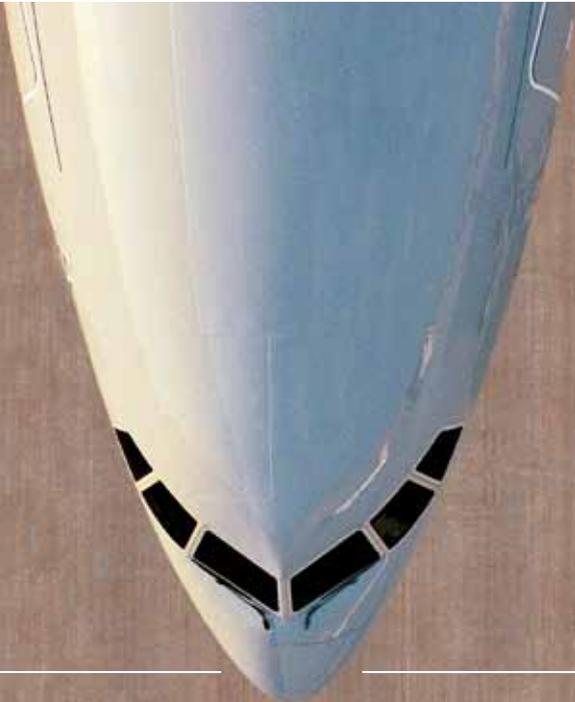
Introducing the new Falcon 900LX. Everything the world has come to expect of this proven, flexible platform. Its robustness, reliability, efficiency and comfort. Now with upgrades from cockpit to cabin that make the 900LX smarter, more efficient and more comfortable than ever. And perfect for any mission. The Falcon 900LX. **Right for today. Ready for tomorrow.**

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