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SP'S AVIATION, SP'S AIRBUZ,
SP'S LAND FORCES, SP'S NAVAL FORCES,
SP'S M.A.I. & BIZAVINDIA

INSIDE



A DAKOTA DC-3 WHICH HAD BEEN GIFTED TO THE IAF BY RAJEEV CHANDRASEKHAR, MP, INDUCED IN 1946, DAKOTA WAS AN ICONIC PLATFORM AND WAS THE MAINSTAY OF THE TRANSPORT FLEET OF THE IAF.

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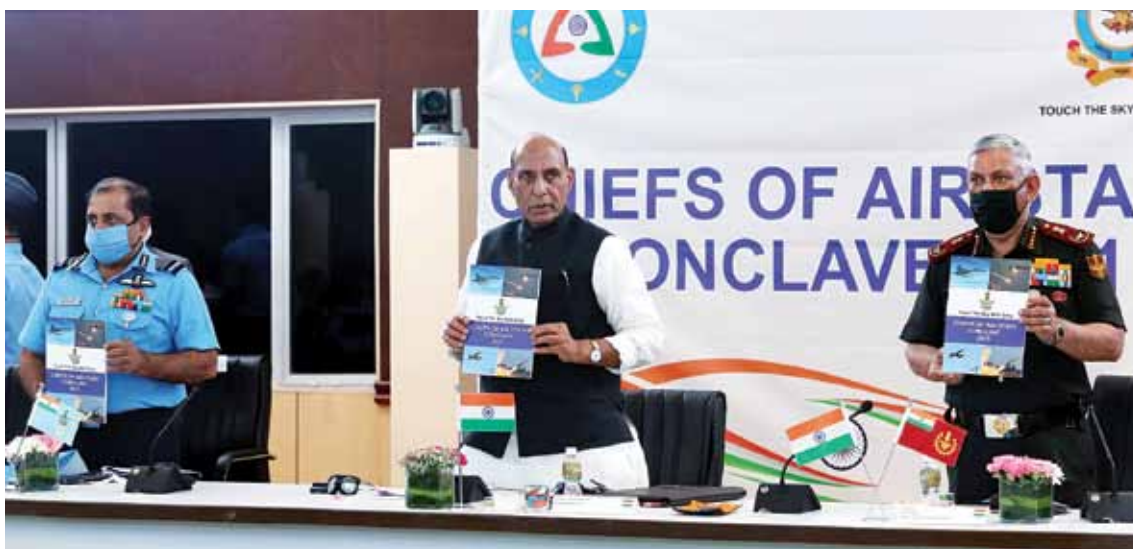
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IAF CHIEF CALLS FOR A COOPERATIVE, COLLABORATIVE AND CO-EXISTING AIR POWER

Indian aerospace sector will truly come off age and emerge in the global aerospace supply chain, ensures IAF Chief **R.K.S. Bhadauria**, while calling for transformational and mutual advancements



DEFENCE MINISTER RAJNATH SINGH RELEASING A BOOKLET TITLED "TOUCH THE SKY WITH GLORY". AT THE CHIEFS OF AIR STAFF CONCLAVE, DURING THE AERO INDIA 2021. THE CHIEF OF DEFENCE STAFF (CDS), GENERAL BIPIN RAWAT AND THE CHIEF OF THE AIR STAFF, AIR CHIEF MARSHAL R.K.S. BHADAURIA ARE ALSO SEEN.

AYUSHEE CHAUDHARY

The Chiefs of the Air Staff Conclave 2021 themed "Leveraging Aerospace Power for Security and Stability", is organised by the Indian Air Force as part of the 13th edition of the Aero India exhibition. The conclave is spread across two days and consists of three key sessions focused around addressing disruptive technology and innovation, air power in Indo-Pacific region and, air power and aerospace strategies.

The conclave was inaugurated on Wednesday by Defence Minister Rajnath Singh in the presence of the Chief of Defence Staff, General Bipin Rawat, Air Chief Marshal Rakesh Kumar Singh Bhadauria and Chiefs and delegates from various countries. The conclave is aimed at discussing important issues with respect to strategies, emerging technologies, and their impact on future avenues in tapping global security and stability, a common goal of the participating countries of the Indo-Pacific

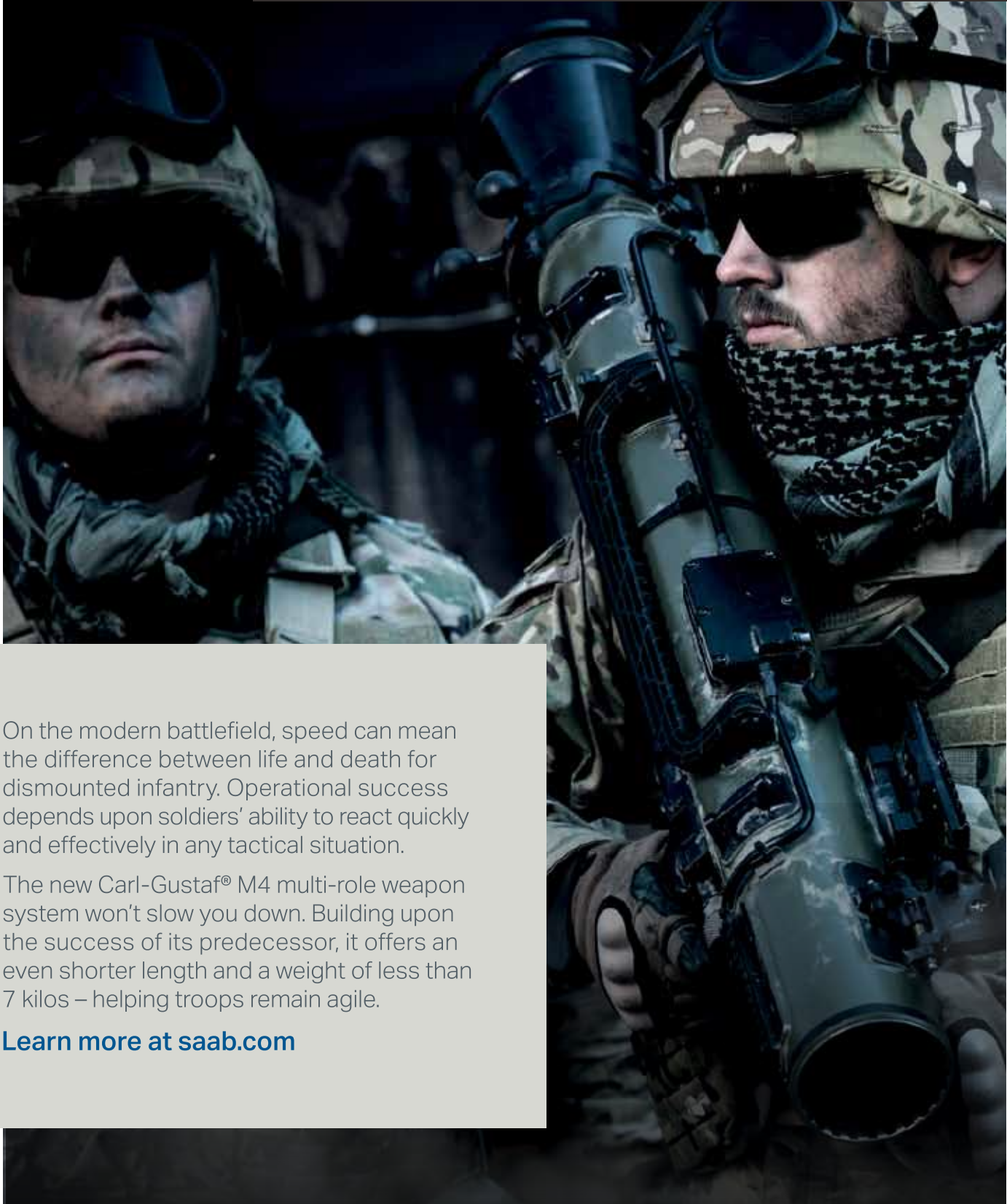
region. The inaugural session witnessed 26 countries in physical participation and 14 virtually in line with the hybrid format of the Aero India 2021.

Air Marshal R.D. Mathur, Air Officer Commanding-in-Chief, Training Command, Indian Air Force welcomed the gathering stating, "For any air force, the strategic and the tactical are two sides of the same air power coin. We are all aware that modern air power assets can vary between strategic, operational or tactical effects sometimes all in a single sortie." He also pointed to the considerable changes that have taken place in India's neighborhood as well as the regional and global scenario.

Air Chief Marshal Bhadauria pointed out to the unprecedented challenges of uncertainty, volatility and common threat. "We have witnessed a paradigm change in the geopolitical landscape in the recent years, and globally, we are facing unprecedented levels of uncertainty, volatility and interconnected threats. While the world was grappling with complications and control of the pandemic, the worsening interstate relations, rising mistrust and geopolitical ten-

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PUBLISHER AND EDITOR-IN-CHIEF

Jayant Baranwal

SENIOR CONTRIBUTORS

Air Marshal (Retd) B.K. Pandey
Lt General (Retd) Naresh Chand
Lt General (Retd) P.C. Katoch

PRINCIPAL CORRESPONDENT

Ayushee Chaudhary

CHAIRMAN & MANAGING DIRECTOR

Jayant Baranwal

PLANNING & BUSINESS DEVELOPMENT

Executive Vice President: Rohit Goel

SALES & MARKETING

Group Director: Neetu Dhulia
Deputy Director - Sales: Rajeev Chugh

LAYOUT DESIGNERS

Vimlesh Kumar Yadav
Sonu S. Bisht

Group Research Associate: Survi Massey

MANAGER - HR & ADMIN

Bharti Sharma

ASST. MANAGER - HR & ADMIN

Pooja Tehlani

SP'S WEBSITES

Sr Web Developer: Shailendra Prakash Ashish
Web Developer: Ugrashen Vishwakarma

SP GUIDE PUBLICATIONS PVT LTD

A-133, Arjun Nagar,
(Opposite Defence Colony)
New Delhi 110003, India

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

Fax: +91 (11) 24647093

E-mail: info@spguidepublications.com

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(ABOVE) DEFENCE MINISTER RAJNATH SINGH WITH CHIEFS OF AIR STAFF OF DIFFERENT COUNTRIES. THE CHIEF OF DEFENCE STAFF (CDS), GENERAL BIPIN RAWAT, THE CHIEF OF THE AIR STAFF, AIR CHIEF MARSHAL R.K.S. BHADOURIA AND OTHER DIGNITARIES ARE ALSO SEEN.

(RIGHT) DEFENCE MINISTER RAJNATH SINGH ADDRESSING THE CHIEFS OF AIR STAFF CONCLAVE.



sions have only reinforced the importance of a mature and balanced cooperation at international level. We need to strengthen our mutual understanding and existing security frameworks based on the principles of Cooperation, Collaboration and Coexistence. A very high degree of networked situational awareness for decision makers is required," he said.

Bhadouria also highlighted the changing nature of warfare. "Advent of new technologies and cross linking of 'Physical', 'Digital' and 'Cognitive' domains has complicated the art of war fighting considerably. Also, the exponential technological progress made in the last few years has made the realm of sub-con warfare more complex. The low cost and easy availability of simple disruptive technology like drones with small state and non-state actors have made them more lethal, agile and capable of generating disproportionate effects," he said pointing to the attack on Aramco oil refinery with armed drones, new drone technologies in the Syrian conflict and massed usage of Unmanned Aircraft System and loitering munitions in Armenia-Azerbaijan fight. He added that the IAF was closely observing these developments and working on capabilities in the unmanned and optionally manned platforms, manned-unmanned teaming and anti-drone technology.

He also talked about working more on public-private partnership models, and to not ignore the essence of software which has become as important as hardware. "Indian aerospace sector will truly come off age and emerge in the global aerospace supply chain. However, to retain edge in a highly diverse airspace, a very network centric approach for information sharing and partnership in combating cohesive activities should be looked at."

Delving into IAF's experience in building a potent Net Centric Warfare capability, he indicated that the military path further should be largely indigenous and noted IAF's electronic Maintenance Management System (e-MMS) which has now become one of the world's largest such systems with complete digital work flow environment across all platforms of the IAF, was developed by an Indian IT firm. Further he said that to deepen the HADR cooperation and coordination among neighbours, "we have also been conducting regular exercises with an aim to mutually share our expertise and assist in capability building. To enhance such interoperability further, we should look at establishing a methodology for sharing ISR grid when necessary."

The defence minister underlined the impact and plans for self-reliance especially after the Prime Minister's call for Atmanirbhar Bharat and the recent order of LCA Tejas being an important one in that direction. He said that the indigenous defence and aerospace

industry of India has many success stories in the form of LCA, ALH and a host of defence weapons.

"A strong aerospace base is essential for India to become self-reliant as well as to support the need of the rapidly growing aviation sector within the country and in the neighborhood as well. The path breaking decision of increasing foreign direct investment (FDI) limit in defence manufacturing under automatic route from 49 per cent to 74 per cent as well as the recently issued Defence Acquisition Procedure 2020 have included necessary provisions to include FDI and enhance manufacturing hubs across India," stated Singh.

Underling the indigenously designed, developed and manufactured LCA Mk-1A as a boost to the 'Make in India', he added that close to 500 indigenous design and production agencies are involved in the manufacture of the LCA. Speaking of the success stories of the indigenous defence industry he applauded the Defence Research and Development Organisation (DRDO) for testing 12 missile types spanning the spectrum of ranges and purposes in a matter of one and a half months. "The IAF has launched a major indigenisation drive for sustenance of all aircraft fleets and maintenance aspects, this will prove to be the growth engine for Indian's domestic aerospace manufacturing capability," he said.

The Defence Minister assured that India can take on the role of being the net security provider in the region adding that air power has and would continue to play a critical role in maintaining regional stability and peace in the region. Recalling Prime Minister Narendra Modi's keynote address at ShangriLa Dialogue-2018, Singh said that the Prime Minister had articulated the key role of India's Armed Forces in building partnerships in the Indo-Pacific region for peace and security, as well as humanitarian assistance and disaster relief and I further express the intention of the country to cooperate with defence partners in these niche technologies with focus on knowledge sharing and co-production.

"The country has reached an inflection point in domestic defence manufacturing and the trajectory from here on would only be upwards," stated the Minister. ●

BIRDS ON SHOW



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1. LIGHT COMBAT HELICOPTER FAMILY IN SUPPORT OF INDIA PAVILION THEME 'ROTARY WING' 2. MAGNIFICENT DISPLAY BY SARANG AEROBATIC TEAM AT THE SHOW 3. TRIO OF IAF'S RAFALE STEALING THE SHOW

4. IAF'S ROARING SUKHOI FLANKED BY JAGUARS AND ADVANCED JET TRAINER HAWKS 5. ADVANCED LIGHT HELICOPTER OF THE INDIAN COAST GUARD 6. IAF'S SUKHOIS MAINTAINED THEIR SUPERIORITY AT THE AIR SHOW 7. WHILE LCA TEJAS LEAVES THE GROUND, ITS COUSIN HELO LCH ACCOMPANIED BY A DORNIER OF INDIAN COAST GUARD WISHES IT THE VERY BEST 8. FIXED WING FAMILY OF HAL ECHOING ATMANIRBHAR BHARAT AND TOUCHING NEW HEIGHTS WITH LCA TEJAS ACCOMPANIED BY TWO HTT-40, FOLLOWED BY INTERMEDIATE JET TRAINER AND ADVANCED JET TRAINER HAWK-I



(LEFT) THE COMPANY OFFERS ASSEMBLY/MANUFACTURE FACILITIES FOR A WIDE RANGE OF PRODUCTS; (RIGHT) REAR FUSELAGE OF LCA DELIVERED BY ALPHA-TOCOL TO HAL

LEADING INDIGENISATION IN AEROSPACE & DEFENCE

Colonel H.S. Shankar, Chairman and Managing Director, Alpha Design Technologies Pvt Ltd highlights their role in supporting 'Make in India' and their foray into the Space Sector

SP's ShowNews (SP's): What are the defence programmes that Alpha Design is looking at under the 'AtmaNirbhar' initiative?

Colonel H.S. Shankar (Shankar): Alpha Design is looking at series of "ATMANIRBHAR BHARAT" projects such as Software Defined Radios, Thermal Imager based Fire Control Systems for tanks, EW equipment, C3I systems, Upgradation of old generation Russian Origin Helicopters, Missile and Radar Systems, important parts like Rear Fuselage for India's Light Combat Aircraft (LCA), Space Satellite, etc.

SP's: What is the contribution of ADTL for indigenous Indian defence programmes?

Shankar: Out of turnover of about ₹500.00 crore, majority of projects are made under the banner of our R&D cum engineering. Hence even those equipment we make under Offset schemes are converted for different versions for various platforms by our own R&D.



PECHORA SAM OF THE IAF

SP's: Kindly elaborate on structural work undertaken by ADTL for HAL or IAF?

Shankar: We have already delivered Rear Fuselage for LCA, Ailerons / Flapperons / Engine Mounts for Su-30, etc., as sub-contractor to HAL. For IAF we carry out upgradation of 90 No's Mi-17 / 1V Russian Helicopter and upgrades of Pechora Radar and Missile Projects.

SP's: Kindly provide an update on the contracts for provision of simulator training for IAF MiG-29 and Mi-17 fleets?

Shankar: We have been bestowed prestigious projects by IAF in establishing three Simulators at Adampur (For MiG-29 Upgrade), Bagdogra and Sarsawa (both for Mi-17 V5 Helicopters). We have been tasked to run these on BOM basis for 20 years. This is a unique initiative taken by IAF and we are ever grateful to IAF.

SP's: Is this the first time that such work has been done in the private sector and what work has ADTL done with regards to simulators?

Shankar: Establishing and running three Simulators Centres together at AF bases for 20 years is the first for any Private Sector Industries though for C-130, M&M is doing the same. ADTL has added its Hardware and Software as also GIS, GIU and mapping software to the Simulators.

SP's: Kindly provide an update on contract for Pechora upgrade for IAF?

Shankar: Pechora is a 30+ years old Radar Missile System for which IAF had lots of difficulties with respect to older Valve-based technology, obsolescence, non-availability of Spares from Russia, old generation hardware/software, etc. All of these will be upgraded under ADTL's project management and its own R&D, with Co-operation from ROE.

SP's: How is work on Tadiran radio sets progressing at ADTL?

Shankar: ADTL is manufacturing more than 4900 CNR Radios as main offset partner to Elbit. Almost 75 per cent sets are manufactured in ADTL and supplied to Elbit. ADTL will also be supplying Spares, etc., for more than 25,000 + CNR sets which are in service on tanks.

SP's: Please provide an update on ADTL's partnership with ISRO?

Shankar: There is so much potential in the Space Sector. ISRO has been developing private industries as sub-contractor / vendors for past 30+ years. But now a new focus has been given to make Private Sector industries part of their programs and to manufacture not only modules / sub-assemblies but also complete systems. There are opportunities in satellites, ground receiving station, launchers and critical technologies - waiting for Private sector to tap it! ADTL has carried out Assembly, Integration and Testing (AIT) under ISRO's guidance. ISRO's Prestigious Satellites - 1.5 Ton IRNSS 1(i) Navigational Satellite and GSAT-30 which is a 3.5 Ton Communication Satellite - both of which are in Space looking satisfactory. ●

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STAR IN THE AIR OF INDIAN REGIONAL CONNECTIVITY

Braving the pandemic year, Star Air continues to expand its operation in regional aviation



STAR AIR OPERATES A FLEET OF EMBRAER ERJ145, WHICH IS AMONG THE FASTEST IN THE CATEGORY HAVING 0.8 MACH FLYING SPEED

AYUSHEE CHAUDHARY

The regional connectivity is garnering much needed attention in the country with more and more people exploring domestic travel and newer destinations. Not only is this a boost to regional tourism but has served well to an airline like Star Air which started in the year before the pandemic struck the industry. The relatively new airline has continued to expand operations and had new routes in the regional aviation of the country. It was in the beginning of the year 2019 that Star Air, a Sanjay Ghodawat Group venture, announced the issuance of "Air Operator Certificate," issued by Ministry of Civil Aviation (MoCA) on January 1, 2019.

Star Air had then said that it plans to operate fleet of Embraer ERJ145, which is among the fastest in the category having 0.8 Mach Flying Speed. Star Air was the first Indian carrier to introduce Embraer 145 to fly for domestic routes. "A highly successful aircraft around the world will now be the first in India. The seating capacity for the aircraft is 50 and have an average seat pitch of 31 inches," Star Air had stated.

Star Air is the first Schedule Commuter Operator based out of Bengaluru (Karnataka) and started flights from Bengaluru and Hubballi, determined to add more cities across India under *Ude Desh Ka Aam Naagrik* (UDAN). The UDAN-3 Scheme featured inclusion of tourism routes under in coordination with the Ministry of Tourism, inclusion of seaplanes for connecting water aerodromes, and bringing in a number of routes in the North-East Region under the ambit of UDAN. Under the UDAN scheme, financial incentives from the Centre, state governments and airport operators are extended to selected airlines to encourage operations from un-served and underserved airports, and keep airfares affordable. According to MoCA, a total of 305 routes and 53 airports including five heliports and two water aerodromes have been operationalised till date under this scheme, the ministry said.

Despite the COVID-19 impacts, the airline has managed to continue its determined plan of enhancing regional connectivity in India. Recently in January 2021, Star Air launched flights between Kalaburagi in Karnataka and Tirupati in Andhra Pradesh under UDAN. "Star Air was awarded the Kalaburagi-Tirupati route under the RCS-UDAN-3 bidding process last year," the Civil Aviation Ministry said. The airline plans to operate three weekly flights on the route and deploy its 50-seater Embraer-145 aircraft.

This service between Kalaburagi and Tirupati will allow the passengers to travel conveniently and reach the pilgrim centre, Tirupati, in an hour. Star Air will reportedly operate four days a week and is offering inaugural flight tickets starting at ₹999.

Prior to this, Star Air had launched its services to Surat in December 2020. The company started non-stop flight services to Surat from Belagavi and Ajmer, also under the RCS-UDAN scheme.

"After running successful operations in Ahmedabad for over a year, we have now expanded our wings further, by launching our services to one more city of Gujarat. Our airline recently commenced its operations in the Silk City of India i.e. Surat from December 21, 2020," the airline stated.

Star Air was already running Belagavi to Ajmer (Kishangarh) services via Ahmedabad and Indore locations. Surat is the third city from where Star Air connected Belagavi and Ajmer.

After commencing operations from Surat, Star Air noted that it is now serving passengers in ten Indian Cities including Ahmedabad, Ajmer, Belagavi, Bengaluru, Delhi, Kalaburagi, Indore, Mumbai, Surat, and Hubballi.

"This Belagavi-Surat-Ajmer (Kishangarh) service is a historic one as, to cover 1480+ kms of the distance between Belagavi and Ajmer, passengers now just have to spend 3 hours instead of 25+ hours as required from other modes of transportation. Moreover, the travel time between Surat-Belagavi and Surat-Ajmer (Kishan-

garh) is reduced to just 1 hour 20 min and thus it provides great relief to countless people who fly between these cities frequently," Shrenik Ghodawat, Managing Director, Star Air had said. The company expects a good interest on this route due to the popularity of Ajmer and nearby places among tourists and also for those people who are in marble business as Kishangarh, known as Marble City of India, is very popular for its exquisite marbles globally, the airline stated.

Before adding Surat, Star Air had begun commercial scheduled non-stop flight services between Kalaburagi and Delhi (Hindon) in November 2020, the first commercial flight service between the two prominent cities.

"Currently, to cover the journey between Kalaburagi and Delhi (Hindon), approximately 1,700 km apart, by road and rail it takes over 24 hours. With this service, people can travel this long distance in just 2-hour 20 minutes with the comfort of world-class, Brazilian-manufactured Embraer ERJ145 aircraft. The passengers will save time as well as money due to the economic cost of the service under RCS-UDAN," said Sanjay Ghodawat, Chairman of Sanjay Ghodawat Group, in a media release.

Having an airport located strategically at a significant geographical point bordering various states, Kalaburagi holds prominence for travel connectivity, Ghodawat had added.

Apart from expanding connectivity in various regions, Star Air also entered into the charter services business in the mid-2020. Previously, Star Air had already commenced air services through its Helicopter services and the airline services were a new addition to the diversified businesses. The scheduled commercial airline with an aim to connect PAN India is the Aviation arm of Sanjay Ghodawat Group (SGG), which is present in several high value industry segments like Aviation, Agro, Floriculture, Food processing, Energy, Mining, Realty, Consumer Products, Textiles and Education.

The press statement highlighted that with its world-class fleet of three Embraer ERJ145 aircraft (50-seater), two helicopters – Airbus H130 (6-seater) and Airbus H135 (5-seater), Star Air has the capacity to fly anywhere at any point in time.

It holds a valid licence for charter service business and operates as per the protocols defined by the DGCA, it noted.

"We are delighted to expand our airline operations by opening this private charter services. Like our scheduled commercial airline services, we are offering a world-class charter service keeping your comfort, safety, and overall flying experience in mind," said Sanjay Ghodawat, Chairman, Star Air.

According to the airline, the demand for availing charter services has risen dramatically over the last a couple of months and encouraged airlines to either start or expand their charter services business further. "This (Covid-19) pandemic has not only limited the modes of transportation for people across India but also forces them to look for safer, convenient, and comfortable travel options. Private charter services are thus seen as the best alternative" Star Air added.

Star Air had achieved a successful growth in the very first year of its operations and continued to add in its feather through the pandemic year as well. These consistent efforts have made Star Air among the most promising airline brands in making.

During the pandemic, Star Air also added passenger's confidence by highlighting how it is a safer option to be opted for once the commercial airline services began after the nationwide lockdown. "Star Air uses 50-seater Embraer aircraft with an alpha seating arrangement facility. This seating is unique because it has dual features of aisle and window seat. Travelling in this arrangement makes any passenger less exposed to other fellow passengers, due to fewer people density and wider distance amongst passengers inside the aircraft," it stated.

Thus Star Air continued operations on the brighter side of the pandemic and holds great promise for the future ahead. ●

F-15EX FIRST FLIGHT CLEARS PATH FOR DELIVERIES TO US AIR FORCE

Newest US Air Force fighter completes 90-minute test flight. Deliveries to begin this quarter, less than nine months after contract award

The new Boeing F-15EX fighter jet completed its first flight, paving the way for the early delivery of the first two jets to the US Air Force later this quarter. The jet took off from St. Louis Lambert International Airport, completing a 90-minute test flight before returning to the airport. Boeing F-15 Chief Test Pilot Matt Giese checked out the multirole jet's avionics, advanced systems and software. A test team monitoring the data collected during the flight in real time confirmed that the aircraft performed as planned.

"Today's successful flight proves the jet's safety and readiness to join our nation's fighter fleet," said Prat Kumar, Boeing Vice President and F-15 Program Manager. "Our workforce is excited to build a modern fighter aircraft for the US Air Force. Our customer can feel confident in its decision to invest in this platform that is capable of incorporating the latest advanced battle management systems, sensors and weapons due to the jet's digital airframe design and open mission systems architecture."

The fighter's digital backbone means it can serve as a test bed for future technology insertion, a key capability for the Air Force. Modern variants of the F-15 also include fly-by-wire flight controls, an all-new digital cockpit, modern AESA radar and the ADCP-II, the world's fastest mission computer. The F-15EX, the most advanced version to date, features the Eagle Passive/Active Warning and Survivability System, Electronic Warfare System to improve mission effectiveness and survivability for operators.

In July, the Air Force awarded Boeing a contract to build the first lot of eight jets. Future plans call for as many as 144 aircraft. ●



BOEING F-15EX FIGHTER JET SOARING HIGH

DASSAULT SYSTÈMES SHOWCASES DIGITALISATION SOLUTIONS



PROGRAM EXCELLENCE INDUSTRY SOLUTION

With the theme of showcasing "Digitalisation to realise a thriving Aerospace, Defense and Space ecosystem," Dassault Systèmes at the 13th edition of Aero India 2021 showcases technology solutions to Improve Supply Chain Collaboration, to Design for Flexible Manufacturing, to Manage Complex Systems and Accelerate Program Integration and to Deliver High Performance Operations. Experts from Dassault Systèmes are present at booth numbers A6.6 and A6.8, to discuss how to bridge the gap between the virtual and real world to accelerate concept to operations by 50 per cent through industry solution experiences based on the 3DEXPERIENCE platform.

Aerospace companies must integrate new technologies into ever-increasing complex aircraft that can meet passenger demands as well as operator cost and uptime targets. To drive down costs, companies must find efficiencies in how they conceptualise, design, manufacture, test, certify and support new aircraft. It requires a model-based and data-driven approach to drive significant process improvements

to transform their ability to deliver on schedule, on cost, and on specification. Dassault Systèmes supports them in accelerating programme maturity from concept to manufacturing while driving 40-60 per cent of cost out. The "Winning Concept" industry solution experience increases success rates of new concepts and bid proposals by uniting the proposal authoring, concept alternatives definition and analysis trade process on a single business platform. The "Cleared To Operate" industry solution experience helps Aerospace & Defence programmes test and certify on time and improve confidence between aviation authorities and their suppliers.

As airlines make decisions on retiring models and reassess their fleet needs, aircraft production and aftermarket services will need to be fundamentally reassessed to account for long-term demand shifts. The "Co-Design to Target" industry solution experience improves programme execution to meet cost, schedule and performance targets, avoid potential contract penalties and reduces engineering complexity. The "Ready for Rate" industry solution experience increases the efficiency of existing manufacturing operations, accelerates the ramp-up of new production lines, and enables future factory innovations.

The new model requires a closer partnership to improve visibility, on-time delivery and first-time quality. The "Program Excellence" industry solution experience enables companies to optimise their product strategy and reach a high level of efficiency in programme execution. Companies can implement their digital transformation around governance, configuration, collaboration and analytics. The "Engineered to Fly" industry solution experience helps suppliers win more business and more efficiently deliver on time, on budget, on target. Best in class engineering, simulation and project tools delivered on a single platform can improve productivity up to 40 per cent while reducing total cost of ownership by at least 15 per cent.

It is critical for the aerospace industry's resiliency and long term development to address costs. To deliver high performance operations at optimised costs requires manufacturing execution optimisation on the shop floor as well as services optimisation for MRO. With the virtual twin, Dassault Systèmes' dedicated industry solution experiences make it possible to achieve excellence at reduced costs. The "Build To Operate" industry solution experience provides the Manufacturing Operations Management capabilities needed to implement lean practices to monitor, control and validate all aspects of manufacturing with digital precision on a global scale. ●



(LEFT) THE KC-46 OFFERS A PERFECT CHOICE FOR A MULTI-ROLE TANKER-TRANSPORT WHILE RETAINING THE CAPABILITY TO UNDERTAKE AERIAL REFUELLING; (RIGHT) THE KC-46 IS EQUIPPED WITH BOTH HOSE-AND-DROGUE AS WELL AS BOOM RECEPTACLE SYSTEM

THE KC-46A PEGASUS: FUELING THE FIGHT WITH UNMATCHED CAPABILITY AND OPERATIONAL FLEXIBILITY

“As India expands its Air Force and increases its defensive capabilities, the KC-46 is the perfect choice for a Multi-Role Tanker-Transport aircraft. The brand new KC-46 is designed from the ground-up to be a combat-ready tanker. This means that unlike other tankers, it can operate closer to the fight, covertly and with the ability to protect itself. In India’s crowded neighborhood, it means it can be closer to action to fuel the fight.” **Michael Koch**, Vice President, Boeing Defense, Space & Security, India

The recent contract award from the US Air Force (USAF) for an additional 12 KC-46A Pegasus aircraft is a testament to the success of the air-refueling platform by Boeing which is enabling the US Air Force to provide in-flight refueling services to bombers, fighters, airlifters, surveillance aircraft, and other aircraft flown by the US military.

With the KC-46A Pegasus, a new era of aerial refueling and mobility capabilities has dawned and Boeing plans to build 179 of the 767-based refueling aircraft for the Air Force to replace its legacy tanker fleet.

Boeing is now on contract for 79 tankers for the US Air Force and 42 aircraft have been delivered to date.

Following an agreement with the USAF, Boeing is currently refreshing the entire Remote Vision System of the KC-46, including upgrades to the existing cameras to provide improved video imagery to the operator as well as the addition of a new sensor that provides information about the distance between the boom and the receiver aircraft. LIDAR sensors (imaging, ranging and object detection) are being developed in the automotive industry for collision avoidance and autonomous navigation in ground vehicles. Boeing is leveraging those commercial applications for use in the KC-46.

The new system includes full colour cameras with 4K Ultra High Definition and High Dynamic Range (4K UHD HDR) sensors and displays that capitalise on technologies like those used in state-of-the-art production and theater systems. An upgraded computing infrastructure will provide improved image processing, camera exposure control, and overlay processing.

The KC-46 is already providing significant capability to the USAF having already delivered more than 28.9 million pounds of fuel to a wide array of receiver aircraft.

In addition, the KC-46A will be certified to refuel 64 aircraft models, including the C-17 Globemaster, F-22 Raptor, B-1 and B-2 bomber aircraft, among others. Of course this number will continue to grow as additional aircraft are added to USAF and ally fleets.

UNMATCHED CAPABILITY FOR INDIA

The KC-46 has the lowest life-cycle costs of any of its current competitors in the market, making it the most efficient tanker available today.

The aircraft can be rapidly reconfigured in two man-hours for any mission — carrying passengers, cargo, aeromedical or any combination of the three, while still performing its main air refueling role. With its unique main cargo deck door, the KC-46 has 7,800+ square feet of cargo space to accommodate up to 18 full-size 463L pallets, which is more than any other tanker aircraft. It also has a fully integrated capability that enables crews to perform aeromedical evacuation on any flight.

ROBUST DEFENSIVE SYSTEMS

The KC-46 is delivered with a robust suite of defensive systems and self-protective measures. It is electromagnetic pulse-hardened for missions in a nuclear environment for the high-end fight as well as incorporates flight-deck armor for protection against small arms. Additionally, the KC-46 is equipped with chemical-biological protective systems. All of these systems are incorporated into the aircraft as it is being produced, not as a retrofitted modification. The KC-46 also has the ability to



A KC-46 PEGASUS LINES UP TO REFUEL US NAVY BLUE ANGELS F/A-18 HORNET. THE KC-46 REPRESENTS THE BEGINNING OF A NEW ERA IN AIR-TO-AIR REFUELING CAPABILITY. THE MODERNISED FLY-BY-WIRE BOOM PROVIDES A LARGER AIR-REFUELING ENVELOPE.

launch from a ‘ready state’ within 10 minutes and coupled with its threat awareness and avoidance system, allows the Pegasus to truly fuel the fight.

PROVEN CAPABILITIES

It can refuel both hose-and-drogue as well as boom receptacle receiver aircraft on any sortie. It utilises 21st century centerline and wing-mounted hose and drogue systems, as well as an advanced sixth-generation fly-by-wire boom. Simultaneous air refueling of two fighter aircraft is supported through wing air refueling pods (WARPS). All of these systems are built to international refueling standards. That means the KC-46 can refuel the IAF fleet now, on day one. From refueling India’s front line fighter force to direct support of its C-17 fleet, the KC-46 enables allied and coalition refueling of all fixed-wing receiver aircraft anytime, on every mission, including simultaneous multi-point refueling.

A large Boeing 787 15-inch displays allows KC-46 pilots to quickly optimise flight parameters for critical decision making and mission success; and it also incorporates a Tactical Situational Awareness System, which provides dynamic, battle-space awareness to the aircrew.

With the Indian Air Force (IAF) intending to convert itself into an expeditionary force, the air refueler is believed to be a necessity in the coming years. The IAF has already taken decisions to increase its operational reach by deciding to enable all its aircraft and helicopters for combat and support role for mid-air refueling.

The most reliable and economical tanker to operate, the KC-46 will provide India with the combat capability it needs for sovereign operations and will also serve as an aircraft to move men and material. Pegasus is the best choice for today and the decades to come. ●

“INDIA READY TO SUPPLY MISSILE AND WEAPON SYSTEMS TO IOR COUNTRIES” – DEFENCE MINISTER RAJNATH SINGH

India calls for collective efforts in Indian Ocean Region to tackle the present challenges of Maritime Security Scenario.



DEFENCE MINISTER RAJNATH SINGH GIVING THE KEYNOTE ADDRESS AT THE INDIAN OCEAN REGION DEFENCE MINISTERS' CONCLAVE. CHIEF OF DEFENCE STAFF, GENERAL BIPIN RAWAT; CHIEF OF THE NAVAL STAFF, ADMIRAL KARAMBIR SINGH; CHIEF OF THE ARMY STAFF, GENERAL M.M. NARAVANE AND DEFENCE SECRETARY, DR AJAY KUMAR ARE ALSO SEEN.

AYUSHEE CHAUDHARY

India hosted the much anticipated Indian Ocean Region Defence Ministers' Conclave on February 4, 2021, on the sidelines of the Aero India 2021. Themed “Enhanced Peace, Security and Cooperation in the Indian Ocean Region”, the conclave is an initiative to promote dialogue to foster the development of peace, stability and prosperity in the Indian Ocean region (IOR).

“India being the largest country and having a vast coastline of 7,500 km in the IOR region, has to play an active role for peaceful and prosperous co-existence of all IOR countries,” said Defence Minister Rajnath Singh during the conclave.

He said that this was an implementation of the concept of the Indian Ocean built around Security and Growth for All (SAGAR), visualised during PM Modi's visit to Indian Ocean Island states in 2015. Defence Ministers from different IOR Countries like Maldives, Comoros, Iran, Madagascar, Ambassadors/High Commissioners representing countries like Australia, Kenya, Seychelles, Mauritius, Kuwait and Myanmar, Defence Secretary of Sudan and Service Chiefs of many other countries took part physically in the conclave while many others joined virtually.

“We all have a shared asset that is the Indian Ocean. It's an important lifeline to international trade and transport as it commands control of major sea-lanes carrying half of the world's container ships, one of the world's bulk cargo traffic,” Singh stated.

IOR is aimed to encourage dialogue in an institutional, economic and cooperative environment, address aspects related to defence industry co-operation amongst participating countries, sharing of resources available in Indian defence shipyards for design & shipbuilding, Indian ports with friendly countries, information-sharing towards increased maritime domain awareness, maritime surveillance and co-operation, Humanitarian Assistance & Disaster Relief (HADR), marine pollution response activities, development of technologies and capabilities for harnessing marine resources, etc.

Talking about the maritime security scenario at present, the Minister said at the conclave, “The present maritime security scenario in IOR is posing a number of challenges piracy, smuggling of drugs/people and arms, humanitarian and disaster relief & SAR, maritime collaboration and cooperation among IOR countries can help meet these challenges effectively. We have to join hands in looking at these threats in unison, because one's threat today maybe another's tomorrow,” said the Defence Minister. He also added that the IOR countries must ensure that the maritime expanse of the Indian Ocean is peaceful and optimally harnessed for the benefit of all nations in the region.

Many of the countries in this region are developing new technologies including defence shipyards for design and shipbuilding, which can be jointly harnessed. The Minister urged the IOR countries to take their economy, trade, naval cooperation and collaboration to a higher level. “Futures of the countries in the IOR region are interlinked and dependent on how effectively and efficiently we tackle present and emerging challenges and leverage opportunities in the Indian Ocean,” he said.



DEFENCE MINISTER RAJNATH SINGH WITH HIS COUNTERPARTS FROM MADAGASCAR, IRAN, MALDIVES AND COMOROS

He also mentioned that India is ready to supply the various types of missile systems, LCA/Helicopters, Multi-purpose light transport aircraft, warship and patrol vessels, artillery gun systems, tanks, radars military vehicles, electronic warfare systems and other weapon systems to IOR nations. Our startup ecosystem is one of the largest and is fostering Innovation and technology development also in the field of defence and aerospace. IOR countries can leverage. This for mutual benefit.

During the Chiefs of Air Staff conclave, the Defence Minister had also noted that India's unique disposition in the IOR complimented by a potent airlift capability of IAF enables it to contribute significantly in HADR missions.

The Government of India too has taken various policy initiatives to promote trade and tourism among IOR countries through sea like Sagarmala, Project Mausam, and Asia Africa Growth Corridor, etc. India's approach and vision to tackle global challenges has been highlighted by our PM as well in his dynamic 5 S vision which comprises of Samman (respect), Samvad (dialogue), Sahyog (cooperation), Shanti (peace) and Samriddhi (prosperity).

“We have taken the initiative to develop a comprehensive Maritime Domain awareness picture in the IOR, which has resulted in signing of technical agreements for sharing ‘White Shipping Information’ with many countries,” noted the Defence Minister, looking forward to enhancing discussions.

In addition to these efforts, an allocation of Rs 4,000 crore over the next five years for the Deep Ocean Mission was also done recently in the Union Budget 2021. The Deep Ocean Mission is a part of the Blue Economy envisioned to be developed by 2030, and is likely to place India among select countries — US, France, Japan, Russia and China — to have special missions dedicated for ocean studies. The mission will involve collaboration of industry experts and displays Indian government's resolve to explore and tap into the ocean prowess.

The IOR Defence Ministers' Conclave is to be followed by two seminars. While the first seminar was conducted by Indian Navy and Naval Maritime Foundation, the second seminar is to be organised by Indian Coast Guard/Bharat Shakti/ Invest India/Indian Defence Shipyards and Industry. ●

GROWING INDO-US PARTNERSHIP AIMS FOR THE NEXT LEVEL OF DEFENCE COLLABORATION



(LEFT) REAR ADMIRAL EILEEN LAUBACHER, DEFENCE ATTACHE, US EMBASSY, NEW DELHI SPEAKING ABOUT INDIA-US DEFENCE PARTNERSHIP
(RIGHT) KEYNOTE ADDRESS BY V.L. KANTHA RAO, DIRECTOR GENERAL (ACQUISITIONS), MINISTRY OF DEFENCE, INDIA

Showing its strong commitment to strengthen the military partnership between India and the United States, the US Embassy organised the US-India Defence Partnership Seminar during Aero India 2021. The seminar witnessed addresses from multiple speakers representing different industries from both the countries, talking about the current and future of the bilateral defence partnership.

Rear Admiral Eileen Laubacher, Defence Attache, US Embassy, New Delhi appreciated the Government of India for being futuristic and said that the country is emerging as the global aerospace power. She highlighted three dimensions to the growing partnership between India and the US.

- First being the growing defence trade between the two countries and the US remaining India's top export market;
- Second is the push of an ambitious agenda of the military to military engagement from joint exercises to subject matter exchanges and everything in between.
- The third dimension is that we have made tremendous progress towards implementing the enabling defence framework that was designed in recent years

"We are working in full swing to resume our full-service exercises in 2021 beginning with our annual army exercise next week," she said.

V.L. Kantha Rao, Director General (Acquisitions), Ministry of Defence, India, also took note of the current partnership between the two nations as strong and the future partnership emerging to be stronger. "In the last six-seven years, we have done business worth \$9 billion and that is a lot of work done with the US government and the OEMs of USA. There are many more opportunities in the offing. We certainly have a robust defence mechanism with a lot of systems in place and so many platforms for engagement between the two countries," he said.

However, Rao also had a request to make to the US side. "We have had the status of major defence partner for some time and have reached the level of maturity, now we should be at a higher level than that and I am looking forward to that kind of announcement. I would also like to add here that we should collaborate on design, as that is more fundamental and will strengthen the partnership in a much better way. So I hope for better terms and conditions when we sign further deals with the US and am certain that we can make this partnership stronger with mutual initiatives."

Among the highlights of the show, from the US Air Force, a B-1B Lancer heavy bomber performed a "fly-by" in the inauguration of the show. ●



OLA RIGNELL,
CHAIRMAN AND MANAGING DIRECTOR,
SAAB INDIA

CARL-GUSTAF - LEGENDARY MULTI-ROLE WEAPON SYSTEM FOR MODERN BATTLEFIELD

Built on over 70 years of heritage and technological development, Saab's Carl-Gustaf system remains an unparalleled and supremely successful solution to the challenges faced by ground forces. By supporting a wide range of ammunition, Carl-Gustaf allows dismounted soldiers to deal with multiple challenges on the modern battlefield.

Since it was introduced in 1948, the Carl-Gustaf multi-role weapon has been supporting dismounted infantry around the world. The wide range of ammunition types makes it a truly multi-role weapon

system that allows the user to take on a wide range of operations on the battlefield - from neutralising armoured tanks or enemy troops in defilade to clearing obstacles and engaging enemies in buildings.

According to Ola Rignell, Saab India Chairman and Managing Director, "Flexibility is a key characteristic of successful modern infantry forces. A global shift is taking place towards asymmetric and intra-state warfare, and troops are much more likely to be deployed in urban or complex combat environments. This could be for full-scale conflict, or for anti-insurgency or peacekeeping operations. In situations like this, it's both strategically and logistically unfeasible to rely upon heavy support. The key motive for infantry is to be able to quickly and efficiently respond to any threats they encounter.

FFV Ordnance, which is a part of Saab, has been the world's leading suppliers of man-portable support weapons for decades. The shoulder-fired weapon system Carl-Gustaf is the flagship of FFV Ordnance's product family. The system has a long

and successful history and is in use in more than 40 countries including India, where Saab has been a trusted supplier to the Indian Armed Forces since the 1970s. Currently, the Indian Armed Forces, operating several version of the Carl-Gustaf, are one of the biggest and most experienced users of the Carl-Gustaf weapon system.

Carl-Gustaf M4 is the latest version and comes with many improvements and innovations, such as a significantly lower weight of just seven kilos, an integrated shot counter and compatibility with future innovations such as advanced fire control devices and programmable ammunition.

Since its release in 2014, around ten customers have acquired the latest system, including the Australian Army, Swedish Armed Forces, Norwegian Armed Forces and US Army. With all the successes in the history of the Carl-Gustaf system and its latest version there is no indication that it is about to stop or even slow down. Customers that uses old versions of the system are now looking into an upgrade to the latest version. With the future in mind when designing Carl-Gustaf M4, the weapon will adapt for future needs and operations. Currently, new ammunition is being developed, for example a programmable high-explosive grenade and a guided Carl-Gustaf munition, that Saab together with Raytheon will demonstrate for the US Army. ●



CARL GUSTAF M4

INDIA'S AVIATION TECHNOLOGY GROWTH STRATEGY

In an effort to strengthen its aerospace industry, India has asked major weapon exporting countries to transfer technology to India, including manufacturing of critical aircraft components in the country



(LEFT) LIGHT COMBAT AIRCRAFT TEJAS; (RIGHT) HAL'S INDIGENOUS LIGHT UTILITY HELICOPTER

AIR MARSHAL SUKHCHAIN SINGH (RETD)

In November 2018, NITI Aayog released the 'Strategy for New India @ 75'. It had identified 41 different areas that require either a sharper focus on implementing the flagship schemes already in place or a new design and initiative to achieve India's true potential. Civil Aviation and Technology Innovation were one of them. The focus of the strategy is to improve the policy environment in which private investors and other stakeholders can contribute towards achieving the goals set out for clean, inclusive, sustained and sustainable growth for the next three decades.

INVESTMENT

According to the data released by Department for Promotion of Industry and Internal Trade (DPIIT), Foreign Direct Investment (FDI) inflow in India's air transport sector reached \$2.79 billion between April 2000 and June 2020. The government has allowed 100 per cent FDI under the automatic route in scheduled air transport service, regional air transport service and domestic scheduled passenger airline. However, FDI over 49 per cent would require government approval. India's aviation industry is expected to witness ₹35,000 crore (\$4.99 billion) investment in the next four years. The Indian Government is planning to invest \$1.83 billion for development of airport infrastructure along with aviation navigation services by 2026.

GOVERNMENT INITIATIVES

Ude Desh ka Aam Nagrik (UDAN) has been instrumental in connecting travellers to destinations that were difficult to reach until now. The scheme focuses on providing connectivity to un-served and under-served airports of the country through the revival of existing airstrips and airports. The Government of India has ensured sustainability by raising the budget substantially for UDAN for the next 10 years.

NABH Nirman (NextGen Airports for Bharat) is an initiative to enhance airport capacity for handling one billion trips in the next 10 to 15 years. According to official sources, the government is also considering setting up a NABH Nirman Fund (NNF) with a starting corpus of around \$2 billion to support low traffic airports in their initial phases. The Civil Aviation Ministry has prepared a proposal seeking additional funds for this flagship scheme by the Centre.

The Airports Authority of India (AAI) that runs all the non-private civilian airports in the country, has plans to create additional capacity in the airports at Agartala, Patna, Srinagar, Pune, Trichy, Vijayawada, Port Blair, Jaipur, Mangalore, Dehradun, Jabalpur, Kolhapur, Goa, Rupsi, Leh, Calicut, Imphal, Varanasi and Bhubaneswar, with a capital expenditure of ₹20,178 crore over the next four to five years. AAI has also decided to lease out six airports run by them, Ahmedabad, Jaipur, Lucknow, Guwahati, Thiruvananthapuram and Mangaluru under phase 1 of development, operation and management under PPP.

The government's focus is also on developing an aircraft financing and leasing model in the country and leveraging the country's large engineering pool to develop a hub for maintenance, repair and overhaul (MRO) services and thereby achieve self-reliance in aircraft maintenance and engineering services.

The government of India has recognised the potential of Artificial Intelligence (AI) and believes that it can boost the country's GDP with \$957 billion by 2035. NITI Aayog is working on the national strategy on Artificial Intelligence and proposed an investment of ₹7,500 crore in funding five institutes or centres for research excellence, 20 international centres for transformational AI for research, development, adoption and skilling in AI.

DEFENCE

The aviation industry which includes military and civil aviation is regarded as

strategic. Defence indigenous technologies will have to be developed especially when this is not available from other countries. It is an industry that involves one of the largest varieties of technologies and number of components/assemblies and equipment. Spin offs into a broad and varied range of industrial sectors is possible. Technology up-gradation for self-sufficiency in various fields has to be an ongoing and vigorous process. Government needs to aggressively encourage and fund Research and Innovation in the DRDO Labs, private sector and in academic institutions as well. Prime Minister Narendra Modi delivering the keynote address at the ASSOCHAM Foundation Week 2020 on December 19, 2020, said that the country needs to enhance investment in the research and development activities in its goals towards becoming Atmanirbhar.

Defence sector has been identified as one of the core areas to boost 'Make in India' where immediate transformation is required. The Government has a vision of achieving ₹35,000 crore defence-related exports target to become net exporter of defence equipment in the next five years. India has embarked on major defence acquisition and development programmes comprising Medium Multi Role Combat Aircraft (MMRCA), Fifth Generation Fighter Aircraft (FGFA), Multirole Transport Aircraft (MTA), Medium Lift Helicopters (MLH) and Light Utility Helicopters (LUH). The industry will witness more than double the number of aircraft and helicopters that will be produced during the next decade. The DPEPP 2020 policy aims at providing greater visibility of the Indian Armed Forces requirements to the defence manufacturing industry. To promote Atmanirbhar Bharat in defence manufacturing, a separate budget of ₹52,000 crore has been set aside for procurement from domestic vendors. The Cabinet Committee on Security (CCS), on January 13, 2021 has approved a ₹48,000-crore proposal to procure 83 Light Combat Aircraft (LCA) Tejas Mk 1A aircraft for the Indian Air Force which is a boon for self-reliance in the Indian defence manufacturing sector. This will enhance the LCA manufacturing ecosystem in India with Hindustan Aeronautics Limited (HAL) following a System Integrator model for LCA Mk 1A programme and acting as an umbrella organisation, fostering manufacturing and design capabilities in the private industry.

Progressive policies by the Government of India, liberalisation of FDI norms in aviation, opening up of the defence sector and forward-thinking policies for selecting strategic partners for defence manufacturing, are expected to be significant growth drivers for this industry. The government is working on a roadmap to boost manufacturing of critical components in India. In an effort to strengthen its aerospace industry, India has asked major weapon exporting countries to transfer technology to India, including manufacturing of critical aircraft components in the country. The Government has identified a list of 49 technologies for such Transfer of Technology. Recently, Bharat Dynamics Limited (BDL) and Thales have signed a Teaming Agreement on January 13, 2021 to facilitate manufacture of Starstreak Air Defence System in India. It will qualify under the 'Make in India' programme to provide opportunity for BDL to offer it to the Indian Armed Forces with a minimum of 60 per cent indigenous content, as well as Design and Development of the system.

Some of the challenges constraining the growth of Indian aerospace industry include lack of raw materials being manufactured in India, which meet global aerospace standards. Therefore, currently the projects available to Indian manufacturers are low on technology and most of them are for structural assemblies and parts. Several initiatives have also been announced to encourage the production of aerospace-grade raw material in India, simplifying the procedure for their approval and encouraging the machine tool industry to produce the state-of-the-art machines. As a strategy it is now important to integrate the physical knowledge of an aviation system with digital capabilities like Industry 4.0, additive manufacturing and predictive analytics to reap the aviation technology growth in India. ●



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