



DAY 1



FEBRUARY 5, 2020





PUBLISHED BY



DEFEXPO 20 OPENS TODAY

CURTAIN RAISER FEBRUARY 4 | LUCKNOW



aksha Mantri Rajnath Singh said that the huge participation of foreign countries and exhibitors in the DefExpo 2020, to be held at Uttar Pradesh capital Lucknow from February 5-9, 2020, reflects India's growing might in the international arena where the world listens to it and powerful nations take pride in marching in step with New Delhi.

He said the participation in such a large number is not merely a business endeavour and that is the reason why every new edition of DefExpo breaks all its previous records. A large country like India cannot depend on imported arms and aspire to become a global superpower. Raksha Mantri said that Government's aim is to develop a vibrant and world class domestic defence industry to reduce dependence on imports and India becomes self-reliant in defence production.



"आज जब हम विश्व की आर्थिक महाशक्ति बनने का सपना देख रहे हैं, मेरा मानना है कि डिफेंस सेक्टर इसमें एक महत्वपूर्ण भूमिका निभाएगा। भारत जैसा विशाल और ग्लोबल प्रोमिनेंस वाला देश इम्पोर्टेड आर्म्स पर निर्भर नहीं रह सकता। हम भारत को 5 ट्रिलियन डालर की अर्थव्यवस्था बनाना चाहते हैं" -रक्षा मंत्री राजनाथ सिंह

PRIME MINISTER NARENDRA MODI TO **INAUGURATE DEFEXPO 2020**



CURTAIN RAISER DEFEXPO 20 - BIGGER & BETTER THAN EVER!

SPECIAL STORY **BIG ANNOUNCEMENTS, GOVT-TO-GOVT** AGREEMENTS SLATED FOR DAY 3

SPECIAL INTERVIEW DR G. SATHEESH REDDY, SECRETARY, DEPARTMENT OF DEFENCE R&D AND CHAIRMAN, DRDO

SPECIAL INTERVIEW CMDE SIDDHARTH MISHRA (RETD), CMD, BHARAT DYNAMICS LIMITED

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UNDER THE LEADERSHIP OF DEFENCE MINISTER RAJNATH SINGH THIS YEAR'S DEFEXPO WILL BE THE LARGEST EVER.

DEFEXPO 20 - BIGGER & BETTER THAN EVER!

🔩 AYUSHEE CHAUDHARY

fter the tremendous response and success of the 10th edition of DefExpo held in 2018, the biennial event is back with its 11th edition. DefExpo 2018, for the first time projected India's Defence manufacturing capabilities to the world is reflected in the tagline for the Expo, 'India: The Emerging Defence Manufacturing Hub'. While endorsing India as a defence exporter and showcasing the strengths of India's substantial public sector, it also uncovered the nation's growing private industry and spreading MSME (Ministry of Micro, Small and Medium Enterprises) base for components and sub-systems.

In the previous edition, 702 companies participated. However, the number of companies registered for participating in this year's edition of the biennial mega defence exhibition, DefExpo 2020, has already reached 1,000. Thus, it has become by far the biggest ever DefExpo to be held in India.

Organised at Uttar Pradesh's capital, Lucknow, from February 5 to February 9, 2020, the number of participating foreign companies has also increased this year to 165 from the previous figure of 160.

This year DefExpo is positioned to see larger participation of defence manufacturers from both the public and private sectors, Original Equipment Manufacturers (OEMs) and MSMEs. A substantial number of Memoranda of Undertaking (MoUs) are also expected to be inked during the Expo. The DefExpo 2020 has participation from more than 70 countries and is in line with the biggest of the international defence exhibitions.

Determined to let the world witness the defence capabilities of India, the theme of the Expo remains 'India: The Emerging Defence Manufacturing Hub'. The aim is to bring the leading technologies in the defence sector under one roof and provide a myriad of opportunities for the government, private manufacturers, and startups. The theme of the Expo remains 'India: The Emerging Defence Manufacturing Hub'. The aim is to bring the leading technologies in the defence sector under one roof and provide a myriad of opportunities for the government, private manufacturers, and startups.

The sub-theme of the exhibition is 'Digital Transformation of Defence' to highlight the future digitalization of the industry and align with the concept of the future battlefield. Manufacturing for the aerospace and defence sector through the application of newer technologies is also being focused. In addition to exhibiting products and technologies, Defence Public Sector Undertakings (DPSUs) and industry are showcasing the land, naval, air and internal security systems.

To enable this, for the first time the DefExpo app was released by Raksha Mantri Rajnath Singh on December 27, 2019, which is available on Apple App Store and Android Play Store. The main features of the app are to 'inform, engage and feedback'. It provides detailed information about the day-to-day events; participating exhibitors; DPSUs, guest speakers of seminars/webinars; publications i.e., electronic brochures and e-books; maps and directions of the venues and city weather.

"The government has recognized that there's a growing importance of the digital era and the emergence of disruptive technologies in the digital space.

This year's expo will focus on bringing to the forefront of digital advances in the industry and provide a platform for drivers of such change to come together and discuss innovative trends that are currently taking place," said Jayant Singh, a senior investment specialist, during a webinar conducted on 'DefExpo 2020 and Investment Opportunities in Defence Sector' as part of the upcoming exhibition.

According to the Ministry of Defence (MoD), the DefExpo is also providing an opportunity to the major foreign OEMs to collaborate with the Indian defence industry and promote Make in India. The presence of 'India Pavilion' is exclusively exhibiting the collaboration and cooperation between the public and private sector, including Small and Medium Enterprises (SMEs), MSMEs and innovation eco-system, which is the key to the way forward.

Continued on page 4...

BIG ANNOUNCEMENTS, GOVT-TO-GO AGREEMENTS **SLATED FOR DAY 3**

India-Africa Defence Conclave to be a highlight in the largest edition of DefExpo



THE DEFENCE SECRETARY, DR AJAY KUMAR BRIEFING THE MEDIA ON DEFEXPO 2020, IN NEW DELHI ON JANUARY 31, 2020

VISHAL THAPAR

rime Minister Narendra Modi will inaugurate the 11th edition of DefExpo 2020, India's premier biennial Land, Naval and Homeland Security Systems exhibition at Lucknow on February 5.

Showcasing India as the Emerging Defence Manufacturing Hub, with 'Digital Transformation of Defence' as its special theme, the 11th edition of DefExpo will its largest ever, with participation from over 60 countries, 40 of which will be represented by Ministerial delegations at the five-day event.

"Defence Ministers of nearly 40 countries, including Russia, South Korea, UAE, UK, Czech Republic and Mexico have confirmed their participation," Defence Secretary Ajay Kumar declared ahead of the inaugural at a press conference in New Delhi on January 31.

The presence of over 1,000 exhibitors - including 165 foreign companies marks a growth over 40 per cent in participation since the 10th edition of Def-Expo in 2018, in which the number of exhibitors was 702.

The exhibition area has almost doubled. At Lucknow, over 53,000 sq metres of exhibition space has been booked as compared to 27,000 square metres during the previous edition, marking a jump of 96 per cent.

"Projection of continuity, leadership of the Defence Minister, India's geopolitical positioning and its enhanced stature globally is reflected in the growing interest in DefExpo," the Defence Secretary said.

A big highlight of the event will be the first ever India-Africa Defence Conclave, which will be organised in collaboration with India's Ministry of External Affairs on February 6, the second day of DefExpo 2020. Of the 24 Defence Ministers from African countries who expressed interest, 14 have confirmed participation and the number is likely to go up. Over 30 African countries will be represented at the event.

"This will be the largest ever Defence Ministers Conclave organised by India. Defence is increasingly an important component in India's close ties with African countries. This will be a good opportunity to intensify it. There will be focused interaction at this ministerial conclave," Dr Kumar said.

Major announcements, signing of MoUs and launch of products is scheduled for February 7 in the presence of Defence Minister Rajnath Singh and UP Chief Minister Yogi Adityanath at an event branded 'Bandhan'. Government-to-Government agreements and Transfer of Technology announcements and Business to Business agreements will be part of the announcements, which will be of a scale "much larger than what has been signed (at a similar event) in the past", the Defence Secretary said.

A special effort will be made to project policy incentives to promote the UP Defence Industrial corridor. Tours will be organised to the designated corridor for prospective investors.

Nineteen business and technical seminars will be organised, 15 of these by various Indian Industry Chambers including CII, FICCI, PHD Chambers of Commerce and ASSOCHAM. The seminars will focus on building up of a defence industrial complex to cater to the future of warfare. In keeping with the theme of DefExpo2020 'Digital Transformation of Defence' the subjects at these seminars include artificial intelligence, robotics, Internet of Things (IoTs), drones and wired warrior.

Live demonstrations of military equipment will be organised at the Exhibition site and on the Gomti riverfront. Sail boats will be exhibited in the Gomti. Flypasts are also slated for the event. The Exhibition will be open for public viewing free of charge on February 8 and 9. Five thousand students from technical colleges across Uttar Pradesh have been invited on the business days from February 5 to 7 to generate interest.

Cash prizes of up to ₹100,000 are up for grabs in an Instagram photo competition during the business days.

... continued from page 3

A significant Uttar Pradesh (UP) Pavilion is also present at the DefExpo venue. This year's DefExpo also has the first-ever 'India-Africa Defence Ministers Conclave' which is being organized jointly with the Ministry of External Affairs. 30 African countries are expected to participate, targeting greater defence cooperation with the African nations

The show will also be marked with numerous attractions such as:

- Live demonstrations of the services, DPSUs, and industry showing the land, naval, air and internal security systems in action. A live demonstration will be held at two locations viz, one at the exhibition site and the other at the Gomati riverfront.
- Business seminars are being organised by both international and Indian Industry chambers viz. Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce & Industry (FICCI), PHD Chamber of Commerce and Industry, National Skill

This year's DefExpo also has the first-ever 'India-**Africa Defence Ministers** Conclave' which is being organized jointly with the Ministry of External Affairs. 30 African countries are expected to participate, targeting greater defence cooperation with the African nations.

Development Corporation (NSDC), US-India Business Council (USIBC), US-India Strategic Partnership Forum (USISPF), etc. The seminar topics are futuristic and include discussions on artificial intelligence, robotics, Internet of Things (IoT), drones, wired warrior, etc.

The UP government has organised several cultural programmes showcasing the rich cultural heritage of the northern state. A unique experience for the visitors is planned at the Tent City, which has been especially erected at the venue.

Ministerial-level delegations from foreign countries and visitors from all over the country as well as all over the globe are visiting the DefExpo 2020 and witness India's emergence as a major manufacturing a hub providing attractive opportunities for co-development and co-production of defence equipment and systems not only for our defence forces but also for export to the world.

"Projection of continuity, leadership of the **Defence Minister, India's** geo-political positioning and its enhanced stature globally is reflected in

DefExpo." **Defence Secretary**

the growing interest in

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C-390 MILLENNIUM READY FOR THE MISSION

It's been a few months since the C-390 MILLENNIUM airlifters started serving the Brazilian Air Force, fulfilling the missions for which they were designed with complete success, and in the coming months more units will join the service. At the same time, the Portuguese Government signed a contract for the acquisition of five units to be operated by the Portuguese Air Force. This is a significant moment in the C-390 MILLENNIUM program, marking its Entry Into Service and the confirmation of the aircraft's operational effectiveness within NATO. The combination of 21st century, state-of-the-art advanced systems and proven engines, in conjunction with a worldwide sustainment alliance of reputable suppliers, makes the C-390 MILLENNIUM the most reliable, easy to operate and efficient aircraft in its class.



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SPECIAL INTERVIEW





Question (Q): What is DRDO showcasing at DefExpo 2020?

Answer (A): Defence Research and Development Organisation (DRDO) is dedicated to the research and development of defence systems for the nation's armed forces. DefExpo is right platform for DRDO to showcase its state-of-the-art products incorporating the latest that technology has to offer. DRDOs extensive products and systems range from aircrafts, radars, sonars, missiles to space.

In aerospace category, DRDO will be displaying LCA Mk II, AMCA, AEW&C, Indian AWACS, Aero Engines, Tapas UAV and various avionics systems as well as indigenous parachute systems. In the arena of missiles, on display will be all types of SAMs, AAMs, ATGMs, ARMs and ASMs. The various types of radars on display will include long range surveillance radars, fire control radars for missiles and guns, AESA for aircrafts and ship based AESA.

In the area of navigation systems, RLG, FOG and MEMS based sensors and systems will be on display.

Additionally, equipment and products such as radar warning receivers, EW suites, SDR and SATCOM communication equipment, security systems, robotic systems, sonars, torpedoes, cooled and uncooled

EO sensors, tracking systems, laser warning systems, dazzlers and seekers are being showcased.

Apart from these telemedicine, high altitude agro products, nuclear and chemical sensors, survival kits for soldier and air warriors also being shown.

Overall, it would be quite informative to visit the DRDO pavilion and know the efforts of DRDO laboratories towards meeting the requirements of the defence forces through self-reliance.

Q: What are three major recent 'Make in India' success stories driven by DRDO?

A: The success story of 2019 is the anti-satellite technology demonstrator 'Mission Shakti,' where we could destroy a LEO satellite using hit to kill vehicle technology. 2019 also witnessed the completion of the Final Operational Clearance (FOC) for LCA Tejas. Numerous successful development trials were carried out for systems such as Astra, ATAGs, QRSAM and guided Pinaka. Guided Pinaka demonstrated enhanced range salvo firing and achieved high levels of accuracy. The Radars and EW systems for the IAF and IN have been success stories in recent times. In the offing are many more achievements.

Q: Which are the key technologies for which the DRDO is open to development collaborations or Industrial/OEM participation in such areas as Drone Swarming & Counter-Swarming, Electric Propulsion, EMALS and Directed Energy Weapons?

A: DRDO has established Centers of Excel-



(TOP) LCA MK II FIGHTER PROTOTYPE; (ABOVE) THE NETRA AEW&CS AIRCRAFT.

DRDO HAS GIVEN DEFINITE EDGE TO THE COUNTRY IN POSSESSING INDIGENOUS CAPABILITY IN DEFENCE TECHNOLOGIES

In conversation with **Dr G. Satheesh Reddy**, Secretary, Department of Defence R&D and Chairman, DRDO

lence in niche areas of advance defence technologies at IITs Delhi, Chennai, Mumbai, University of Jammu, Jadavpur University, Mizoram, Hyderabad and Coimbatore. Prime Minister has recently dedicated five Young Scientist Laboratories (YSL), working in the areas of Quantum computing, Artificial Intelligence, Smart Materials, Sensors and Asymmetric Technologies. These labs are going to collaborate with academia, industry and start-ups in a major way. The technologies mentioned by you are being researched by the YSLs and other DRDO labs with involvement collaboration. DEW work is already taken up by DRDO.

Q: The first flight of the AMCA is targeted for 2024-25, and recent validation of capabilities by LCA Navy appears to have set the stage for the development of a Twin-Engine Deck-Based Fighter. Which areas or systems have been identified for development cooperation in combat aircraft systems?

A: We have established expertise in aerodynamic design and validation. We have demonstrated capability to develop avionics and software, cockpit systems and

weapon interfaces. We will be partnering with a major engine house for engine development. We are in the process of working with academia for model characterization and mathematical modeling. The bottom-line is to have capabilities inhouse for all system related requirements.

Q: What are the three biggest initiatives taken by DRDO in the last few years?

A: First is the development of next generation systems. Over the years DRDO has been successful in developing a wide range of missile systems catering to the varied needs of the tri services. DRDO has now launched programs to achieve self reliance in the areas of next generation of missiles, radars, EW systems and torpedoes.

The second major initiative is related to the induction and streamlining of policies related to the ToT with the industries. DRDO has been striving for indigenisation of defence equipment and systems for the country. In this direction, indigenous BMD system and indigenous fighter aircraft development are success stories which very few countries have.

Third is renewed involvement of academia as well as young minds in the research advancement for next generation technologies. DRDO has established Young Scientists Laboratories headed by young directors to spearhead new avenues of research in addition to opening centers of excellence leveraging the experience of academia. We are encouraging the young as well as the experienced to take us forward.

These initiatives taken by DRDO has given definite edge to the country in possessing indigenous capability in defence technologies.

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Φ

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SPECIAL INTERVIEW





BHARAT DYNAMICS LIMITED – IN THE FOREFRONT OF EMERGING TECHNOLOGIES

Cmde Siddharth Mishra (Retd), Chairman and Managing Director, Bharat Dynamics Limited talks about their participation at DEFEXPO 2020 and elaborates on the use of latest technologies for future growth



(LEFT) MEDIUM RANGE SURFACE-TO-AIR-MISSILE BEING HANDED OVER BY RAKSHA MANTRI RAJNATH SINGH; (RIGHT) VARUNASTRA OR HEAVY WEIGHT TORPEDO.

SP's Team (SP's): What is unique about BDL's participation in Defexpo – 2020 ? Cmde Siddharth Mishra (Mishra): BDL will be launching its next product, the Amogha-III which is a 3rd Generation Anti-Tank Guided Missile which is displayed at the DefExpo 2020.

Varunastra or the Heavy Weight Torpedo manufactured by BDL will be handed over to the Indian Navy. Varunastra has been designed and developed by NSTL, DRDO.

BDL has its largest-ever display of its products for its visitors at DefExpo 2020 showcasing various products under different categories namely Guided Missiles Weapon System and associated equipment, Underwater Weapons, Air borne products, Ground Support Equipment and Refurbishment and Life Extension of Missiles. Also for the first time, BDL will be displaying models of Chatbot, Industry 4.0 and Amogha-III at the DefExpo.

BDL will be entering into MoUs with various Companies in areas of mutual interests.

SP's: Which are the companies with which BDL plans to enter into MoUs during Defexpo ?

Mishra: During Defexpo BDL will be entering into MoUs with various organizations such as Naval Group France, ROXEL France, IIT, Kanpur, Javelin Joint Venture, comprising Raytheon, USA and Lockheed Martin USA, JSC Almaz Antey Air & Space Defence Corporation, Russian Federation, and HEMRL, Pune, DRDO.

SP's: How is BDL utilizing Artificial Intelligence based technology for development of Next Generation Weapons? What measures are being taken up in this direction ?

Mishra: Effective utilization of AI based technology for the Next Generation Weapons is a priority for the Company. BDL has started undertaking development of products for the Armed Forces with AI Technologies with active participation of start-ups.

BDL has entered into MoU with International Institute of Information Technology (IIIT), Hyderabad for joint development of AI technologies for products developed at BDL. The MoU envisages setting up of an exclusive 'Centre of Excellence for Artificial Intelligence in Missile Technology.' The Centre of Excellence will function as an AI Laboratory for BDL, building an understanding of BDL's products and business within the IIIT, Hyderabad's research groups.

As per the MoU, BDL and IIIT, Hyderabad will take about five AI projects a year, in both software and hardware segments, covering missiles, manufacturing, inspection and allied areas.

SP's: How is BDL doing in the export front?

Mishra: BDL is aggressively promoting its products in the international market with an aim to expand its footprints globally. The Akash surface-to-air missiles, Light Weight Torpedoes, Heavy Weight Torpedoes, MILAN-2T, Counter Measures Dispensing Systems and Konkurs – M have been identified for export to friendly foreign countries. A lot of foreign countries have evinced interest in our products. BDL is currently executing its export order for supply of Light Weight Torpedoes to a friendly foreign country.

SP's: What is BDL doing towards Innovation?

Mishra: Thrust is being given to Innovation by the in-house R&D Division of the Company. BDL is encouraging start-up companies to participate in its innovation programmes. This is being done in association with the Government of India's Ministry of Defence's wing, iDEX (Innovation for Defence Excellence) and the T- Hub set up by the Government of Telangana.

SP's: What will be BDL's thrust areas in the near future ?

Mishra: This year, BDL is celebrating 50 years of its service to the Nation. The Company has a rich experience in defence production with state- of- the-art manufacturing facilities. In the coming years, BDL's thrust will be to persistently pursue the 'Make in India' programme by continuing to invest in infrastructure, automate its production lines, adopt continual process improvement, enhance in-house R&D efforts, bring in new generation technology to manufacture missiles and underwater weapons, leverage experience to develop new indigenous products and increase its export revenue.

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SPECIAL FOCUS





INNOVATIONS FOR DEFENCE EXCELLENCE (iDEX)

Innovations for Defence Excellence (iDEX) was launched by the Government in April 2018, with the aim to create an ecosystem to foster innovation and technology development in Defence and Aerospace industries. Engaging MSMEs, start-ups, individual innovators, R&D institutes & academia, and providing them with grants/funding and other support to carry out R&D which would catalyse their future participation addressing Indian defence and aerospace needs would be part of iDEX agenda.

iDEX will be funded and managed by 'Defence Innovation Organisation (DIO)' which has been formed as a 'not for profit' company by the two founder members i.e. Defence Public Sector Undertakings (DPSUs) - HAL & BEL. iDEX will function as the executive arm of DIO, carrying out all the required activities while DIO will provide high level policy guidance to iDEX. This is the first part of a 3-part series detailing the objectives and activities of iDEX.



DEFENCE MINISTER RAJNATH SINGH RELEASING THE 'COMPENDIUM OF IDEX GUIDELINES', AT THE 'DEF-CONNECT' UNDER THE AEGIS OF INNOVATIONS FOR DEFENCE EXCELLENCE (IDEX), IN NEW DELHI ON NOVEMBER 11, 2019. THE DEFENCE SECRETARY, DR AJAY KUMAR, THE SECRETARY (DEFENCE PRODUCTION), SUBHASH CHANDRA AND THE SECRETARY (DEFENCE FINANCE) GARGI KAUL ARE ALSO SEEN.

INTRODUCTION

India is the world's largest defence equipment importer and is expected to spend around USD 220 billion in the coming decade to modernise its armed forces. One of the major aims of India as a nation is to achieve self-reliance in the field of defence and defence production. In the recent years, the Government of India has initiated various schemes like 'Make in India', Startup India, Atal Innovation Mission (AIM), etc. to encourage innovation and entrepreneurship in the Indian commercial ecosystem, which includes higher manufacturing in defence. It is increasingly evident that achieving the goal of self-sufficiency for the Indian military will require a means to incorporate innovation rapidly in the weapons procurement process.

The rates of adoption of innovation for different sectors vary, due to several factors such as applicability, absorption capability of the systems, etc. A special effort is required to reach out and engage the smaller enterprises, start-ups and innovators, which have the flexibility and adaptability to supply the Indian military with innovative and ingenious technological solutions. Such a system will be needed to encourage development of innovative technologies for the defence sector by roping in the nation's industry, start-ups, MSMEs, R&D institutes, academia and even the individual inventors.

These details covers the objective and scope of the Defence Innovation Fund (DIF), steps involved in implementation of DIF and the roadmap for creating an innovation ecosystem for defence called the **Innovations for Defence Excellence** (iDEX), through funding, guidance, handholding, customer engagement, and facilitation. The document gives a brief of the funding mechanism for the Organisation, the Fund, its Program Management and top level institutional arrangement at MoD for this initiative.

OBJECTIVES, FUNCTIONS, AND ACTIVITIES

The establishment of Defence Innovation Fund (DIF) and iDEX is at creation of an ecosystem to foster innovation and technology development in Defence and Aerospace by engaging Industries including MSMEs, start-ups, individual innovators, R&D institutes and academia and provide them grants/funding and other support to carry out R&D development which has good potential for future adoption for Indian defence and aerospace needs.

The **core objectives** of setting up the Defence Innovation Fund are to:

Facilitate rapid development of new, indigenised, and innovative technolo-

gies for the Indian defence and aerospace sector, to meet needs for these sectors in shorter timelines

Create a culture of engagement with innovative startups, to encourage cocreation for defence and aerospace sectors

Empower a culture of technology co-creation and co-innovation within the defence and aerospace sectors.

- Adoption of innovation requires execution of three critical functions:
- Co-Innovation/co-creation Discovery and exploration of existing technologies, or development of relevant technologies
- Piloting of candidate technologies in important platforms, with quick feedback to the innovators
- **Indigenisation** of various defence and aerospace related platforms being manufactured in the country based on ToT

The iDEX structure shall perform all these three functions, in partnership with other competent stakeholders. iDEX functions as the executive arm of DIO, carrying out all the required activities. To execute the above functions, the iDEX team undertakes the following activities:

Setting up and managing of the iDEX network in form of Independent Defence Innovation Hubs.

Communicate with innovators/startups through the Defence Innovation Hubs regarding defence and aerospace needs.

Organising various **challenges/hackathons** to shortlist potential technologies for defence and aerospace use.

Evaluate technologies and products coming from innovators/startups in terms of their utility and impact on the Indian defence and aerospace setup.

Enable and fund pilots, using innovation funds dedicated to the purpose. Interface with the military (Army/Navy/Airforce) top brass about key innovative technologies and encourage their adoption into the defence establishment with suitable assistance (financial if required).

Facilitate scale-up, indigenisation and integration in manufacturing facilities for successfully piloted technologies.

The Defence Innovation Organisation with its iDEX team enables creation of channels for innovators to engage and interact with the Indian defence production industry. The long-term effect to be realised by the group is establishment of a culture, where enlisting the effort of innovators by the Indian military is commonplace and frequent.

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INDIGENOUS QRSAM

The indigenous Quick Reaction Surface to Air Missile System (QRSAM) developed by the DRDO was successfully flight tested on December 23, 2019 from the Integrated Test Range in Odisha's Chandipur. The missile was tested with full configuration in deployment mode intercepting the target in midair and meeting mission objectives. The entire event was monitored by Ground Telemetry Systems, Range Radar Systems, Electro Optical Tracking System, etc. The QRSAM weapon system, which operates on the move, comprises of fully automated Command and Control System, Active Array Battery Surveillance Radar, Active Array Battery Multifunction Radar and Launcher. Both radars are fourwalled having 360-degree coverage with search on move and track on move capability. The system is compact with minimum number of vehicles for a firing unit. Single stage solid propelled missile has midcourse inertial navigation system with two-way data link and terminal active seeker developed indigenously by DRDO.

The missile successfully engaged the aerial target establishing its capability. With this mission, the developmental trials of the weapon system are successfully completed and the weapon system is expected to be ready for induction by 2021. It is an all-weather, all-terrain SAM equipped with electronic counter measures against jamming by aircraft radars. The missile can be mounted on a truck and is stored in a canister. The solid-fuel-propellant has a range of 25-30 km. It has the capability to search and track targets while moving.

The missile was developed by DRDO in association with Bharat Electronics Limited (BEL) and Bharat Dynamics Limited (BDL) with both firms participating in development and manufacturing. DRDO's other labs including RCI, R&D Engineers and ITR are also contributing to the missile development effort.

The first test firing of the QRSM missile took place on June 4, 2017. This was followed by the second successful test on July 3, 2017, also conducted from Chandipur, Odisha. The third test of the QRSM was conducted on December 22, 2017. The fourth test of the QRSAM was conducted on October 8, 2018 which report-



QRSAM SYSTEM DEVELOPED BY DRDO SUCCESSFULLY FLIGHT-TESTED FROM INTEGRATED TEST RANGE, CHANDIPUR OFF THE ODISHA COAST ON DECEMBER 23, 2019.

edly was successful. The fifth test conducted on February 26, 2019 was also successful. The sixth test was successfully conducted on August 4, 2019 at 1105 am from a mobile truck-based launcher at the launch complex-3 of the Integrated Test Range (ITR) at Chandipur. The test conducted on December 23, 2019 was the seventh test of the QRSAM, successful completion of which development phase of the missile system has been completed.

UPGRADED PINAKA ROCKET SYSTEM

n December 19-20, 2019, the upgraded version of Pinaka guided rocket system was successfully testfired to a range of 90 km from the Integrated Test Range, Chandipur, off the Odisha coast. The missile system has been jointly developed by various Defence Research and Development Organisation (DRDO) laboratories. The mission achieved all the objectives including enhancing the range, accuracy and sub-system functionality. The flight was tracked by multiple range systems like telemetry, radars, electro-optical targeting system (EOTS), etc, which confirmed the textbook flight performance.

The Pinaka Mk-II rocket is modified as a missile by integrating with the navigation, control and guidance system to improve the end accuracy and enhance the range. The navigation system of the missile is also aided by the Indian Regional Navigation Satellite System (IRNSS) termed NAVIC. The upgraded Pinaka Mark-II missile system is capable of striking into an enemy territory up to a range of 90 km with high precision, compared to Pinaka Mark-I which has a maximum range of 40 km.

Pinaka is a complete MBRL system, each Pinaka battery consists of: six launcher vehicles, each with 12 rockets; six loader-replenishment vehicles; three replenishment vehicles; two Command Post vehicles (one stand by) with a Fire Control computer, and the DIGICORA MET radar. A battery of six launchers can neutralise an area of 1,000 m × 800 m. All of the 72 rockets can be fired in 44 seconds. Each

launcher can fire in a different direction too. The system has the flexibility to fire all the rockets in one go or only a few.

The launcher can operate in autonomous mode, stand-alone mode, remote mode or manual mode. Pinaka MBRL System was tested during the Kargil Conflict and the first Pinaka regiment was raised in February 2000. The Army had reportedly placed intent for Pinaka Weapon System worth ₹1,300 crore. On October 29, 2015, the Defence Acquisition Council (DAC) chaired by the Defence Minister, cleared purchase of two more Pinaka regiments at a cost of ₹3,300 crore. On March 18, 2016, the Cabinet Committee on Security (CCS) cleared the purchase of two additional Pinaka regiments. On March 7, 2016, the CCS cleared an order



THE DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO) SUCCESSFULLY FLIGHT TEST OF TWO PINAKA MISSILES FROM ITR, CHANDIPUR, ODHISA ON DECEMBER 20, 2019.

of additional six Pinaka Regiments to augment the four regiments cleared earlier.

The Pinaka is in the process of further improvement. The Israel Military Industries (IMI) is teamed up with DRDO to implement its Trajectory Correction System (TCS) on the Pinaka, for further improvement of its CEP, trials of which are ongoing. The rockets can also be guided by GPS to improve their accuracy. Additionally, DRDO's ARDE and partner organisations are launching a project to develop a long-range MRL, similar to the 'Smerch'; a rocket for the Pinaka MBRL that can carry a 250 kg payload to a distance of 120 km. The Pinaka Mark-II with 90 km range provides greater punch to Indian Artillery. The rocket under development carrying 250 kg payload to a distance of 120 km will boost it further.



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डेफएक्सपो 2020 - रक्षा क्षेत्र में अब तक का बड़ा और बेहतरीन आयोजन!

दुनिया आए दिन हो रहे डिजिटल बदलाव का गवाह बन रही है। एक्सपो का उप-विषय भी "डिजिटल ट्रांसफॉर्मेशन ऑफ डिफेंस" है, जो रक्षा उद्योग के भविष्य के डिजिटल स्वरूप को उजागर करता है।

🖢 आयुषी चौधरी

ल 2018 में हुए डेफएक्सपो के 10वें संस्करण की जबरदस्त सफलता के बाद यह द्विवार्षिक आयोजन अपने 11वें संस्करण के साथ फिर से अपनी जोरदार उपस्थिति दर्ज करा रहा है। डेफएक्सपो 2018 ने "इंडियाः द इमर्जिंग डिफेंस मैन्युफैक्चरिंग हब" की टैगलाइन के साथ पहली बार दुनिया के सामने भारत की रक्षा विनिर्माण क्षमताओं को प्रदर्शित किया था। यह आयोजन भारत को एक रक्षा निर्यातक के रूप में स्थापित करने और यहां के पर्याप्त सार्वजनिक क्षेत्र की क्षमताओं को उजागर करने की दिशा में मील का पत्थर साबित हुआ। इस आयोजन ने देश के बढ़ते निजी उद्योगों के साथ—साथ सूक्ष्म, लघु व मध्यम उद्यमों को मुख्य घटकों और उप—प्रणालियों के रूप में प्रदर्शित किया।

डेफएक्सपो के पिछले आयोजन में 702 कंपनियों ने भागीदारी की थी। हालांकि, इस साल हो रहे द्विवार्षिक मेगा रक्षा प्रदर्शनी डेफएक्सपो 2020 में भाग लेने के लिए करीब 1,000 कंपनियों ने पंजिकरण कराया है। इस प्रकार, यह भारत में होने वाला अब तक का सबसे बड़ा डेफएक्सपो बन गया है। इस बार यह आयोजन उत्तर प्रदेश की राजधानी लखनऊ में हो रहा है। इस साल डेफएक्सपो में भाग लेने वाली विदेशी कंपनियों की संख्या भी 160 से बढ़कर 165 हो गई है। डेफएक्सपो में सार्वजनिक और निजी दोनों क्षेत्रों, ऑरिजिनल इक्विपमेंट मैन्युफैक्चरर्स (ओ.ई.एम.) और सूक्ष्म, लघु व मध्यम उद्यमों (एम.एस.एम.ई.) से रक्षा निर्माताओं की बडी भागीदारी देखने को मिल रही है।

एक्सपो के दौरान पर्याप्त समझौता ज्ञापनों (एम.ओ.यू.) को भी शामिल किए जाने की उम्मीद है। डेफएक्सपो 2020 में 70 से अधिक देश भागीदारी कर रहे हैं। इस तरह यह एक बड़ी अंतरराष्ट्रीय रक्षा प्रदर्शनी साबित हो रही है। दुनिया को भारत की रक्षा क्षमताओं का गवाह बनाने के लिए संकल्पित इस एक्सपो का विषय "इंडियाः द इमर्जिंग डिफेंस मैन्युफैक्चरिंग हब" है। इसका उद्देश्य रक्षा क्षेत्र में अग्रणी प्रौद्योगिकियों को एक छत के नीचे लाना और सरकार का निजी निर्माताओं व स्टार्टअप्स के लिए बेशुमार अवसर प्रदान करना है।

इस एक्सपो का उप–विषय "डिजिटल ट्रांसफॉर्मेशन ऑफ डिफेंस" है, जो रक्षा उद्योग के भविष्य के डिजिटल स्वरूप को उजागर करता है। साथ ही भविष्य की युद्ध भूमि की अवधारणा को रेखांकित करता है। इस प्रदर्शनी में नई प्रौद्योगिकियों के अनुप्रयोग के माध्यम से एयरोस्पेस और रक्षा क्षेत्र के लिए विनिर्माण पर भी ध्यान केंद्रित किया जा रहा है। उत्पादों और प्रौद्योगिकियों के प्रदर्शन के अलावा, रक्षा सार्वजनिक क्षेत्र के उपक्रम (डी.पी.एस.यू.) और उद्योग थलसेना, नौसेना, वायुसेना और आंतरिक सुरक्षा प्रणालियों का भी प्रदर्शन किया जा रहा है।

इस आयोजन को डिजिटल बनाने की दिशा में पहली बार रक्षा मंत्री राजनाथ सिंह ने 27 दिसंबर, 2019 को डेफएक्सपो ऐप जारी किया था, जो ऐपल ऐप स्टोर और एंड्रॉयड प्ले स्टोर पर उपलब्ध है। ऐप की मुख्य विशेषताएं "सूचित करना, संलग्न करना और प्रतिक्रिया देना" हैं। यह रोजाना की घटनाओं के बारे में विस्तृत जानकारी प्रदान करता है। इस पर भाग लेने वाले प्रदर्शकों, डी.पी.एस.यू., सेमिनार / वेबिनार के अतिथि वक्ताओं, प्रकाशन यानी इलेक्ट्रॉनिक ब्रोशर व ई–बुक्स, आयोजन स्थल का मैप व दिशाओं के अलावा शहर के मौसम की जानकारियां भी उपलब्ध हैं।

वरिष्ठ निवेश विशेषज्ञ जयंत सिंह ने "डेफएक्सपो 2020 और रक्षा क्षेत्र में निवेश के अवसर" विषय पर पूर्व में आयोजित एक वेबिनार में कहा था, सरकार का भी मानना है कि डिजिटल युग का महत्व बढ़ता जा रहा है। डिजिटल क्षेत्र में तमाम आधुनिक प्रौद्योगिकियों का आविष्कार हो रहा है। उन्होंने कहा था कि इस वर्ष एक्सपो में रक्षा उद्योग में डिजिटल संसाधनों को आगे लाने पर ध्यान केंद्रित किया जाएगा। साथ ही इस तरह के बदलाव के पक्षधरों को एक साथ लाने और वर्तमान में होने वाले अन्वेषणों के रुझानों पर चर्चा करने के लिए एक मंच प्रदान किया जाएगा।

रक्षा मंत्रालय के अनुसार, डेफएक्सपो विदेशी ऑरिजिनल इक्विपमेंट मैन्युफैक्चरर्स (ओ.ई.एम.) को भारतीय रक्षा उद्योग के साथ सहयोग करने और मेक इन इंडिया को बढ़ावा देने का एक अवसर प्रदान कर रहा है। "इंडिया पवेलियन" की उपस्थिति लघु व मध्यम उद्यमों (एस.एम.ई.), एम.एस.एम.ई. और इनोवेशन इको–सिस्टम सहित सार्वजनिक और निजी क्षेत्र के बीच विशेष रूप से सहयोग और सहयोग प्रदर्शित कर रही है, जिससे आगे की राह प्रशस्त होगी।



रक्षा मंत्री राजनाथ सिंह

डेफएक्सपो में यूपी पैवेलियन भी है। डेफएक्सपो में पहली बार भारत–अफ्रीका के रक्षा मंत्रियों का एक कॉन्क्लेव भी होने जा रहा है, जिसे विदेश मंत्रालय के साथ संयुक्त रूप से आयोजित किया जा रहा है। प्रदर्शनी में करीब 30 अफ्रीकी देश भाग ले रहे हैं। इस दौरान अफ्रीकी देशों के साथ अधिक से अधिक रक्षा सहयोग पर समझौते की उम्मीद है।

इस रक्षा प्रदर्शनी के आकर्षणों में शामिल हैः

- थलसेना, नौसेना, वायुसेना और आंतरिक सुरक्षा प्रणालियों को दिखाने वाली सेवाओं का प्रदर्शन होगा। लाइव प्रदर्शन दो स्थानों पर आयोजित किया जाएगा। एक प्रदर्शनी स्थल पर और दूसरा गोमती रिवरफ्रंट पर।
- अंतर्राष्ट्रीय और भारतीय उद्योग मंडलों द्वारा व्यावसायिक सेमिनार का आयोजन भी होगा। इनमें कन्फेडरेशन ऑफ इंडियन इंडस्ट्री (सी.आई.आई.), फेडरेशन ऑफ इंडियन चैंबर्स ऑफ कॉमर्स एंड इंडस्ट्री (फिक्की), पी.एच.डी. चैंबर ऑफ कॉमर्स एंड इंडस्ट्री, नेशनल स्किल डेवेलपमेंट कॉर्पोरेशन (एन.एस.डी.सी.), यू.एस.—इंडिया बिजनेस काउंसिल (यू.एस.आई.बी.सी.), यू.एस.—इंडिया स्ट्रेटेजिक पार्टनरशिप फोरम (यू.एस.आई.एस.पी.एफ.) आदि शामिल हैं। सेमिनार में आर्टिफिशियल इंटेलिजेंस, रोबोटिक्स, इंटरनेट ऑफ थिंग्स, ड्रोन, वायर्ड वॉर्रियर्स आदि पर चर्चा होगी।
- उत्तर प्रदेश सरकार की ओर से कई सांस्कृतिक कार्यक्रम होंगे, जिनमें उत्तरी राज्य की समृद्ध सांस्कृतिक विरासत का प्रदर्शन किया जाएगा। दर्शकों के लिए टेंट सिटी में बेहतरीन व्यवस्था की गई है, जो उनके लिए यादगार अनुभव साबित होगा।

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डिजिटल प्लेटफॉर्म पर डिफेंस एक्सपो

डिफेंस एक्सपो 2020 की जानकारी मोबाइल ऐप पर भी उपलब्ध है। यह ऐप विभिन्न विशेषताओं के साथ प्रदर्शकों और दर्शकों को जोड़ता है। यह आपको व्यस्त भी रखेगा और इस पर आप अपनी राय भी दे सकेंगे।



रक्षा मंत्री राजनाथ सिंह ने 27 दिसंबर, 2019 को नई दिल्ली में डेफएक्सपो 2020 मोबाइल ऐप लान्च किया। इस दौरान रक्षा सचिव डॉ. अजय कुमार और सचिव (रक्षा उत्पाद) सुभाष चंद्रा भी मौजूद थे (बाएं)। मोबाइल ऐप का स्क्रीनशोट (दाएं)

🖢 आयुषी चौधरी

1 वां द्विवार्षिक वृहत रक्षा प्रदर्शनी डेफएक्सपो 2020 आपके सामने है। यह पहली बार लखनऊ में 5 से 9 फरवरी के बीच आयोजित हो रहा है। यह आयोजन देश के एयरोस्पेस, रक्षा और सुरक्षा हितों से जुड़े सभी आयामों को प्रस्तुत करता है। इस साल डेफएक्सपो इंडिया–2020 का विषय "इंडिया: द इमर्जिंग डिफेंस मैन्युफैक्चरिंग हब" है। इस विषय का उद्देश्य रक्षा क्षेत्र में अग्रणी प्रौद्योगिकियों को एक छत के नीचे लाना और सरकारी और निजी उत्पादों के साथ–साथ स्टार्टअप के लिए अवसर उपलब्ध कराना है।

इस प्रदर्शनी का दूसरा विषय "डिजिटल ट्रांसफॉर्मेशन ऑफ डिफेंस" है। यह विषय भविष्य की युद्धभूमि की अवधारणा को रेखांकित करता है। डेफएक्सपो का केंद्रबिंदु नई प्रौद्योगिकियों के इस्तेमाल से एयरोस्पेस और रक्षा क्षेत्र के लिए उत्पादन है। डिजिटल ट्रांसफॉर्मेशन विषय के अनुरूप रक्षा मंत्री राजनाथ सिंह ने डेफएक्सपो 2020 के लिए 27 दिसंबर, 2019 को एक मोबाइल ऐप लॉन्च किया था। यह ऐप रक्षा सचिव डॉ. अजय कुमार और रक्षा उत्पाद विभाग (डी.डी.पी.) के सचिव सुभाष चंद्रा की मौजूदगी में लॉन्च हुआ था।

डेफएक्सपो 2020 ऐप एंड्रॉयड प्ले स्टोर के साथ—साथ ऐपल ऐप स्टोर पर भी उपलब्ध है। यह ऐप रक्षा उत्पाद विभाग की ओर से विकसित किया गया है, जिसका उद्देश्य प्रदर्शकों के साथ—साथ दर्शकों को महत्वपूर्ण जानकारी देने के साथ—साथ उन्हें व्यस्त रखना भी है। वर्तमान समय में हम एक डिजिटल युग का अनुभव कर रहे हैं, जिसे दर्शाने में यह एक महत्वपूर्ण कदम है। साथ ही आगामी डिजिटल समय और प्रदर्शनी के विषय पर ध्यान केंद्रित करने का एक आसान तरीका भी है।

रक्षा मंत्री ने ऐप लॉन्च करने के बाद सोशल मीडिया पर कहा था, "लखनऊ में आयोजित होने वाले डिफेंस एक्सपो इंडिया 2020 के लिए एक मोबाइल ऐप (http:// get-eventedge-com/defexpo2020/) आयोजन की तैयारियों की समीक्षा बैठक में लॉन्च किया गया। यह ऐप एंड्रॉयड और आईओएस दोनों प्लेटफॉर्म पर उपलब्ध है। डिफेंस एक्सपो 2020 के अपडेट के लिए ऐप डाउनलोड करें।" इस बैठक में डॉ. अजय क्मार और सुभाष चंद्रा सहित अन्य वरिष्ठ अधिकारी मौजूद रहे।

ऐप्लिकेशन की प्रमुख विशेषताओं में सूचना देना, प्रदर्शकों व दर्शकों को व्यस्त रखना और प्रतिक्रिया देने का विकल्प शामिल हैं। इसके कई और विशेषताएं हैं, जिनमें बिजनेस–टु–बिजनेस कनेक्ट, एग्जिबिटर चैट, टिकट बुकिंग, टेंटेड सिटी में आवास, पुश नोटिफिकेशन और सोशल मीडिया की सुविधाएं शामिल हैं। ऐप में फीडबैक जैसी महत्वपूर्ण सुविधा भी है, जो प्रदर्शनी की व्यवस्था बेहतर करने में मद्दगार साबित होगा। यह ऐप्लिकेशन रोजाना की घटनाओं के साथ–साथ भाग लेने वाले प्रदर्शकों, रक्षा सार्वजनिक क्षेत्र के उपक्रम (डी.पी.एस.यू), सेमिनार ∕ वेबिनार के अतिथि वक्ताओं, प्रकाशकों जैसे कि इलेक्ट्रॉनिक ब्रोशर व ई–बुक, मैप, प्रदर्शनी परिसर की दिशाओं और मौसम की जानकारी भी उपलब्ध कराता है। रक्षा मंत्री राजनाथ सिंह ने तैयारियों की समीक्षा की और उस समीक्षा बैठक में वरिष्ठ अधिकारियों ने यह भी बताया कि विदेशी कंपनियों सहित 880 से अधिक प्रदर्शकों की एक रेकॉर्ड संख्या ने इवेंट में शामिल होने के लिए पंजीकरण कराया है। यह आंकड़ा डेफएक्सपो 2018 की संख्या से अधिक है। रक्षा मंत्रालय का कहना है कि अब तक लगभग 70 देशों की 1,000 से अधिक कंपनियां इस सबसे बड़े डेफएक्सपो में भाग लेने के लिए तैयार हैं। भारत की इस मेगा रक्षा प्रदर्शनी में भाग लेने वाली विदेशी कंपनियों की संख्या भी 160 के पिछले आंकड़े से बढ़कर 165 हो गई है।

प्रदर्शनी के पिछले संस्करण ने भारत को "इमर्जिंग डिफेंस मैन्युफैक्चरिंग हब" के रूप में पेश किया था। डेफएक्सपो 2018 अब तक की बड़ी रक्षा प्रदर्शनियों में से एक माना जाता है। यह 50 से अधिक द्विपक्षीय जी2जी बैठकों, 40 समझौता ज्ञापनों पर हस्ताक्षर करने और 700 से अधिक प्रदर्शकों (542 भारतीय और 160 विदेशी प्रदर्शकों) की भागीदारी के लिए मंच बन गया। डिफेंस एक्सपो 2020 संस्करण सार्वजनिक और निजी क्षेत्रों दोनों से रक्षा उत्पाद निर्माताओं, ओ.ई.एम. (मूल उपकरण निर्माताओं) और एम.एस.एम.ई. (सूक्ष्म, लघु और मध्यम उद्यम) की बड़ी भागीदारी सुनिश्चत करता है। यह आयोजन व्यापार, निर्णायकों और नीति निर्माताओं के लिए एक आदर्श मंच प्रदान करने, समान चुनौतियों पर चर्चा करने के साथ–साथ न केवल भारत को एक रक्षा विनिर्माण केंद्र के रूप में स्थापित करने के लिए, बल्कि वैश्विक पारिस्थितिकी तंत्र को मजबूत करने का भी वादा करता है।

इस ऐप की अतिरिक्त विशेषताएं प्रदर्शनी से अधिक से अधिक लोगों को जोड़ने के लिए उत्प्रेरक की भूमिका तक ही सीमित नहीं है, बल्कि दर्शकों को भविष्य के समारोह की जानकारी भी देता है, जिससे विभिन्न स्तरों पर उनकी अधिक भागीदारी हो सके। डिफेंस एक्सपो के इस संस्करण को उन लोगों के लिए महत्वपूर्ण माना जा रहा है जो भारतीय रक्षा उद्योग में दीर्घकालिक लक्ष्य रखते हैं। इस एक्सपो में भारत को उभरते रक्षा विनिर्माण केंद्र के रूप में प्रदर्शित करने की कल्पना की गई है।

रक्षा मंत्री ने डेफएक्सपो 2020 को लेकर राजदूतों के साथ हुई बैठक के दौरान कहा था कि डेफएक्सपो साझेदारी को बढ़ावा देने और साझा समृद्धि का हिस्सा बनने का अवसर होगा। यह मजबूत संबंध निवेश को बढ़ावा देने, विनिर्माण का विस्तार करने, प्रौद्योगिकी के स्तर को बढ़ाने और संबंधित देशों के आर्थिक विकास को गति देने का काम कर सकते है। भारत का रक्षा क्षेत्र काफी सुदृढ़ है और देश और विदेश में उद्योग स्थापित करने के लिए मित्र देशों के साथ पारस्परिक रूप से लाभप्रद साझेदारी की खोज कर रहा है। रक्षा मंत्रालय के एक बयान में कहा गया है कि नई दिल्ली स्थित विदेशी मिशनों के प्रतिनिधियों को डिफेंस एक्सपो की जानकारी देने और अपने अनुभवों को बढ़ाने के लिए उनकी सलाह के लिए एक राउंड टेबल मीटिंग का भी आयोजन किया गया था। रक्षा मंत्री ने यह भी कहा कि यह इवेंट साल 2025 तक एयरोस्पेस और रक्षा उत्पादों व सेवाओं में 26 बिलियन अमरीकी डॉलर का कारोबार हासिल करने के सरकार के इरादे को प्रदर्शित करेगा। •

डिफेंस एक्सपो 2020 की विस्तृत जानकारी के लिए देखें www.defexpo.gov.in.





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SPECIAL STORY



🔅 डिफेंस इंडिया स्टार्टअप चैलेंज

रक्षा मंत्रालय ने इनोवेशन फॉर डिफेंस एक्सीलेंस (आईडेक्स) की पहल को आगे ले जाते हुए अटल इनोवेशन मिशन के सहयोग से डिफेंस इंडिया चैलेंज की शुरुआत की। इसका उद्देश्य रक्षा क्षेत्र में स्टार्टअप्स, सूक्ष्म, लघु व मध्यम उद्योगों और अन्वेषकों को राष्ट्रीय रक्षा व सुरक्षा के क्षेत्र में प्रोटोटाइप्स, व्यावसायिक उत्पाद और समाधान के लिए सहयोग प्रदान करना है।



इनोवेशन फॉर डिफेंस एक्सीलेंस (आईडेक्स) के तहत आयोजित 'डिफेंस–कनेक्ट' कार्यक्रम के दौरान 11 नवंबर, 2019 को इनोवेटिव स्टार्टअप को चेक देते हुए केंद्रीय रक्षा मंत्री राजनाथ सिंह। साथ में हैं रक्षा सचिव डॉ. अजय कुमार और रक्षा उत्पादन विभाग के सचिव सुभाष चंद्रा।

उद्देश्य

डिफेंस इंडिया स्टार्टअप चैलेंज का उद्देश्य राष्ट्रीय सुरक्षा (प्रोटोटाइप) के लिए प्रासंगिक उत्पादों और प्रौद्योगिकियों के व्यावहारिक प्रोटोटाइप के निर्माण में सहयोग प्रदान करना है। साथ ही भारत के रक्षा क्षेत्र में तेजी से बढ़ते इनोवेशन और नए प्रौद्योगिकी उत्पादों / प्रौद्योगिकियों को बाजार और शुरुआती ग्राहक (व्यावसायीकरण) उपलब्ध कराने में मदद करना है।

कौन कर सकता है आवेदन

- (क) वैसे स्टार्टअप्स, जो भारत सरकार के वाणिज्य एवं उद्योग मंत्रालय के औद्योगिक नीति एवं संवर्धन विभाग (डी.आई.पी.पी.) से परिभाषित और मान्यता प्राप्त हो।
- (ख) कोई भी भारतीय कंपनी जो कि एम.एस.एम.ई. एक्ट 2006 में परिभाषित कंपनी अधिनियम के तहत आती हो और प्रारंभ में सूक्षम, लघु व मध्यम उद्यम (एम.एस. एम.ई.) के तहत शामिल की गई हो।
- (ग) व्यक्तिगत अन्वेशकों को भी आवेदन करने के लिए प्रोत्साहित किया जाता है। इस वर्ग में शोध व शैक्षणिक संस्थान आवेदन कर सकते हैं।

कैसे करें आवेदन

आवेदकों को निम्नलिखित जानकारी देना अनिवार्य हैः

- (1) किसी ऐसे व्यक्ति का पूर्ण विवरण जो आईडेक्स और आवेदक के बीच संपर्क के रूप में कार्य करेगा। यह व्यक्ति आवेदक इकाई (स्टार्टअप / एम.एस.एम.ई.) का मुख्य सदस्य होना चाहिए।
- (2) कंपनी का विवरण आवेदन करने वाले स्टार्टअप या एम.एस.एम.ई. का पूर्ण विवरण होना जरूरी है। व्यक्तिगत अन्वेषकों को इन्हें नहीं भरना है।
- (3) प्रस्ताव का विवरण आईडेक्स चैलेंज से संबंधित समस्या का विवरण या केंद्र बिंदु को लेकर प्रस्ताव की जानकारी अग्रलिखित है। आवेदकों का आवश्यक रूप से उस समस्या का विवरण चुनना है जिसे वह संबोधित करना चाहता है। आवेदन किस स्तर पर फंड चाहता है यह भी उल्लेखित होना चाहिए। साथ ही प्रस्ताव को लेकर तकनीकी और वित्तीय विवरण देना जरूरी है। अगर आवेदक के पास उपलब्ध हो तो उन्हें प्रासंगिक पेटेंट और शोध पत्रों का उल्लेख करना होगा, साथ ही एक अस्थायी व्यवसाय योजना भी देनी होगी।

आवेदनों का मूल्यांकन

आईडेक्स चैलेंज के लिए रक्षा और प्रौद्योगिकी विशेषज्ञों की विधिवत गठित उच्चस्तरीय समिति द्वारा आवेदनों की जांच की जाएगी।

चयनित आवेदकों को मिलेगा सहयोग

डिफेंस इंडिया स्टार्टअप चैलेंज के तहत चयनित आवेदकों को 1.5 करोड़ रुपये तक का फंड उपलब्ध कराया जाएगा। यह फंड एक उच्चस्तरीय चयन समिति द्वारा तय मानकों के आधार पर किस्तों में दिया जाएगा। फंड के अतिरिक्त, चयनित आवेदकों को आईडेक्स सहयोगियों द्वारा प्रोत्साहित करने के लिए आयोजित विभिन्न कार्यक्रमों में प्रवेश दिया जा सकता है, जहां उन्हें अन्वेषण व उद्योग जगत के विशेषज्ञों की ओर से मेंटरशिप के जरिए प्रौद्योगिकी और व्यावसायिक विकास में सहायता प्रदान की जाएगी। चयनित आवेदकों को अपने उत्पाद व प्रौद्योगिकी विकास के लिए रक्षा परीक्षण सुविधाओं और विशेषज्ञों की सहायता भी उपलब्ध कराई जा सकती है।

कार्यक्रम का उद्देश्य प्रोटोटाइप बनाने और उत्पादों व प्रौद्योगिकियों को बाजार (रक्षा या अन्य) उपलब्ध कराने की सुविधा प्रदान करना है। आवेदकों को निम्नलिखित मदों में खर्च करने के लिए प्रोत्साहित किया जाएगाः

- (क) अनुसंधान एवं विकास
- (ख) प्रोटोटाइपिंग
- (ग) पायलट क्रियान्वयन
- (घ) बाजार मूल्यांकन

रक्षा मंत्री ने 4 अगस्त, 2018 को डिफेंस इंडिया स्टार्टअप चैलेंज (डी.आई.एस.सी.) को लॉन्च किया था। इस दौरान अन्वेषकों और विभिन्न संगठनों के साथ–साथ व्यक्तिगतों के सामने समाधान के लिए 11

तकनीकी चुनौतियां (प्रॉब्लम स्टेटमेंट्स) प्रस्तुत की गई थीं। इस समारोह में चार इन्क्यूबेटर (क) सेंटर फॉर इनोवेशन इन्क्यूबेशन एंड एंटरप्रिन्योरशिप, आई.आई.एम. अहमदाबाद, (ख) एस.आई.एन.ई., सोसायटी फॉर इनोवेशन एंड एंटरप्रिन्योरशिप, इंडियन इंस्टिट्यूट ऑफ टेक्नॉलजी बॉम्बे, (ग) टी–हब, हैदराबाद (घ) एफ.ओ.आर.जी.ई. – कोयंबटूर इनोवेशन एंड बिजनेस इन्क्यूबेटर (सी.आई.बी.आई.) की ओर से लॉन्च ब्रैंडेड इन्क्यूबेशन इंटरप्राइजेज को पार्टनरशिप के सर्टिफिकेट दिए गए थे। ये सर्टिफिकेट नई रक्षा प्रौद्योगिकी के सह–निर्माण में स्टार्टअप्स / एम.एस.एम.ई. की खोज, अन्वेषण और संरक्षण को लेकर रक्षा मंत्रालय को दिए गए सहयोग के लिए दिए गए थे। इसके बाद, आईडेक्स के तहत दो और पार्टनर इन्क्यूबेटर आए, जिनमें इन्क्यूबेशन सेल आई.आई.टी. मद्रास और एफ.टी.आई.आई., आई.आई.टी. दिल्ली शामिल हैं।

डिफेंस इंडिया स्टार्टअप चैलेंज (डी.आई.एस.सी.) - I

चुनौती के पहले चरण में लगभग 500 आवेदन प्राप्त हुए थे। इनमें से प्रोटोटाइप डिवेलपमेंट और उसके बाद संभावित व्यावसायीकरण के लिए फंड उपलब्ध कराने के लिए कुल 28 विजेता चुने गए।

डी.आई.एस.सी. - II

डी.आई.एस.सी. - II को चार तकनीकी चुनौतियों के साथ लॉन्च किया गया था। इसमें अन्वेषकों को अत्याधुनिक तकनीकी का प्रयोग कर प्रौद्योगिकी समाधान तलाशना था। चार चुनौतियां वैमानिक, ड्रोन, जी.पी.एस. आधारित उपकरण और रडार जैसे महत्वपूर्ण डोमेन से संबंधित हैं। एयरो इंडिया 2019 के दूसरे दिन 21 फरवरी, 2019 को कॉन्सेप्ट विजेताओं की घोषणा की गई। डी.आई.एस.सी. II के तहत चार तकनीकी चुनौतियों को लेकर कुल 28 आवेदकों को रक्षा मंत्री की ओर से 'सर्टिफिकेट्स ऑफ रिकग्निशन' से सम्मानित किया गया।

डी.आई.एस.सी. - III

डिफेंस इंडिया स्टार्टअप चैलेंज के इस वर्ग में भारतीय सेना, नौसेना और वायु सेना से 3 नई और रोमांचक चुनौतियों के जवाब में आवेदन मांगा गया था।

- (क) सी और केयू बैंड ऑपरेशन के लिए फोर एक्सिस एंटीना
- (ख) निगरानी और जमीन आधारित वायु रक्षा हथियारों के लिए एक पोर्टेबल स्पूफ एमिटर का निर्माण
- (ग) मित्र या दुश्मन की पहचान को लेकर प्रणाली का विकास •

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SPECIAL REPORT





LOCKHEED MARTIN TO LOOK FOR NEW INDIAN PARTNERS AT DEFEXPO 2020

F-21 fighter & its cockpit demonstrator, MH-60R SEAHAWK helicopter to take centrestage

BILL BLAIR, VICE-PRESIDENT AND CHIEF EXECUTIVE OF LOCKHEED MARTIN INDIA

ockheed Martin, the global security and aerospace company, is showcasing its robust and diverse portfolio of defence and civil capabilities at the 11th biennial edition of DefExpo India-2020, taking place in Lucknow, India February 5-9, 2020.

"We're proud to participate in DefExpo 2020, where we can showcase our commitment to 'Make in India' directly to the largest gathering of defence and aerospace partners in the country," said William (Bill) Blair, Vice-President and Chief Executive of Lockheed Martin India. "Lockheed Martin continues to build upon its more than three-decades of partnership with India, expand collaborations with local industry to support the evolution of indigenous defence manufacturing ecosystem, and further advance India's strategic security and industrial capabilities."

Blair added that Lockheed Martin's goals at the show include building on the company's existing foundation in India by identifying additional strategic partners from across the country, to include companies of all sizes — large, Micro, Small & Medium Enterprises (MSMEs) and start-ups. "For the past decade, we have supported the growth and development of India's innovation and start-up ecosystem, and look forward to strengthening those partnerships to support the advancement of India's defence industry well into the future," Blair said.

The F-21 fighter aircraft, which is on offer to the Indian Air Force, takes centerstage at Lockheed Martin's display. An F-21 cockpit demonstrator is available at the booth for defence and aerospace partners to "fly" the jet for themselves, experiencing its unmatched performance. The F-21 demonstrates Lockheed Martin's com-

mitment in delivering an advanced, scalable single-engine fighter to the Indian Air Force that also provides unrivaled industrial partnership opportunities - for India, from India.

Another platform highlighted is the MH-60R "Romeo" SEAHAWK helicopter, also on offer to the Indian Navy. The MH-60R is the world's most advanced maritime helicopter and will bring vital anti-submarine and anti-surface warfare capabilities to the Indo-Pacific region.

Boosting Lockheed Martin's presence at the show is the C-130J Super Hercules and the S-92 multi-role helicopter, both of which represent a strong legacy of partnership with India and the Indian defence industry. The Indian Air Force operates 12 C-130Js, using the tactical airlifter to go anywhere to do everything. India also is connected to the C-130J through Tata Lockheed Martin Aerostructures Limited, a joint venture, that has the distinction of being the single-global source of C-130J empennage assemblies included on all new Super Hercules aircraft. All C-130Js now built have major components manufactured in India.

On prominent display is the Javelin Anti-Tank Guided Missile system. This versatile and effective one-man-portable and platformemployed anti-tank and multi-target precision weapon system provides capability to defeat a broad spectrum of close combat threats on the modern battlefield. Using fire-and-forget technology, the weapon guides itself to the target without external commands, allowing soldiers to take cover or reposition. With a range of 65 meters to 4 kilometers in most operational conditions, as well as the ability to operate through adverse weather and battlefield obscurants, Javelin can be deployed in a variety of environments and conditions.

Also highlighted is the Modernized Target Acquisition Designation Sight/ Pilot Night Vision Sensor (M-TADS/PNVS), the advanced electro-optical fire control system used by AH-64D/E Apache helicopter pilots for long-range precision engagement and pilotage capabilities in day, night and adverse-weather missions; and precision guided munitions.

Lockheed Martin has currently integrated more than 70 Indian suppliers including Micro, Small & Medium Enterprises (MSMEs) into our global supply chain. At the expo, the company representatives will seek to discuss partnership opportunities with Tier 1 suppliers and prospective Indian industry partners that strengthen India-US defence industrial ties and 'Make in India' opportunities. As a part of its larger commitment to enhance the growth and development of India's innovation, Lockheed Martin has sponsored and supported the India Innovation Growth Program (IIGP) since 2007 with the Department of Science and Technology, Government of India. In 2019, the company established Memorandums of Understanding with three Indian startups – Terero Mobility, Sastra Robotics, and NoPo Nanotechnologies integrating them in Lockheed Martin's global supply chain, contributing to the evolution of both the Indian and global aerospace and defence industry.



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POWER AT SEA

SPECIAL REPORT





he F/A-18 E/F Block III Super Hornet is the world's most lethal, advanced, combat-proven, multi-role frontline fighter-jet. This next-generation aircraft is ready to protect Indian armed forces from current and evolving threats for decades to come.

The Block III Super Hornet will be delivered to the US Navy early next year and will continue to serve as their frontline fighter. This modern jet on offer to Indian Navy and Indian Air Force incorporates several key enhancements and cutting edge technologies including enhanced network capacity, longer range, even better stealth performance, an advanced cockpit system and new sensors, with the life of the aircraft extended to 10,000 hours.

GAME CHANGER FOR THE INDIAN NAVY

The Block III Super Hornet is uniquely suited for the Indian Navy's operational environment. Built to meet the broadest range of mission needs, the Block III delivers the world's most contemporary warfighter technologies for unique and differentiated capabilities while offering full compatibility with India's naval carriers without modifications.

Beyond its advanced technology, the Super Hornet was designed as a carrier-based fighter for high-loading, high-stress operations with minimal support equipment required. These operational requirements have allowed for nearly two decades of naval operations in all-weather conditions and long duration deployments flying all types of mission profiles. The Block III Super Hornet is compatible with STOBAR and CATOBAR take-offs.

Today, the Indian Navy has eight P-8I long range maritime reconnaissance aircraft and more are expected to be delivered. The F/A-18 Super Hornets can optimally interface with the P-8I and other US platforms soon to be inducted in the Indian Navy. This is sure to augment the lethality of these platforms, enhancing India's force projection capabilities.

With both one-seat and two-seat variants, the Super Hornet directly aligns with the Indian Navy's training philosophy and mission set. Both these variants are capable of performing all missions from the carrier. The two-seat variant is able to provide training capabilities aligning with Indian Navy's concept of operations for the carrier qualification of a fighter pilot.

Furthermore, the Block III Super Hornet may serve as a conduit to the US Naval Aviation ecosystem, enabling the sharing of tactics, technological upgrades and knowledge. It unlocks the potential of cooperation with the sharing of best practices in modern naval aviation systems, know-how, services and training.

SUPERIOR ECONOMICS

The Super Hornet's proven track record of reliability, readiness and affordability ensure the lowest risk, most cost-effective solution over the total life cycle. Available at a predictable and affordable cost, with operational flight hour costs that have been documented by US Government to be the lowest among US fighter aircraft in production, the Super Hornet saves billions of dollars over the aircraft's 10,000+ hour lifetime. Its cost per flight hour is lower than single-engine aircraft and fifth-generation aircraft among US tactical aircraft inventory in production. A constant focus on supporting both the design and upgrades philosophy by Boeing and its industry partners has enabled superior economics for the Super Hornet.

Currently, more than 550 Super Hornets operate in the US Navy and are with the navies or air forces of other countries. With 106 Block III orders for the US Navy and international air forces of the world, combined with a modernised production line delivering aircraft, and long term sustainment and upgrade programmes, the Super Hornet will be in service through at least 2050s with high mission readiness rates. The growth potential of the Super Hornet will assure new capabilities to the Indian Navy in the most economical manner since it also factors in a technology insertion capability roadmap.

Along with this extended growth potential, the Super Hornet provides a lowrisk transition path to an aircraft that is ready to operate on day one, allowing India

FLYING INTO ACTION WITH THE BLOCK III SUPER HORNET

to effectively safeguard its country while also adding significant and tactically relevant contributions to coalition operations.

'BY INDIA - FOR INDIA' SUSTAINMENT

Beyond manufacturing, Boeing's 'For India – By India' sustainment program builds on the company's nearly eight decades of history in the country, leveraging existing programs, growing supply chain capabilities and partnering with the local industry.

As it has for every United States Naval aviator and maintainer, Indian Navy personnel will receive the knowledge and skills required for acceptance, operation, maintenance, repair, and deployment of their F/A-18E/F Super Hornet fleet. The Super Hornets will be sustained in India, in partnership with the Indian Navy as well as India and US-based partners throughout the lifecycle of the aircraft. This will further enable its growth and develop advanced expertise in maintenance, resulting in higher availability of the aircraft, at competitive pricing and reduced risk for the Indian Navy.

— Ankur Kanaglekar, India Fighters Lead, Boeing Defense, Space & Security







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SPECIAL FEATURE



IAI'S FAMILY OF LOITERING ATTACK SYSTEMS ALLOWS CLIENTS TO PERFORM IN 21ST CENTURY BATTLEFIELD

n the rapidly changing battlefield of the 21st century, the ability to detect and quickly strike time-sensitive targets has become one of the most important aspects of combat success. This ability is more relevant than ever, whether the adversary is an asymmetric actor hiding in an urban arena, or a military with targets on the move. Precise, rapid, pinpoint strikes are needed in modern warfare, with an emphasis on reducing collateral damage as much as possible. More than thirty five years ago, Israel Aerospace Industries (IAI) began developing a family of loitering attack systems, by connecting its missile abilities with drone designs.



HAROP GETTING LAUNCHED

connecting its missile abilities with drone designs. The result was a series of products that gives operators the ability to strike pinpoint, time critical targets – just the kind of ability that is becoming ever-more

relevant in the rapidly changing battlefield. "Systems that are robust and flexible will allow combatants to adapt, to be the first, to activate force on the battlefield in the most relevant manner. In the days of World War Two, we saw carpet bombing air attacks, in which bombers dropped munitions en masse. Today, we are increasingly moving towards pinpoint strikes, and our loitering systems allow operators to not be dependent on intelligence to pick out the targets," a senior IAI company source said.

When IAI began developing its loitering munitions, it already had fire-andforget missiles that were fully autonomous, but an operational challenge arose when operators were not certain about the location of targets.

The first system to address this gap is the Harpy, a platform IAI says laid down the foundation for all of its loitering munitions. The Harpy is a fire-and-forget autonomous weapon that is launched from a ground vehicle behind the battle zone. It detects, attacks, and destroys enemy radar emitters with high accuracy, suppressing hostile SAM and radar sites for long durations, and loitering over enemy territory for hours. It is currently operational with several air forces around the world.

"Its advantage is that it knows how to deal with changing situations while in the air," the IAI source said. "When we developed the next member of the loitering munition family, the Harop, it inherited these features. The big difference is the replacement of Harpy's radiation seeker with the Harop's electro-optical seeker, and the insertion of a human operator in the attack loop, thereby greatly avoiding collateral damage," he stated. The human operator dictates the critical order of steps, such as deciding when to attack and when to abort. The Harop also conducts its own automatic processes during this time.

The Harop and Harpy evolved into two groups of products that have since underwent a series of upgrades. Neither are dependent on outside intelligence, and their flight ranges have been extended to up 200 kilometers, together with an ability to fly for up to nine hours over targets. The Harop can target mobile targets as they appear – a crucial ability in the battlefield of today - and tomorrow.

"The ability to dive at the target, and abort seconds before striking it, significantly decreases collateral damage," the IAI source stressed.

In recent years, the systems' propulsion systems, sensors, computer systems, end electronics have all experienced upgrades. The platforms are also more aerodynamic than in the past, and more energy efficient. They employ navigational systems that rely on both internal and external systems, meaning there is no dependence on just one kind of navigation. The systems can deliver strike solutions for ground forces, navies, and the air force.

TACTICAL LOITERING ATTACK SYSTEMS

In the lighter-weight section of IAI's loitering munition family, the company has developed a miniature version of the Harop, known as mini Harop.

This tactical, low-cost loitering munition is designed to answer the needs of small ground units and special operations forces, delivering high situational awareness and firepower in a compact platform.

The Mini Harop is stored, transported, and launched from a sealed canister, and one small vehicle can move as many as 16 units. It is operated from a tablet-sized control panel and equipped with high quality day/night electro-optical guidance systems, enabling it to collect visual intelligence at range of up to 50 kilometers. It is powered by a battery-powered electric motor with a flight time of up two hours.

The newest addition to the family is a miniature version of the Harpy, for radiation-seeking anti-radar missions the mini Harpy. Mini Harpy, a newly-developed loitering munition. Based on unique IAI development and technology, the Mini Harpy combines the capabilities of the Company's two flagship loitering missiles, the Harop and the Harpy, offering detection of broadcast radiation with electro optical capabilities. The system was designed to provide operators with control up to the last moment, including cessation of attach at any stage. Electrically powered, it is extremely quiet, carries shaped charge of approx. 8 kg, and operates in mission range of 100 km for duration of two house and 45 kg in weight.

The smallest member of this family is the Rotem, a tactical loitering munition that is named after the Hebrew acronym of the words 'suicide attack drone. 'This multi-rotor platform, whose design is influenced

by commercial drones, delivers low signature strikes on enemy targets in urban and complex battle arenas, and can be deployed in under one minute by a single soldier.

The Rotem can hover for up to 45 minutes, and dive at a speed of up to 50 knots. It is able to conduct both reconnaissance and lethal precision strike missions, depending on its payloads, striking targets that are stationary or on the move.

"A soldier can take this drone out of their bag and deploy it. It takes off automatically and searches and locates targets. As soon as a target is located, the sensor to shooter cycle is just a few seconds long," the IAI source said.

It too is operated from a tablet-like device. "It is very simple and intuitive to operate," the source said. "Our clients have learned to use it in a very short time." \bullet

-Lital Ben Ari, Corporate Communications, IAI





Shares and has filed a DRHP dated March 28,2018 with the SEB, Investors should note that investment in Equity Shares involves a high degree of risk and for details refer to DRHP, including the section titled 'Risk Factors' on page 16 of the DRHP. The DRHP shall be made available on the websites of the BRLMs at www.asticapital.co.in, www.edelweissfin.com, NSE at www.nseindia.com, NSE other jurisdiction outside India and may not be offered or sold, and Bids may not be made by person in any such jurisdiction, except in compliance with the applicable laws of such jurisdiction. This announcement is not an offer of securities for sale in the United States securities law in the United States and may not be offered or sold within the United States, except in compliance with any applicable laws of such jurisdiction. This announcement is not an offer of securities for sale in the United States securities law in the United States and may not be offered or sold within the United States, except pursuant to an exception from, or in a tubict to, the registration requirements of the U.S. Securities Act in accordance with any applicable United States state securities laws. There is no intention to register the Equity Shares in the MAZAGON DOCK SHIPBUILDERS LIMITED is proposing, subject to applicable statutory and regulatory requirements, receipt of requisite approvals, market conditions and other considerations, to undertake an initial public offering of its Equity www.idfcbank.com and www.jmfl.com , respectively. Potential investors should not rely on the DRHP for any investment decision. The Equity Shares offered in the Offer have not been and will not be registered, listed or otherwise gualified in any United States or to make a public offering of the securities in the United States.

SPECIAL REPORTS



EMBRAER C-390 MILLENNIUM – A MULTI-MISSION MEDIUM AIRCRAFT



mbraer has announced the name and designation of its multi-mission medium aircraft, the Embraer C-390 Millennium. The new designation reflects increased flexibility and value for operators that look for a transport/cargo aircraft to perform airlift and air mobility missions, among others.

In 2009, the Brazilian Air Force (FAB) contracted Embraer to design, develop and manufacture the aircraft as a replacement for its aging C-130 fleet. Deliveries to FAB started last September.

The C-390 Millennium is a tactical transport jet aircraft designed to set new standards in its category, while presenting the lowest life-cycle cost in the medium airlift market. Some of the strong aspects of the aircraft are increased mobility, rugged design, higher flexibility, state-of-the-art yet proven technology, and easier maintenance. In addition, the C-390 Millennium can perform a variety of missions, such as cargo and troop transport, cargo and paratroopers airdrop, search and rescue, aerial firefighting, medical evacuation, and humanitarian missions. The designation KC-390 will be maintained for the customers that have opted for the aerial refueling capability.

"With the C-390 Millennium we will be able to deliver the right solution to our customers, according to their specific needs", said Jackson Schneider, President and CEO of Embraer Defense & Security. "The C-390 is a highly capable aircraft. Its unrivalled combination of speed, payload and rapid reconfigurability for multi-mission operations are the cornerstones of its excellent productivity".

Flying faster and delivering more value, the Millennium is the right sized platform for major airlift deployment scenarios. Minimized intervals and on condition maintenance, combined with highly reliable systems and components, reduce downtime and costs, contributing to outstanding availability levels and low life cycle costs.

KALYANI GROUP TO SHOWCASE AN ARRAY OF INDIGENOUS SOLUTIONS AND CAPABILITIES

Pure based Kalyani Group shall be showcasing its wide range of indigenous solutions and capabilities at the upcoming DefExpo 2020 at Lucknow. Three new Artillery platforms stand to be unveiled by them at the show - MArG Extended Range, which is a 155mm/52 cal Ultra-Light Howitzer; Garuda-105 V2, which is a 105mm gun mounted on their own "Go Anywhere Vehicle"; and 4x4 MGS, which is a 155mm/39 cal gun system mounted on a 4x4 platform. All three gun platforms and the "Go Anywhere Vehicle" have been indigenously designed and developed by Kalyani Group incorporating niche and advanced technologies. Visitors to Kalyani Stall can also witness 'Kalyani M4', which is a 4x4 armoured protected fighting vehicle that can provide side blast protection against 50 kgs of TNT explosives- the highest in its class. Another exciting product on display will be 6x6 ECARS, which is a UGV developed by the group which offers enhanced collision avoidance system, threat analysis and missions planning.

Kalyani Group's 'Journey to digital transformation', will be conceptualised by creating an 'Experience Zone' for their esteemed guests to experience various niche and futuristic technologies that Kalyani group is currently working on, including HoloSuit, which is a full body motion tracking suit that virtualizes the human body motion and can be used to skill humans and robots using advanced AI.

The Kalyani stall shall also have a dedicated section for their partnerships. The group has been relentlessly working on bringing niche technologies in the country and has formed strategic collaboration with global OEMs to achieve the same. Their product profile in the field of Small Arms, Defence Electronics and their JV offerings can be viewed in this section.

Kalyani Group will be in Hall No. 7 at the expo.



BABA KALYANI, CHAIRMAN KALYANI GROUP, AND AMIT KALYANI, DY MANAGING DIRECTOR, PROUDLY DISPLAYING 'BHARAT 52'

SPECIAL FEATURE



RAFAEL AT DEFEXPO 2020

Rafael Advanced Defense Systems Ltd. is participating in DefExpo 2020 in Lucknow, India, February 5-9.

or more than two decades RAFAEL Advanced Defense Systems has been supporting the Indian Armed forces with stateof-the-art systems, during which RAFAEL has stood by India to supply systems at

short notice in various operational contingencies, including air-to-air, air defence, ATGMs, targeting and reconnaissance pods, SDR communication and more.

RAFAEL already works with the different branches of the Indian military and the Indian security apparatus and has cooperated to integrate its electro-optical systems, advanced ordnance, as well as its air-to-air and air defence systems.

RAFAEL has been working steadily to create Technology Partnerships or Joint Ventures with

major Indian companies to address various projects and has created structures to ensure technological transfer to India.

Over the last few years, RAFAEL has continued to realize its commitment to the Indian market and to its economy, including last summer's inauguration of a state-of-the-art facility at Hardware Technology Park, Hyderabad for local manufacturing of the SDR BNET communication system for the Indian Air Force, with a \$30 million purchase order. In addition, RAFAEL has placed a \$100 million order for Barak-8/ MRSAM missile kits for the Indian Army and Air Force from KRAS (Kalyani RAFAEL Advanced Systems Ltd. India). This, among other steps, is part of RAFAEL's compliance with the "Make-in-India" policy of the Indian government and is testimony to RAFAEL's global commitment to local production, knowledge transfer and industrial cooperation.

At DefExpo 2020, RAFAEL will showcase a variety of solutions and capabilities in various fields:

SPIKE - A FAMILY OF MISSILES

SPIKE is an advanced electro-optical guided missile system family. The SPIKE Family has reached exports of well over 30,000 missiles, is in use by 34 nations including India. More than 5000 missiles have been fired in training and combat and more than 43 different platforms have been integrated including vehicles, helicopters (more than 10 different types) and marine boats.

AIR DEFENCE CAPABILITIES

SPYDER - a quick reaction, low level surface-to-air missile system designed to counter attacks by aerial threats.

C-DOME: NAVAL DEFENCE SYSTEM

Mature, operational anti-missile naval defence system, designed to protect combat vessels against sea skimming missiles and all other airborne threats. Using the Iron Dome interceptor, the system is effective against highly manoeuvring, supersonic and low altitude threats (sea skimmers), as well as low radar cross section (RCS) targets. It is also effective against a full variety of free space threats.

Iron Dome - Dual mission counter rocket, artillery and mortar (C-RAM) and Very Short Range Air Defence (VSHORAD) system.

Rafael is also proud to announce that substantial share of its Air Defence portfolio is now made in India. The Air Defence display is part of our Joint Venture, Kalyani Rafael Advanced Systems (KRAS), co-located with the RAFAEL pavilion.

DEFENCE AGAINST HOSTILE UAVS

Drone Dome - an end-to-end system designed to provide effective airspace defence against hostile drones (micro and nano UAVs).

LAND SYSTEMS - A RANGE OF SOLUTIONS

Rafael offers a range of high technology solutions for land warfare, to defend against a wide range of threats such as anti-tank missiles and rockets, small arms, AP projectiles, high speed fragments of artillery, mortars, and high explosives.

Designed for high performance and survivability, RAFAEL's Samson RWS with Spike ATGM Dual Launcher have been adapted to a wide variety of main tracked and wheeled armored personnel carriers and marine craft.

GUIDANCE KITS FOR ROCKETS

EPIK - a new concept of RAFAEL to upgrade existing Rocket Artillery Systems for Autonomous, Pin-Point hit Accuracy and increased range capability.



SPIKE ON TIGER

COMMUNICATION

BNET broadband IP SDR (software defined radio), supporting the modern digital battlefield's needs with high-speed, low-delay, reliable connectivity for broadband data, voice and video on the move. Delivering unprecedented network capacity in terms of data rates, number of users and minimal delay, BNET enables all land, sea and air radio units to participate in a single, seamless, scalable mobile ad hoc network (MANET). Displayed at RAFAEL's Joint Venture Astra Rafael Comsys (ARC). Please visit for a live demonstration of these capabilities.

INFRA RED SEARCH AND TRACK SYSTEM (IRST)

The Sea Spotter is a new generation infrared, passive staring system designed to be installed on naval ves-

sels, capable of automatically locating all types of surface and aerial targets/threats.

NAVAL REMOTE WEAPON STATION

For naval platforms, RAFAEL offers the Typhoon, a family of lightweight, stabilized, remote controlled weapon systems with a full range of weapons, including small or medium caliber guns, coaxial machine guns and missiles.

UAS BY AERONATICS (A RAFAEL SUBSIDIARY) AT THE RAFAEL PAVILION

The Orbiter 4 STUAS is an advanced multi-mission platform with extraordinary and versatile carrier, mission and endurance capabilities. Orbiter 4 STUAS delivers top mission performance with its lightest, most versatile and most advanced covert platform available today, for both land and maritime operations.

The Pegasus 120 is a multi-rotor platform, designed especially for defence and security missions.

-Brig. Gen. Ariel Karo, Executive VP, Marketing and Business Development, RAFAEL.







BAE SUPPORTING INDIAN BID TO EXPORT HAL-MADE HAWKS

Indigenisation key to securing future orders for M777 gun, **Nik Khanna**, MD India BAE Systems, tells **Vishal Thapar** of SP's Team

SP's Team (SP's): What is BAE showcasing at DefExpo 2020?

NiK Khanna (Khanna): We will exhibit an array of state-of-the-art capabilities, including towed and self-propelled artillery, naval gun systems and ships, ammunitions, unmanned autonomous systems and precision munitions. The centre-stage of our showcase will be the two 'Make-in-India' M777 Ultra Lightweight Howitzer (ULH) gun systems, which have been locally assembled and integrated by Mahindra Defence Systems Limited as part of our commitment to manufacture 120 out of the 145 guns here.

SP's: What is the future of artillery cooperation with India after the M777 delivery?

Khanna: India's artillery needs are considerable and the future is bright. We're focused on providing long-term support for the M777 ULH agreement and beyond. We will continue to invest in greater levels of indigenisation and a broader and deeper industrial base to support future batches of M777 beyond the 145 which are on the current FMS programme.

SP's: In the area of precision ammunition, long range munitions and course correction technology, what solutions could be offered to India?

Khanna: There are opportunities for a single calibre 155 which will potentially replace the 105 and the 130mm. There are also a range of ammunition-related opportunities. Their requirements have been seen for PGMs which is a small subset of their artillery ammunition mix. So, we have an opportunity to work in that entire space. The munitions we will exhibit at DefExpo 2020 include the 57mm

and 40mm programmable 3P Ammo, BONUS 155mm sensor-fused ammunition, and 120mm tank ammunition, CT40 cannon.

SP's: Is there any progress in efforts to explore the export of Made in India Hawk AJTs to third countries?

Khanna: The Department of Defence Production (DDP) is keen to export Hawk to friendly countries and allies and HAL has been active in that discussion with BAE Systems. Discussions are now taking place in regard to securing export clearances. BAE Systems believes this is a tremendous opportunity because it goes to the heart of what the DDP wants to achieve which is to build self-sufficiency and to produce in India and export out of India.

SP's: What is the status of the Naval Gun programme?

Khanna: This program and its corresponding value would cover a comprehensive procurement of systems and services to include 13 Mk 45 guns, ammunition hoists, lifts and racks, spares, power converters, and long-term extensive support lasting up to 25 years.

These services would consist of integration, installation, warranty, training, engineering support, and waterfront facilities. The program would provide naval guns for two warship classes (15B and 17A) and include new infrastructure on the country's east and west coasts to provide training, parts and lifecycle maintenance with special tools and equipment.

India has committed to the 11 warships being built by GRSE and MDL that are slated to have Mk45 gun systems on them.



HYBRID BIHO - A FORMIDABLE AIR DEFENCE SOLUTION

Sungsoo Lee, CEO & President, Hanwha Defense and Hanwha Defense International highlights the capabilities of their Hybrid BIHO weapon system and their ongoing interest in India.

SP's: What products Hanwha Defense is interested in promoting to India? Sungsoo Lee (Lee): Hanwha has independently developed and produced kinds of defence systems in the areas of ammunition & PGM, land systems, defence electronics and aircraft engine for more than 47 years. In the ammunition area, Hanwha is specialized in medium to large calibre ammunitions, GPS/INS and PGM. We are also focused on defence electronics such as EOIR (Electro-Optic InfraRed), FCS (Fire Control System), CMS (Combat Management System). Hanwha has full line up in Land Systems including Medium Tank (K21-105), Artillery (K9) and Air Defence system (Hybrid BIHO). Hanwha is more familiar to India since Hanwha successfully delivered K9 Vajra-T with L&T.

SP's: What is the progress of the K9 Vajra to Indian Army? Lee: Today, 50 numbers of K9 Vajra-T are in service with Indian Army. In Jan 2020, the 51st K9 has been delivered. Remaining units will also be delivered to Indian Army by our Indian Partner L&T before November 2020.

SP's: What is the status of SPADGMS programme with Indian Army, for which Hanwha Defense has participated with Hybrid BIHO?

Lee: Hanwha Defense had participated in the procurement process for SPADGMS for Indian Army in Year 2013. Our product, Hybrid BIHO, has been fully qualified for all evaluation parameters and the programme is now ready to move to the next stage of commercial negotiation.



HYBRID BIHO ANTI-AIRCRAFT WEAPON SYSTEM

SP's: What makes the Hybrid BIHO a formidable anti-aircraft weapon system? Lee: Hybrid BIHO, a Self-propelled Air Defence Gun and Missile System, is one of the most effective short-range anti-aircraft systems ever, as it features formidable air defence capabilities in its ability to detect and intercept low-flying infiltration enemy targets, including small size drones.

The system is equipped with twin electro-optically 30mm machine guns with an effective range of over 2.5 km. Hybrid BIHO features advanced surveillance radar with a detection range of 21 km and fire-control systems. The vehicle is also armed with 4 surface-to-air guided missiles with a range of over 6 km.

Battle engagement capability of Hybrid BIHO utilises both gun and missile system and also have high accuracy by simultaneous operation of radar and EOTS (Electro-Optical Tracking and Searching) system.

SP's: Which countries are operating the Hybrid BIHO anti-aircraft system?

Lee: Hybrid BIHO has been delivered to Republic of Korean Army and it is in operation since 2015. We are promoting this advanced system to multiple foreign countries including India.

SP's: Has there been Indian interest for Hanwha Defense's range of armoured fighting vehicles? Lee: Hanwha has a full line up of products for armored vehicle including wheeled vehicle (4x4, 6x6, 8x8), tracked vehicle and light tank. Utilising those experience and expertise, we promote for multiple programmes like FICV, FRCV, 8x8 APC in India.

SPECIAL REPORT



ISRAEL AEROSPACE INDUSTRIES TO PRESENT A VARIETY OF SYSTEMS AT DEFEXPO 2020

srael Aerospace Industries (IAI) will participate in the DefExpo 2020 Exhibition (February 5-9, Lucknow, India). The company expects to expand its collaboration with local companies in integrating strategic and state-ofthe-art systems for the Indian MoD in a number of areas in accordance with the Indian Government's 'Make in India' policy. These collaborations are a direct continuation of IAI's business deals in India which totaled some \$5 billion in the past five years.

IAI has been working with India's defence industries and armed forces for the past 28 years as part of a strategic collaboration that spans many fields. The company collaborates with local companies and works with India's defence agencies, as well as with the Navy, Air Force,

Army, and Coast Guard. Some of the jointly development projects include the MRSAM Air defence system, for both the maritime and land-based versions; mission aircraft; various radar systems, and UAVs. The collaboration agreements are based on the transfer of technology for the benefit of local production as part of the Indian Government's 'Make in India' policy.

Nimrod Sheffer, IAI's President and CEO, said: "India is one of IAI's main partners. This important partnership is characterised by long-term collaboration, joint development and production, technology transfer and technical support over many



(LEFT) NIMROD SHEFFER, PRESIDENT AND CEO, IAI; (RIGHT) IAI'S MRSAM MISSILE DURING A TEST.

years. We are working to nurture this relationship in the future despite growing competition. The excellent reputation that IAI has earned among its Indian partners is vitally important to continuing this tradition of successful cooperation."

At the exhibition, IAI will present a variety of strategic defence systems with an emphasis on MRSAM and Top-Gun, and in the loitering-munition category, they will be featuring the Rotem. In the Unmanned Aerial Systems area, IAI will display the Unified Control Station (UCS), a 5th generation UAV ground control station (GCS). Additional developments on display will include a mission aircraft for intelligence missions, the ELW 2090.

IAI Ltd. is Israel's largest aerospace and defence company and a globally recog-

nised technology and innovation leader, specialising in developing and manufacturing advanced, state-of-the-art systems for air, space, sea, land, cyber and homeland security. Since 1953, the company has provided advanced technology solutions to government and commercial customers worldwide including satel-lites, missiles, weapon systems and munitions, unmanned and robotic systems, radars, C4ISR and more. IAI also designs and manufactures business jets and aerostructures, performs overhaul and maintenance on commercial aircraft and converts passenger aircraft to refueling and cargo configurations.



SPECIAL REPORTS



USIBC PREPARES EXECUTIVE DEFENSE MISSION TO DEFEXPO 2020



The US-India Business Council (USIBC) will lead its 17th Defence Executive Mission to DefExpo 2020 (February 5-9), showcasing the continuing vibrance and importance of the US-India defence partnership. The mission will be co-led by Dennis Swanson, Vice President, International Sales, Global Sales and Marketing, and Defense, Space & Security, Boeing Global Services and David Sutton, Director for the Indo-Pacific, Lockheed Martin International. It follows a successful US-India 2+2 Ministerial Dialogue, which featured the signing of defence agreements including the Industrial Security Annex (ISA).

"Defence trade is a key part of the US-India commercial partnership," said USIBC President Nisha Biswal. "With the signing of the ISA and agreements to operationalize the Defence Trade and Technology Initiative (DTTI) in December, we anticipate opportunities for deeper industry collaboration and DefExpo is an important venue for strengthening these ties." Bilateral defence trade reached \$18 billion in 2019, up from less than \$1 billion in 2008.

The mission includes executives from over a dozen top US aerospace and defence companies seeking to enhance partnerships within India's rapidly growing defence ecosystem. The delegation will include representatives from BAE, Continental Carriers, General Atomics, Jacobs, L3Harris, Northrop Grumman, Raytheon, Telephonics and Textron, among others.

"We have seen great positive energy and strong engagement between both governments and industry, leading to clarity in policy and the creation of a business-friendly climate to attract investment and spur growth," said mission cochair Dennis Swanson. "The expanded defence partnership between the US and India serves as an engine for growth and innovation, and we're excited about the future potential of the relationship."

Mission co-chair David Sutton similarly noted, "we are encouraged by positive developments in US-India relations, especially on the defence-industrial partnership front. With a presence of over 30 years in country, Lockheed Martin is privileged to have contributed to Indian defence operations as well as the evolution of indigenous defence manufacturing. We're excited to be back at DefExpo and showcase our 'Make in India' legacy and present-day activities to the largest gathering of defence and aerospace partners in the country. We look forward to expanded collaboration with local industry to advance India's strategic security and industrial capabilities."

In collaboration with the Government of India's Department of Defence Production, USIBC will also host an industry session at DefExpo 2020 on February 6, focused on the US defence industry's contributions towards 'Make in India'. The session will explore the investment environment in India's defence sector and opportunities for collaboration between US and Indian defence companies.

USIBC EXECUTIVE DELEGATION TO DEFEXPO 2020

Delegation Co-Chair

- Dr Vivek Lall, Vice President of Strategy and Business Development, Lockheed Martin US
- Dennis D. Swanson, Vice President, International Sales, Global Sales and Marketing, Defense, Space & Security and Boeing Global Services

Delegation Members

- Nisha Biswal, President, US-India Business Council and Senior Vice President, US Chamber of Commerce
- Ambika Sharma, Managing Director India, US-India Business Council
- David Keith Sutton, Director for Asia, Lockheed Martin
- Kevin McSweeney, President, Telephonics Corporation
- Timothy A. Byers, Vice President, Federal Defense and Environmental Growth and Strategy, Jacobs
- Anil Kumar Relan, Vice President, Jacobs
- Ravi Nirgudkar, President, Raytheon India
- Daniel Jay Darnell, Vice President Global Initiatives, Raytheon
- Cesar Antonio Rodriguez JR, Vice President Global Initiatives (International Business Development), Raytheon
- Amitabh Ghosal, Managing Director, L3 Harris Corporation
- Vaibhav Vorah, Managing Director, Continental Carriers
- Bob Schoeffling, India Regional Director, International Strategic Development, General Atomics Aeronautical Systems, Inc.
- David Park, Regional Director, BAE Systems
- Gyanendra Sharma, Country Head, Northrop Grumman
- Faran Siddiqi, Director, BAE Systems
- Vikram Narayanasamy, Director Business Development, Telephonics Corporation
- Ravi Sharma, Director, Business Development, Textron
- Pratesh Gandhi, Director, India Strategic Development, International Strategic Development, General Atomics Aeronautical Systems, Inc.
- Sandip Samaddar, Senior Director, US-India Business Council
- Osamazaid Rahman, Director, US-India Business Council

CONTROP WINS DRDO TENDER FOR SUPPLY OF ITS ISKY-50HD SYSTEMS

ONTROP Precision Technologies, specialising in the field of electro-optics and infrared (EO/IR) for defence and homeland security solutions has won a tender by India's Defence Research and Development Organisation (DRDO) for the supply of its iSky-50HD systems, for use on unmanned air platforms currently being developed for the Indian Armed Forces.

The iSky-50HD is a member of CONTROP's iSky family of lightweight, compact EO/IR observation systems, which have been specifically designed for use in challenging airborne environments. The iSky-50HD features highly-sensitive multi-spectral sensors, which are gyro-stabilized and have advanced image processing algorithms, thereby providing maximum sensor ranges and performance, for a variety of airborne defence appli-



cations. In daily operation around the world since the 1990s, the iSky systems are integrated into a wide variety of UAV, helicopter, fixed-wing aircraft and aerostat platforms.

"Winning this tender confirms CONTROP's leadership in the field of electro-optic systems," says Hagay Azani, CON-TROP's CEO & President. "We are very proud to have been awarded this strategic tender, which reflects our deep commitment to supporting the Indian Armed Forces with the latest technology. The DRDO tested several systems and concluded that our technology and pricing was best suited to meet India's defence requirements. We thank the DRDO for the confidence which they have shown in our products and technologies, and hope that this collaboration will lead to further projects in the future."

SPECIAL STORY



LUCKNOW TRIVIA

Lucknow, the capital city of Uttar Pradesh has always been a multicultural city that flourished as a North Indian cultural and artistic hub. Lucknow is known as the city of adab, nawabs and kebabs! The city offers magnificient heritage sites, delectable food and a hub of cultural renaissance. Here are few unique or unknow facts about the city.

To see:

Bara Imambara, also known as Asfi Mosque is an Imambara complex in Lucknow, India built by Asafud-Daula, Nawab of Awadh in 1784. The building also includes the large Asfi mosque, the Bhul-bhulaiya (the labyrinth), and Bowli, a step well with running water. Two imposing gateways lead to the main hall.

The **Rumi Darwaza**, in Lucknow, India, is an imposing gateway which was built under the patronage of Nawab Asaf-Ud-daula in 1784. It is an example of Awadhi architecture. The gateway stands 60 feet tall, was modeled after the Sublime Porte in Istanbul.

Chota Imambara, also known as Imambara Hussainabad Mubarak is an imposing monument built as a congregation hall for Shia Muslims, by Muhammad Ali Shah, the Nawab of Awadh in 1838. It was to serve as a mausoleum for himself and his mother, who is buried beside him.

The Residency, also called as the British Residency and Residency Complex, is a group of several buildings in a common precinct in the city of Lucknow, Uttar Pradesh, India. It served as the residence for the British Resident General who was a representative in the court of the Nawab. The Residency is located in the heart of the city, in the vicinity of other monuments like Shaheed Smarak, Tehri Kothi and High Court Building.



To shop:

Hazratganj Market – Hazratganj got its name in 1842, and is popularly known as 'Ganj'. After the First War of Independence in 1857, the British took over the city of Lucknow and Hazratganj was modeled after Queen Street in London. In 2010, after nearly 200 years, Hazratganj received a makeover. Buildings were painted in a uniform color, and stone pavements and Victorian style balustrades were constructed to enhance the architecture.

Lucknow is renowned for the art of **Chikankari** (Chikan embroidery). It is believed to have been introduced by Nur Jehan, the wife of Mughal emperor

Jahangir. Done using various techniques and a variety of textile fabrics, it is a popular choice among tourists visiting the city. At Hazratganj, you can find a variety of Chikan work at numerous stores in the Janpath Market. Hazratganj is also the hub for various other handicrafts and handmade objects.

To eat:

Lucknow is the land of Awadhi cuisine, has much more to offer than what meets the eye. From a wide range of lip-smacking kebabs to drool-worthy sweetmeats, Lucknow is heaven for gluttons! Here are some important food stops you should make.

- Basket Chaat at Gomti Nagar
- Ratti Lal's Khasta
- Prakash ki Kulfi
- Sharma Tea Stall
- Jain Chat Wala
- Raja Thandai
- Makhan Malai at Chowk
- Tunday Kababi
- Rahim's Kulcha Nahari
- Idris ki Biryani
- Chappan Bhog ki Mithaiyan
- Chole Bhature at Chowk
- Sheermal at Chowk
- Awadhi Biryani at Wahid's Biryani •

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