

# INDIAN AEROSPACE & DEFENCE



Aerospace, Defence, Security, Civil Aviation & Geopolitics



VAdm. S N Ghormade (r),  
Former VCNS



Lt. Gen. A K Suri,  
DG AAC



Cdr. Rahul Verma,  
TDAC, Indian Navy

# TRUSTED BY ARMED FORCES WORLDWIDE

High Quality Military-Grade Ammo  
from India's Only Private Sector  
Manufacturer & Exporter

## NATO & GLOBAL CALIBERS



- ▶ High accuracy ammunition for on target performance shot after shot



- ▶ Sealed to provide shelf life > 15 years
- ▶ Packaging to your custom requirements



- ▶ Non-jamming finish so you can fire with confidence. Will not let you down ever!

- ▶ State-of-the-Art Manufacturing Facility
- ▶ Highest Quality Standards

FOR MORE INFORMATION, CALL +91 80108 13607

**Marketing Office:**

No 111, 1<sup>st</sup> Floor, Mercantile House, K G Marg, Connaught Place, New Delhi, 110 001, India

 +91 11 4657 5529

**Factory:**

100-102, Verna Industrial Estate, National Highway 17, Goa - 403 722, India

 +91 832 6750 200

**Registered Office:**

#84, EPIP Industrial Area, Whitefield, Bangalore - 560 066, India

 +91 80 6717 1100

**DEFENCE**

India's Defence Sector:  
Reforms That Perform **7**

The Sky Is The Limit For  
Industry To Meet The Indian  
Army's Aviation & MRO Needs! **16**

'SPRINT': A Boost To Defence  
Innovation **18**

HENSOLDT Presents Twinvis  
Passive Radar System: To See  
Without Being Seen **22**

ISPA & DRDO Collaborate To  
Enhance India's DefSpace  
Capabilities: Expert Insights  
On Industry's Future **24**

Riding The LASER Wave **28**

**SPACE**

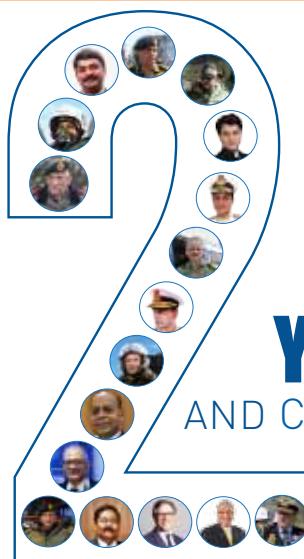
Indian Space Policy 2023  
Gets Green Light From  
Government, Focus On  
Private Sector Participation In  
Space Activities **30**

**CIVIL AVIATION**

Fractures In Supply Chain, A  
Spectre For Indian Carriers:  
Pratt & Whitney Power  
Plants Servicing Way Behind  
Schedule! **34**

# INDIAN AEROSPACE & DEFENCE

Aerospace, Defence, Security, Civil Aviation & Geopolitics



**YEARS  
AND CLIMBING**

**Cover Photo:**

Lt Gen. A K Suri,  
DG AAC  
VAdm. S N Ghormade (r),  
Former Vice Chief of the Naval Staff

Cdr. Rahul Verma, TDAC,  
Indian Navy

**Cover Artwork:** IA&D Creative Team

EU-India Aviation Summit  
Promotes Air Transport  
Relations, Tackles Shared  
Challenges & Industry  
Opportunities **36**

Airbus & Boeing: No Longer Is  
The Cupboard Bare **38**

**NEW BRIEFS**

**40**

**APPOINTMENTS**

**49**

**EVENT CALENDAR**

**50**

**Visit our digital bulletin today!**



**ENERGISE YOUR JOURNEY.  
PRESENTING THE COMPLETE  
MARINE LUBRICANT SOLUTIONS  
FROM INDIANOIL.**





**SERVO®**  
WORLD-CLASS LUBRICANTS  
*THE SCIENCE OF EXTREME*



# Two Years On...The Time Has Come

Two years ago, we took it upon ourselves to record the nation's progress in defence, aviation and aerospace with a vigorous editorial and an emphasis on the spearheads of our forces. As we cross this milestone, it has been a journey of discovery and given us great insight into the strategic planning and the intricacies of maintaining security and ensuring that defence is the best offence rather than the other way around.

In these two years, the Make-in-India mantra has fast-tracked into reality and galvanised the military-industrial complex (MIC). We have a plan for the short term and the long term, not just in tangibly upgrading our armed forces but in creating a viable infrastructure in manufacture, research and development not only for terrestrial reasons but also up in Space. India is, today, a major player in these areas and the future is not just bright but full of promises of high achievement.

By the same token, aviation has been prioritised, and the 'Ude Desh ka Aam Nagarik' (UDAN) aims to develop smaller regional airports to allow everyone access to flights. Over 400 routes in the regional connectivity scheme (RCS) have already made the concept a reality.

We are now the number one nation for buying aircraft, giving global aviation a spur after the Covid crisis. In a conversation with the Minister of Civil Aviation, Jyotiraditya Scindia, it was patently clear that we were literally going places...and new ones at that. Time indeed on this anniversary to thank him and other state ministers and elected leaders for giving us so much encouragement. We express a vat of gratitude to several high-profile Managing Directors and CEOs who got us this far and the Tri-Service Chiefs, Vice Chiefs, among the other flag rank officers who have given so freely of their time.

At this juncture, we once again salute the memory of the country's first Chief of Defence Staff (CDS), General Bipin Rawat, who, at the very beginning, said, don't stop; you can do it; something like your effort is vital to educate the civil population. We did not stop.

The Indian Army has been incentivised to modernise the soldier and enhance his lethal envelope. Upgraded state-of-the-art artillery and cutting-edge technology are also reflected in the manufacture of modern combat vehicle platforms. The latest in assault rifles will provide tangible comfort to the man on the battlefield.

The Indian Navy is being given influence to patrol the oceans and be counted. Over 45 vessels are under construction, and that is a lot of seapower. These include destroyers, frigates, corvettes, and conventionally-powered and nuclear submarines. No longer is the dependence on second-hand 'gifts' from other lands.

The Indian Air Force is primed for protecting the celestial canopy, and as fourth-generation fighters are inducted, there is a priority given to drone power and missile systems. The extra Long Range Surface to Air Missile (XRSAM) for the IAF, which is being developed by the Defence Research and Development Organisation (DRDO), is a case in point.

Our Defence Public Sector Undertakings (DPSUs) and our paramilitary forces have matured to individual entities in themselves, providing the ideal infrastructure and capabilities to make us a formidable foe and a very good friend. Our aerospace profile has widened its window dramatically. From now on, Industry 4.0 technologies hold the key to the A&D sector's competitiveness in the future and are being inducted rapidly.

Across the board, the Indian aerospace and defence composite market size will increase with a compound annual growth rate (CAGR) of 13.1 percent for the next six years. These are all positive developments and thanks to a more enlightened government and to the top echelons in the various corridors of power who have collectively understood and appreciated the need for fast-tracking our armed might and our determination to extend the frontiers.

  
**Kamal Shah**  
Editorial Director

## INDIAN AEROSPACE & DEFENCE

Aerospace, Defence, Security, Civil Aviation & Geopolitics

### Editorial Board & Panel

General MM Naravane (r)

Former Chief of the Army Staff

General Bikram Singh (r)

Former Chief of the Army Staff

Admiral Sunil Lanba (r)

Former Chief of the Naval Staff & Chairman – Chiefs of Staff Committee

Air Chief Marshal RKS Bhadauria (r)

Former Chief of the Air Staff & Current Chief Nodal Officer  
Uttar Pradesh Defence Industrial Corridor

Lieutenant General V G Khandare (r)

Advisor to Ministry of Defence

Air Marshal SBP Sinha (r)

Defence Research & Development  
Organisation – Chair

Air Marshal Anil Chopra (r)

Director General – Centre for Airpower Studies

### Editorial Team

Kamal Shah | Editorial Director

Vijay Grover | Editor

Bikram Vohra | Consulting Editor

Aritra Banerjee | Senior Correspondent

Anish Gandhi | Executive Director

Rajeev K Jha | Vice President -  
Strategic Affairs & Corporate Alliances

Mohammad Sahil Sarwar | General Manager

Design | Ragini Bisht

### For Editorial Queries Contact:

editorial@iadb.in

### For Advertising Details Contact

advertise@iadb.in

Subscription/Circulation

Annual within India Rs. 3,499 + Courier Charges

Annual Overseas US\$ 200 + Courier Charges

Email: subscribe@iadb.in

All rights reserved with Indian Aerospace & Defence. Reproduction, in whole or part, without permission of the publisher is prohibited. The entire contents are protected by copyright.

**DISCLAIMER:** Great care has been taken in the compilation and validation of information. All information in Indian Aerospace & Defence is derived from sources we consider reliable. The views expressed in the Indian Aerospace & Defence are not necessarily shared by, nor should they be taken as the views of the Publisher, Editor or the owner of Indian Aerospace & Defence. Any views expressed are those of the individual contributors. No responsibility or liability is accepted by the editor, the publisher or the owner for any loss occasioned to any person, legal or physical, acting or refraining from action as a result of any errors, statement, fact, figure, expression of opinion or belief contained in Indian Aerospace & Defence.

All advertisements must comply with the Indian Advertisement Code. The publication of advertisement does not in any way imply endorsement by the editor, the publisher or the owner of the product or services referred to therein.

### Registered Office:

Aviatara Media Pvt. Limited  
E-9/24 Vasant Vihar, New Delhi-110057

### Bengaluru Office:

C/o The Hub, Safina Plaza, Infantry Road,  
Bengaluru-560001

Printed and published by Rajeev Kumar Jha on behalf of  
Kamal Shah and Printed at Paras Offset Pvt.Ltd., C-176, Naraina  
Industrial Area, Phase-I, New Delhi - 110028 and Published from  
Gurugram, Gurgaon One, Old Delhi Road, Haryana.

Editor: Vijay Grover

Owned by Kamal Shah, Gurgaon One, Old Delhi Road, Haryana.

RNI NO: HARENG01038

# India's Defence Sector: Reforms That Perform

Kamal Shah

In the grand scheme of things, a nation's prowess in science, technology, and economics can be measured by its ability to arm its forces and reduce dependence on foreign imports. The present administration has taken significant steps towards the indigenisation of defence technologies and manufacturing in the country. The goal being, to utilise India's exceptional science, technology, and research talent base to develop new capabilities in defence innovation. The government's reforms will not only meet the requirements of the Armed Forces but also cater to the needs of friendly countries by exporting defence items.

The Central Government has been working towards the realisation of the objective of Make in India and Make for the World. They have implemented a series of reforms such as increasing Foreign Direct Investment (FDI), corporatising the Ordnance Factory Board (OFB), and creating defence corridors in states such as Uttar Pradesh and Tamil Nadu. These efforts will encourage foreign original equipment manufacturers (OEMs) to invest, manufacture and export from India.

Over the past two years, Indian Aerospace & Defence has consistently reported on measures such as increased defence budget and the administration's efforts to ensure that the earmarked amount goes to developing the defence-manufacturing ecosystem in the country. India has seen unprecedented advancements

in new technology developments and significant improvements in defence infrastructure as well.

Additionally, there have been several structural changes in the forces. Establishing the post of Chief of Defence Staff (CDS), launching the Department of Military Affairs (DMA), and working towards creating Integrated Theatre Commands top that list. These changes will require the Armed Forces to develop Integrated Operational Concepts (IOpC) and Doctrines to fight together, which is crucial currently.

## ECONOMIC REFORMS IN THE DEFENCE SECTOR

The extensive focus on ushering in economic reforms in the defence sector in the past few years is impossible to miss. The allocations in

the Union Budgets reflect this trend, with the Indian Armed Forces, part of the larger Ministry of Defence (MoD), receiving the largest share of the budget.

The Defence Allocation is about 1.5-2.5% of India's Gross Domestic Product (GDP). Within this, the Indian Army, the second largest in the world, commands a share greater than 50%.

Yet, the picture becomes a bit confusing when viewed from the perspective of expenditures. The revenue expenditure, which includes salaries, allowances, and other daily expenses, is sky-high compared to the capital expenditure, which deals with equipment and infrastructure.

IADB has extensively covered the multiple reforms initiated to curb this trend.

Over the years, the Government of India's (GoI) primary goal has been to increase the capital expenditure while reducing the revenue expenditure to enhance the capacity of the Armed Forces to invest in new equipment and infrastructure. This would not only help the Armed Forces to modernise and strengthen their defence capabilities but would also reduce dependence on foreign imports. Bringing in transparency and encouraging the private sector's participation have been critical steps in this direction.

### ► Zeroing in on the need for better equipment

In India, the defence services had a disorienting ratio of revenue expenditure to capital expenditure - a close



LCA Tejas during a sortie; File Photo



'Indian Coast Guard Ship Rani Abbakka' was the 1st Inshore Patrol Vessel (IPV) commissioned into the ICG; File Photo

65:35. This meant that for every INR 100, a whopping INR 65 was spent on salaries, allowances, and pensions, while a measly INR 35 was allotted for equipment and infra-related activities. For the army, out of every INR 100, a staggering INR 81 was spent on revenue expenditure. In 2014, the Centre set up the General Shekatkar Committee to recalibrate the expenditure pattern and enhance India's combat capability. The committee presented its report in 2016, highlighting the urgent need for a change. Following the committee's recommendations, the government took an unprecedented step to hike the capital outlay by 19%, ensuring that soldiers did not suffer from the lack of equipment.

#### ► Paving the way for more investments

India's strict licensing norms in the defence manufacturing sector have necessitated greater investments to expedite modernisation. The cumbersome process for FDI approval holders to seek Government approval for changes in equity/shareholding patterns under the Automatic Route has also unnecessarily subjected many companies to the approval regime. Additionally, unlike other sectors, defence lacked a dedicated

**"The present administration has taken significant steps towards the indigenisation of defence technologies and manufacturing in the country. The goal being, to utilise India's exceptional science, technology, and research talent base to develop new capabilities in defence innovation."**

agency to streamline and promote investments, and India's Defence Industry was left to compete in a field heavily weighted in favour of foreign manufacturers due to cheap imports of essential supplies.

To address these issues, the Government of India has liberalised the FDI policy, increasing FDI in the Defence Sector by up to 74% through the Automatic Route and up to 100% by Government Route, where it could provide access to modern technology. This higher automatic route limit facilitates ease of doing business.

Moreover, the Defence Investor Cell (DIC) was created in February 2018 to act as a single point of contact for addressing all defence production-related queries of entrepreneurs and/or industry. Since

its inception, DIC has successfully handled more than 1,100 queries. To further promote investments, the policy envisages the establishment of long-term strategic partnerships with Indian defence majors through a transparent and competitive process wherein Indian companies would collaborate with foreign military firms to set up domestic manufacturing infrastructure and supply chains to build military platforms like submarines, fighter jets, helicopters, and armoured vehicles/main battle tanks in India.

Furthermore, the Border Roads Organisation (BRO), a premier road and infrastructure building organisation, has been allowed to participate in Global Tendering in select priority countries where India has specific strategic interests to



The Pinaka 214 MM Multi Barrel Rocket Launcher System passes through the Rajpath during the full dress rehearsal for the Republic Day Parade; File Photo

counter China's aggressive strategy. This move is intended to help India increase its presence in neighbouring countries, providing strategic dividends against the aggressive policies of China.

#### ► Providing a level-playing field for Indian Industry

The Indian government has taken measures to provide a level playing field to the domestic defence industry by introducing import embargoes and reforms in the offset policy.

Under the import embargo, three 'Positive Indigenisation Lists (PILs)' have been issued, comprising 310 weapons and military platforms of Defence Services, for which there will be a phased embargo on imports. This includes high-tech weapon systems such as artillery guns, cruise missiles, assault rifles, corvettes, sonar systems, transport aircraft, light combat helicopters (LCHs), radars, wheeled armoured platforms, rockets, bombs, and armoured command post vehicles, among others. This initiative is expected to translate into orders worth more than INR seven lakh crores over the next five years.

Additionally, two 'PILs' of Defence Public Sector Undertakings (DPSUs) were launched, comprising 2,958 items for which there would be an embargo on imports. The first list for DPSUs contains 2,851 items, out of which 2,500 items have already been indigenised. This initiative is expected to save foreign exchange of INR 3,000 crore a year.

Furthermore, reforms in the offset policy have been introduced in the Defence Procurement Procedure (DAP) 2020 to incentivise investment and transfer of technology (ToT) for defence manufacturing. The value of the incentive multiplier for the transfer of critical technologies under offset discharge has been increased, and such transfers have been extended to private industries, with a thrust on attracting investment and transfer of technology for defence manufacturing.

These measures offer an unprecedented opportunity to the Indian Defence industry, particularly the private sector, to manufacture items using their own design and development capabilities and to meet the requirements of the Armed Forces in the coming years.

#### ► Ensuring efficiency for Defence Manufacturing

##### 1. Corporatisation of Ordnance Factory Board

- The rigidity and hindering control of needless compliance hurdles meant that the OFB, with its ordnance PSUs, could never become agencies with higher turnover and enhanced profitability.
- Corporatisation of OFB was approved in May 2020. OFB has been restructured, and seven new Defence Cos have been set up for greater efficiency and productivity.
- The Corporatisation of OFB has provided functional and financial autonomy and managerial flexibility, improving its accountability and efficiency in Ordnance Supplies.
- It has also enabled the organisation to grow faster and play a greater role in the country's defence preparedness while adequately safeguarding the workers' interests.
- The Ordnance Factories, which were classified into seven groups, are showing profit.

## **DEFENCE**

### **2. Defence Testing Infrastructure Scheme (DTIS)**

- Defence Testing Infrastructure is often capital intensive, requiring continuous upgradation. It is not economically viable for individual defence industrial units to set up in-house testing facilities.
- Earlier, private sector companies had to make their own arrangements and get the testing done by Indian/international private agencies.
- Testing facilities available with Government entities have been made available to the private sector
- DTIS has been formulated for creating six to eight Greenfield Defence Testing facilities in the country.

- This will provide easy access and meet the testing needs of the domestic defence industry, which will facilitate indigenous defence production, consequently reduce imports of military equipment and helping make the country self-reliant.

### **REVOLUTIONISING PROCUREMENT PRACTICES**

In pursuit of the “Atmanirbhar Bharat” vision, the Indian government has strongly pushed towards procuring defence equipment from domestic sources. This has provided a boost to private domestic manufacturers, including Micro, Small and Medium Enterprises (MSMEs) and start-ups, and has made Indian private shipyards eligible for bidding on projects alongside PSU shipyards.

Reforms have also focused on accelerating domestic defence acquisitions with greater transparency, overhauling trial and testing procedures to nurture competition based on principles of transparency, fairness, and equal opportunities for all, as pointed out by IADB's extensive coverage in the past two years.

To encourage start-ups and promote indigenous design and development of defence equipment, the “Buy Indian-IDDM” (Indigenously Designed, Developed and Manufactured) category has been introduced as the most preferred category for procurement. The newly introduced “Buy Global - Manufacture in India” category of capital procurement in DAP 2020 allows the outright purchase of equipment from foreign vendors, followed by indigenous manufacture through its subsidiary in India, a joint venture, or an Indian agency. This reform has helped create domestic design capabilities in the defence sector.

Furthermore, faster approvals for amendments to contracts have been implemented. All cases for extension of the Delivery Period (DP) were previously processed with the imposition of damages and other penalties as per the contract. This led to a delay in decision-making for the extension of DP cases where consultation was required with the IFA.

**“The Indian government is moving ahead with its vision of establishing Defence Industrial Corridors to bolster economic development and growth in the country’s defence industrial base. The corridors, one in Uttar Pradesh and the other in Tamil Nadu, are set to become an engine of economic growth.”**

INS Kalvari was the first of six Scorpene class submarines constructed at Mazagon Dock Limited (MDL) under Project 75 (Kalvari Class) to be commissioned into the Indian Navy; File Photo



75  
आज़ादी का  
अमृत महोत्सव



A Joint Venture of  
DRDO, India & NPOM, Russia



## BRAHMOS AEROSPACE

16, Cariappa Marg, Kirby Place, Delhi Cantt.,  
New Delhi - 110010 INDIA

Tel.: +91-11-4228 5000 Fax: Tel.: +91-11- 2568 4827

Website: [www.brahmos.com](http://www.brahmos.com) Mail: [mail@brahmoss.com](mailto:mail@brahmoss.com)

## **DEFENCE**

It is now proposed that Competent Financial Authority (CFA) may approve all amendments to contracts for DP extension, with LD, without consultation of IFA even when the original contract was concluded with its concurrence. This will lead to faster decision-making by taking away the time for unnecessary approvals.

### ► **Streamlining Procurement: Boosting Armed Forces' Operational Capability**

With the aim of aligning procurement with the specific requirements of India's armed forces, several measures have been implemented to empower service headquarters and field formations. These measures include the delegation of procurement powers to Service Headquarters (SHQs) and the enhancement of financial powers of Vice Chiefs up to INR 500 crore. Emergency financial powers have also been delegated to the armed forces for the procurement of ammunition and spares, while special emergency powers have been granted to SHQs.

These reforms have resulted in quicker decision-making, better planning, and enhanced operational preparedness of the services, enabling the optimum utilisation of resources.

### ► **Terrain-Specific Equipment for India's Armed Forces**

Acquiring equipment suitable for all kinds of terrain has led to longer acquisition timelines, sub-optimal exploitation of equipment, and increased costs. In response, a study on 'Designing and Equipping the Armed Forces with Terrain Specific Equipment' was ordered and conducted by Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA). Implementation of the recommendations will lead to equipment

suitable for terrain configurations that exist in the country, resulting in speedy acquisition and optimal utilisation of equipment. This will lead to reduced acquisition timelines, reduced costs, and optimal utilisation of equipment.

### ► **Simplified RFP for Ship-building and Repairs**

The Defence Procurement Procedure, 2016 ('DPP'), promotes procurement of products from Indian vendors, with prescribed Indigenous Content ('IC') levels. To streamline the process, the overall documentation requirements from the OEM have been reduced, along with the time for procurement and procedural steps. The prescribed format for calculating IC has been mentioned for ease of calculation for the bidder, and the categorisation has been simplified to make it more accessible for bidders.

The simplified Request for Proposal (RFP) has a direct impact on intended RFP participants by reducing procurement time and documentation requirements while improving transparency by providing upfront clarity on the calculation of IC, which will be covered under qualitative parameters.

### ► **Devolution of Financial Powers to Field Formations**

The primary aim of enhanced delegation of financial powers is to empower field formations to procure equipment/war-like stores speedily for urgent operational necessities. This will overcome procedural delays and bring about greater decentralisation and operational preparedness. These measures ensure the optimum utilisation of resources, enabling the Indian armed forces to be well-prepared for any challenge that comes their way.

## **STRUCTURAL REFORMS IN THE ARMED FORCES**

In recent years, bringing the three forces together under theatre commands and making India's defence forces modern, capable and efficient have been amongst the administration's top priorities. There have been some major structural reforms to that end:

### ► **Chief of Defence Staff (CDS)**

Following the several wars that occurred after India's independence in 1947, the need for a Chief of Defence Staff was identified. In 2019, Prime Minister Narendra Modi formalised the appointment of the CDS to integrate the forces and streamline communication protocols among them. The CDS's role helped fast-track indigenisation and reduce dependency on imports while implementing the Five-Year Defence Capital Acquisition Plan (DCAP) and the Two-Year roll-on Annual Acquisition Plans (AAP) as part of the Integrated Capability Development Plan (ICDP).

### ► **The Benefits of a Theatre Command System**

Implementing the 'Theatre Command System' aims to bring synergistic coordination between the three branches of the armed forces. Not only will the theatre commands be useful during wartime, but they will also streamline communications and procurement of resources. This will help establish a budget, reduce expenses, and upgrade armed forces as required.

### ► **Leveraging Young India**

The Agnipath Scheme has been designed to enable a youthful profile of the Armed Forces. The scheme offers a Tour of Duty (ToD) model for aspiring youth to join the forces. Under this scheme, 25% of Agniveers will be inducted into the forces on a permanent basis. Not only that, several state governments and private industries have stepped up to provide jobs for candidates who pass out of the programme.

The five Young Scientists Laboratories launched by the Defence Research and Development Organisation (DRDO) in 2020 are located in

**"The Indian government's push for self-reliance in defence manufacturing has gained steam under the leadership of PM Modi. With a goal to increase domestic manufacturing capacity and reduce dependence on imports, the government has introduced several policies and initiatives."**

Bengaluru, Mumbai, Chennai, Kolkata, and Hyderabad. They provide an R&D environment for young minds to explore emerging engineering fields and advanced technologies such as Artificial Intelligence (AI), Quantum Technologies, Cognitive Technologies, and Smart Materials. With such opportunities at hand, the future looks bright for young talent looking to serve their country and make a difference.

## MAJOR PROCESS REFORMS

The Indian government's push for self-reliance in defence manufacturing has gained steam under the leadership of PM Modi. With a goal to increase domestic manufacturing capacity and reduce dependence on imports, the government has introduced several policies and initiatives. One key initiative has been the digitisation of processes, which has streamlined procurement and made the process more transparent. In addition, the government has implemented checks and balances to restrict imports, while promoting exports and creating a conducive ecosystem for FDI.

The government has also formulated schemes aimed at promoting ease-of-doing-business and encouraging the manufacturing and procurement of indigenous products. These policies have provided a much-needed boost to the domestic defence industry, creating new business opportunities and helping establish India as a global player in the defence sector. IADB's previous coverage has highlighted that the focus on domestic manufacturing and innovation is expected to drive significant growth in the defence sector, creating new jobs and boosting the economy.

**Industrial licensing:** Simplifying industrial licensing processes to encourage more domestic production has been a key area of focus. The government has rationalised the defence products list requiring industrial licenses, which has increased the validity of the license from three to 15 years, with an option to extend it further on a case-by-case basis. This move has provided companies with the necessary time and space to operate without any hindrance and secure financing from institutions. The ease of filing applications has also resulted in more licenses being

**"Designing and Equipping the Armed Forces with Terrain Specific Equipment' was ordered and conducted by Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA)."**

## BIG BOOST STRATEGIC SELF-RELIANCE

As a result of the reforms initiated in India in the last 8 years, many state-of-the-art products have been produced. These include:

- 155mm Artillery Gun system 'Dhanush'
- Light Combat Aircraft (LCA) 'Tejas'
- Surface to Air Missile (SAM) system 'Akash'
- Next-Generation BrahMos Missiles
- Main Battle Tank (MBT) 'Arjun'
- Armoured Personnel Carrier (APC)
- Advanced Light Helicopter (ALH)
- Dornier Do-228
- Pinaka Rocket
- Man Portable Anti-Tank Guided Missile (MPATGM)
- High Mobility Trucks
- INS Kalvari
- Anti-Submarine Warfare Corvette (ASWC)
- Bridge Laying Tank
- Weapon Locating Radar (WLR)
- Integrated Air Command and Control System (IACCS)
- 'Lakshya' Parachute for Pilotless Target Aircraft
- Inshore Patrol Vessel (IPV) and Offshore Patrol Vessels (OPVs)

issued and faster approvals.

**Capital Acquisition Procedures:** Another move has been to simplify the Make-I and Make-II Capital Acquisition Procedures. Under the Make-I category, the administration funds 90% of the projects, whereas the Make-II category involves prototype development or upgrades primarily for import substitution. The government has introduced industry-friendly provisions in this procedure, such as relaxing eligibility criteria and minimal documentation.

**SRIJAN portal:** To facilitate indigenisation by the Indian industry, including MSMEs, the government launched an indigenisation portal, SRIJAN, in August 2020. Through this portal, the Indian industry can identify and express interest in the items for which they possess or can obtain design, development and manufacturing capabilities. Over 21,000 defence items that were previously imported have been displayed on the

portal, and the private industry has expressed interest in indigenising more than 4,700 items.

## SPECIAL FOCUS: DEFENCE INDUSTRIAL CORRIDORS

The Indian government is moving ahead with its vision of establishing Defence Industrial Corridors to bolster economic development and growth in the country's defence industrial base. The corridors, one in Uttar Pradesh and the other in Tamil Nadu, are set to become an engine of economic growth. The Uttar Pradesh Defence Industrial Corridor (UPDIC) will connect six nodes: Agra, Aligarh, Chitrakoot, Jhansi, Kanpur, and Lucknow, while the Tamil Nadu Defence Industrial Corridor (TNIDC) will develop five nodes, including Chennai, Coimbatore, Hosur, Salem and Tiruchirappalli. The corridors will house public, private, and MSME units, with an investment of INR 20,000 crore planned by 2024. So far, the industry has already invested around INR 5,000 crore, indicating



Arjun MK1A variant during field trials; File Photo

strong support for the project. This initiative will create numerous job opportunities in the coming years, while the development of regional industries will get a significant boost.

### R&D DRAWING AN ERA OF INNOVATION

Gone are the days when Defence R&D was limited to government labs and research centres. The Indian government has now opened up defence R&D to the industry, start-ups, and academia, with a whopping 25% of the defence R&D budget earmarked to promote the development of defence technology in the country.

**Nine thrust areas for defence research:** The Defence Research and Development Organisation (DRDO) has identified nine thrust areas for focused research to develop innovative solutions in defence technology. These areas include platforms, weapon systems, strategic systems, sensors & communication systems, space, cyber security, artificial intelligence and robotics, material and devices, and soldier support.

**New initiatives to foster the adoption of AI:** To enable the adoption of AI in defence, the government has created the Defence AI Council (DAIC) and Defence AI Project Agency (DAIPA). An AI roadmap has also been finalised to streamline the development of AI in the defence sector.

**DRDO launches Technology Development Fund (TDF):** The DRDO has launched the TDF to support Indian industries, including MSMEs and

start-ups, with financial support for the design and development of innovative defence products. The TDF provides funding through grants-in-aid to enable the development of new technologies.

**New patent policy to boost Indian industries:** The DRDO has also promulgated a new patent policy to provide Indian industries free access to use DRDO patents. This move is expected to provide Indian industries access to the innovations carried out by DRDO, further boosting their R&D capabilities and fostering the development of new technologies.

**iDEX platform to incubate and develop ideas:** The Indian government has launched the Innovations for Defence Excellence (iDEX) platform to foster innovation and technology development in defence and aerospace. Hundreds of start-ups and innovators have responded to the rounds of Defence India Start-up Challenge (DISC) and open challenges, and many of them are using the iDEX platform to incubate and develop their ideas. The government earmarked INR 500 crore to support MSMEs and start-ups through iDEX, and the platform provides funding and other support to carry out R&D with potential for future adoption in the Indian defence and aerospace industries.

With these revolutionary initiatives, India is fostering open innovation and collaboration in defence R&D, opening up new opportunities for start-ups, MSMEs, and academia to develop cutting-edge technologies to meet the country's defence needs.

### GOING TO THE GRASSROOTS

Connectivity and economic vitality in remote border regions are crucial for national security. It can strengthen border security against external threats and promote cross-border trade for improved regional relations and stability.

Two of the Central government's initiatives focus on this aspect of defence.

**Vibrant Village program:** The Vibrant Villages Programme (VVP) was unveiled in India's Union Budget for 2022-23. The government is implementing the Border Area Development Programme (BADP) in partnership with State Governments/UT Administrations, covering habitations situated within 0-10 km from the first habitation at the international border in 460 border blocks of 117 border districts in 16 States and 2 UTs. The programme approves annual action plans submitted by States/UTs, consisting of works related to village infrastructure, such as roads and bridges, health, education, agriculture, sports, drinking water, and sanitation.

**Development of BRO in work of strategic nature:** Over the past eight years, several measures have been implemented to enhance the efficiency and timeliness of the (BRO) in carrying out its duties. These include the establishment of a "Centre of Excellence" by BRO to prioritise road safety, the integration of safe road practices in construction, and the identification and mitigation of accident-prone areas or "black spots," leading to a decrease in road accidents.



# MAGNETIC MAHARASHTRA

## Maharashtra: The economic powerhouse



- **Largest GDP in India**  
Maharashtra's GSDP is \$439 billion; accounting for 14% of India's GDP.
- **Largest share in FDI**  
Attracted \$182 Billion FDI in April 2000 – September 2022; accounting for 28.5% of India's share.
- **Leader in Manufacturing**  
Maharashtra contributes to 13.8% of the Industrial output in India.
- **Excellent industrial area in IPRS**  
As per the Industrial Park Rating System (IPRS) report released by the Department of Promotion of Industry and Internal Trade (DPIIT), Maharashtra's most favourable industrial zones.
- **Excellent Law and order**  
This is known for progressive administration and policy continuity.
- **Leader in Exports**  
Maharashtra has the highest value of exports; accounting for 16% exports
- **Best Quality Workforce**  
Maharashtra has the highest employable talent in India at 68%.
- **Robust Infrastructure**  
3 International & 13 domestic airports, 2 major & 53 minor ports, and largest power capacity.

## Investment Intentions Signed

The industries department along with MIDC signed 143 MoUs with key investors between June 2020 and January 2023 amounting to INR 4,11,868 Crores and potential employment generation of 5,28,296.

- **Magnetic Maharashtra 2.0, June & July 2020 - INR 17,686 Cr | 14,025 Jobs**  
No. of MoUs – 15 | Key Sectors – Chemicals, Auto, ESDM, Oil & Gas | Key Countries – USA, Japan, Singapore, South Korea
- **Magnetic Maharashtra 2.0, November 2020 - INR 34,829 Cr | 23,182 Jobs**  
No. of MoUs – 15 | Key Sectors – Data Centers, Logistics, Electronics | Key Countries – Spain, United Kingdom, Japan, Singapore, India
- **Magnetic Maharashtra 2.0, December 2020 - INR 61,042 Cr | 2,55,380 Jobs**  
No. of MoUs – 25 | Key Sectors – Data Centers, Logistics, Electronics | Key Countries – India
- **Magnetic Maharashtra 2.0, July 2021 - INR 16,500 Cr. | 5,000 Jobs**  
No. of MoUs-2 | Key Sectors - Petroleum, Natural Gas, Renewable Energy | Key Countries-Australia, India
- **Magnetic Maharashtra 2.0, September 2021 - INR - 35,500 Cr. | 10,000 Jobs**  
No of MOU's - 2 | Key sectors - Renewable Energy | Key countries - India
- **Magnetic Maharashtra 2.0, October 2021 - INR - 2,823 Cr. | 1,250 Jobs**  
No of MoU's - 1 | Key sectors - Electric Vehicle | Key countries - UK
- **Magnetic Maharashtra 2.0, November 2021 - Dubai Expo 2020 - Rs.15,617 Cr. | 11,385 Jobs**  
No. of MoUs - 25, 1 Key Sectors - Logistics, Auto Components, Oxygen Manufacturing, Data Centres, Bio-Fuel | Key Countries-Japan, Singapore, Sweden, Korea, Germany, Italy, and India.
- **Magnetic Maharashtra 2.0, December 2021 and January 2022 - INR - Rs.5,512 Cr. | 9,980 Jobs**  
No. of MoUs - 13 | Key Sectors - Bio Fuel, IT-ITES, Technical Textiles, Chemical, Auto, Electronics | Key Countries - France and India.
- **Magnetic Maharashtra 2.0, May 2022 - INR - Rs.80,479.78 Cr. | 96,705 Jobs**  
No. of MoUs - 25 | Key Sectors - IT Parks, IT-ITES and Data Centres, Textiles, Food Processing, Paper & Pulp, Engineering and Steel, Renewable Energy, Logistics, Oil and Gas | Key Countries - Singapore, Indonesia, USA, South Korea and Japan.
- **JSW Energy, October 2022**  
INR – Rs. 4,196 crores No. of MoUs- 1 | Sector-Energy | Key Country- India
- **World Economic Forum 2023, January 2023**  
INR – Rs. 1,37,666 crores (~ USD 17 Bn) No. of MoUs- 19 | Jobs- 101,389 | Key Sectors- Energy, Hi-tech & Infrastructure Industry, Steel Manufacturing, Agro & Food Processing, IT/Fintech/Data Center | Key Countries: India, Portugal, Japan, USA, Mauritius, Netherlands, Finland, Singapore, Canada, Taiwan, Luxembourg, Israel, Korea, Germany

## Total Investment Mobilised – INR 8,83,384 Cr

### Investment Intentions - INR 4,11,868 Cr

(June 2020 - January 2023)

### Foreign Direct Investment – INR 3,51,330 Cr

(October 2019 - December 2022)

### Regular Investment – INR 1,20,186 Cr

(From December 2019)

#### Strategic investment corporation agreement with key partners:

- Swiss India Chamber of Commerce India
- University of Berkley
- Center for New Economy and Society
- The World Economic Forum's Platform for Shaping the Future of Urban Transformation

Head office:

**Maharashtra Industrial Development Corporation**  
Udyog Sarathi, Mahakali Caves Road, Andheri (E), Mumbai - 400 093.

**Website:** [www.midcindia.org](http://www.midcindia.org)

Principal office:

**Maharashtra Industrial Development Corporation**  
4(A), 12th Floor, World Trade Centre Complex 1, Cuffe Parade, Colaba, Mumbai - 400 005.  
**Website:** [www.midcindia.org](http://www.midcindia.org)



# The Sky Is The Limit For Industry To Meet The Indian Army's Aviation & MRO Needs!

Kamal Shah

Indian Aerospace & Defence's Editorial Director, Kamal Shah, conducted an exclusive interview with the Indian Army's Director General, Army Aviation Corps (AAC), Lieutenant General A K Suri, on his military aviation vision for the service and the nation. The interaction delved into critical technologies the domestic defence industry could focus on, the emerging defence Maintenance, Repair and Overhaul ecosystem and opportunities for the private sector, the indigenous aircraft engine manufacturing efforts and how they could be achieved, followed by advice for start-ups on how they can support the operational needs of army aviators.

**Q. Post Aero India 2023, what are your expectations from the indigenous industry towards meeting the services critical technology needs? What specific areas and technologies would you suggest to the Indian companies dealing in the aviation sector to focus on keeping Army Aviation's requirements in mind?**

**Ans:** Self-reliance in defence production is very important. A large scope exists for indigenous manufacture of various components of helicopters such as avionics, communication equipment, airframe components etc. Artificial Intelligence (AI) based solutions to reduce pilot fatigue, In-

dian Regional Navigation Satellite System (IRNSS)-based Global Positioning System (GPS), Software-defined Radio (SDR) for helicopters and latest generation Night Vision Goggles (NVGs) are some of the technologies where Indian companies can focus on.

**Q. The AAC has established MRO hubs in collaboration with Hindustan Aeronautics Limited (HAL), can these be further streamlined with private sector players too? Also, looking at the current massive expansion plans in terms of the number of aircraft in both commercial**

**and military domains in India, do you see India becoming an MRO sector hub in the region and could grow rapidly in India?**

**Ans:** MRO hubs are HAL-operated Maintenance and Repair hubs which have been established to facilitate the units in terms of reducing the Advanced Light Helicopter (ALH) related spares and Line-Replaceable units (LRUs). A need was felt to make these repair hubs more effective by including the repair and calibration of critical Ground Support Equipment (GSE), Ground Handling Equipment (GHE) and Bay Servicing Equipment (BSE).

In this regard, an interaction with Original Equipment Manufacturers (OEM) and Original Equipment Suppliers (OES) of critical GSE, GHE and BSE supplied by the private sector was undertaken. During the meeting majority of OEM/OES agreed in principle for the establishment of facilities at MRO hubs. Army Aviation and OEM/OES have also been facilitated in this regard.

**Q. What opportunities are available for the Indian private sector, notably Micro, Small and Medium Enterprises (MSME), to collaborate and support the AAC and, in turn, create a foundation for the military MRO ecosystem in India?**

**Ans:** As already brought out earlier, MSMEs can be part of the large ecosystem of the Indian industry to provide various components of helicopters for manufacturing by HAL or to



DG AAC, Lt Gen. A K Suri at work



An Indian Army Chetak helicopter undergoing a sortie; File Photo



AAC DG Lt Gen. AK Suri successfully completed test sortie of Light Utility Helicopter; File Photo



Personnel from the Indian Army's Parachute Regiment slithering down an ALH Dhruv during Army Day demonstrations; File Photo



US Army soldiers exit an ALH Dhruv flown by Indian Army aviators during static load training conducted for Yudh Abhyas; File Photo

some other manufacturer.

**Q.** Indigenisation in engine production and serving has been an area of development for a while now. Could you share your views on how a robust indigenous engine ecosystem could be set up in the country? For this, what areas should Indian companies/Joint Ventures (JVs) focus on?

**Ans:** HAL has already paved the path for indigenisation in engine production. The establishment of HEMRU (JV between HAL and Safran) would strengthen the indigenisation effort towards engine production. HAL has laid out an elaborate path for indigenisation where clear milestones with regards to the indigenisation of critical technologies have been well spelt out. HAL is making endeavours to establish a local vendor base for

**"There is a large scope for private industry to cater for the requirements of Indian defence forces. The quality of equipment being offered by the start-ups for aviation use should be of nothing less than gold standards."**

the sub-system, and in this regards, the local vendors must be facilitated for joint production and co-development with HAL.

**Q.** What message would you like to give to the indigenous defence industry, especially start-ups and innovators, after Aero India 2023?

**Ans:** The response from the Indian industry post the impetus on At-

manirbhar Bharat has been very encouraging. A number of products have been offered by various start-ups and innovators for various defence solutions. Still, there is a large scope for private industry to cater for the requirements of Indian defence forces. The quality of equipment being offered by the start-ups for aviation use should be of nothing less than gold standards.

# 'SPRINT': A Boost To Defence Innovation

Vice Admiral S N Ghormade (r)

Inducting new defence technology into the Armed Forces takes years! Or at least it used to. This is the story about how things are changing. This is due to the changed environment and the thrust given to the Atmanirbharata by our Hon'ble Prime Minister, Narendra Modi. This is the story of 'SPRINT'. This is a story that needs to be told.

The ambitious commitment by the Naval Innovation & Indigenisation Organisation (NIIO) to induct at least 75 indigenous technologies or 'products' into the Indian Navy as a part of Azadi ka Amrit Mahotsav which was unveiled by the Hon'ble Prime Minister during the 'Swavlamban' seminar in July last year has, arguably, forever transformed defence innovation in the country.

The results will, I am sure, be showcased during this year's edition of the NIIO seminar - but all of us involved were aware even while it was being launched that we were witnessing history in the making. The

initiative named 'Supporting Pol-evaluting in R&D through iDEX, NIIO and TDAC' (SPRINT) has shown what can be done.

In this article, I shall cover some aspects of how things could be accelerated to hitherto unimaginable levels. Let me put things in perspective, 75 technologies over a year mean - on an average - more than one new product every few days! This includes not only the selection of the winner, agreement/contract signing, actual product development and the trials. Each of these steps itself takes many days. The pace at which work progressed obviously meant that people were multi-tasking, and the status was changing not every day but every hour.

The cases currently being handled by a very small team of officers at NIIO exceed cases that the remaining services and all Defence Public Sector Undertakings (DPSUs) are progressing - combined! Just examining over 1,100 proposals from the industry



**VAdm. S N Ghormade (r),**  
Former Vice Chief of the Naval Staff

and signing a development agreement within 20 days is an achievement in itself. I think it is, therefore, in order that the factors that helped us achieve this are documented so that other stakeholders and future officers benefit.

The primary thrust which helped



was collaboration and a positive attitude. This collaboration was not limited within the Navy but included stakeholders such as the Defence Innovation Organisation (DIO) under the Ministry of Defence (MoD), the Ministry itself, the academia and the industry. This collaboration was also interspersed with numerous challenges and contestations!

Anything disruptive will understandably have challenges and resistance. Many occasions involved disagreements. The disagreements were, however, never disagreeable. The differences of opinion were professional, never personal and handled with a positive attitude. The discussions never turned acrimonious, even as we ensured that every dissonance was heard, brainstormed and debated. Ultimately, we all came together for a solution towards building a capability for the nation.

The next important aspect that worked was a combination of the Top-down and Bottom-up approaches. SPRINT was simultaneously 'top driven' but had enough leeway for the delegation to the lowest rung possible. The intent was made clear by the top naval hierarchy and endorsed by the apex politi-

**"The statement that the NIIO sees the startups as 'partners' and not 'vendors' may be clichéd, but it is true and certainly did help. This was followed in letter and spirit. Small actions like staying back after the Manthan event at DefExpo to interact with our partners by the naval hierarchy made a huge difference. This was appreciated by the startups. A very small gesture, but it helped. During the Aero India exhibition, the entire top naval hierarchy, made it a point to visit every SPRINT winner's stall."**

cal leadership. The execution was left to the nodal officers at the working level.

*"Greater Freedom means greater responsibility"* is a mantra I believe. Therefore, Nodal officers were to take informed decisions keeping their hierarchy informed if deemed necessary. Periodic reviews at various levels including me ensured adequate checks and balances without any delay and brought in value addition expeditiously. This ensured that youngsters took responsibility whilst also being aware that not only would

their actions be monitored but also fully supported as long as the direction was right. While these two overarching tenets have defined SPRINT since its inception, specific actions to make the project successful had to be taken. Again, it was a top-driven approach with a lot of leeway for execution that helped. Let me list some of the actions that were undertaken.

The outreach needed to be effective in increasing awareness to get the industry to participate in such large numbers. Of course, the fact that the initiative was launched





Former VCNS, VAdm. Ghormade interacting with SPRINT winners during Aero India 2023

by the Prime Minister gave it a head start, but the same had to be followed up by multiple sessions (hybrid as well as in person) across the country where teams from the NIIO and the DIO interacted with the industry and not only explained the procedures but also clarified any doubts. This was done at an unprecedented scale, resulting in a remarkable outcome. Over eleven hundred applications (1106) from the industry were received in response to the challenges!

DIO's 'partner incubators' role in providing administrative support for the outreach was invaluable and must be acknowledged. Effective use was also made of social media for this outreach. Serving officers, traditionally, do not interact with the media and are averse to social media platforms. This needed to change if we were to reach out. The media interaction helped and was undertaken both formally and informally. At the formal level, for example, a curtain raiser press conference was organised before the Swavlamban seminar and was at the level of the Vice Chief. This created a very positive and conducive environment right from the beginning and gave the necessary impetus to the initiative.

The Officer-in-Charge (OIC) Technology Development Acceleration Cell (TDAC) not only gave media interviews but was also active on Twitter. At the informal level, the spokesperson navy ensured that

all media queries were answered by TDAC. OIC TDAC had been permitted to be active – in his personal capacity – on social media by my predecessor. I continued and encouraged this.

Another approach which we followed was that once committed, we only moved forward with the DIO and partner incubator and did not look back. In my view, quite a few cases of SPRINT may never have materialised if not for this factor. Resistance (both internal and external) could be overcome as we had – publically and visibly – committed to the cases. As stated, resistance to change and difference of opinion is normal and natural. A healthy and committed approach was found to overcome this.

After the outreach came the challenging task of selecting the winners. Selecting one or two winners for each challenge from so many applicants was again not an easy task. This was enabled by multiple levels of screening. We worked in parallel. Each problem had a nodal officer who shortlisted the potential firms.

The partner incubators similarly made their own list. TDAC then shortlisted a few based on these lists, and the High Powered Screening Committee (HPSC) took the final decision. The task of the HPSC was also difficult but more easily handled in a collegiate manner. Some applicants had terrific technology but a terrible presentation, and vice versa. Most decisions finally came down to a vote. Every screening committee member

voted, and the aggregate was taken as the decision, which all concerned agreed to abide by. This was fair and transparent and even helped give the winners a final ranking or order of priority.

Keeping with the spirit of acceleration, the screening was carried out over a continuous sitting of many days so as to not break the momentum. TDAC operated from the Indian Institute of Technology Delhi (where HPSC meetings were conducted) for ten days, attending presentations by startups from '8 to 8'. Even after the gruelling 12 hours of presentations, the team (both from NIIO and DIO) worked late into the night, compiling the results for the day so that the paperwork was sorted before the next day's presentations started. This continued over many days, including over holidays. This level of demonstrated commitment rubbed an infectious enthusiasm on all.

The first development agreement was signed by DIO within 20 days of the winner being declared. This was an achievement of the DIO and the startup itself and had only a minor involvement of the NIIO. The fact that the need to accelerate had been imbibed by all is, however, certainly a factor of the pace at which the screening was undertaken in a missionary mode whilst keeping the overall aim of capability development for the nation always in mind.

Even after the winners were selected, numerous small actions went

into making the initiative a success. Let me list just a few.

The statement that the NIIO sees the startups as 'partners' and not 'vendors' may be clichéd, but it is true and certainly did help. This was followed in letter and spirit. Small actions like staying back after the Manthan event at DefExpo to interact with our partners by the naval hierarchy made a huge difference. This was appreciated by the startups. A very small gesture, but it helped. During the Aero India exhibition, the entire top naval hierarchy, made it a point to visit every SPRINT winner's stall.

Given the limited time available, this required some planning, but by the end, the 'SPRINT winner' had become a brand in itself and got envious looks from the rest of the industry. We also designed a banner stating 'Proudly working with NIIO towards Atmanirbhar Bharat' and encouraged the SPRINT winners to display it at their stalls at various exhibitions - like a badge of honour. They all did, and the pride was mutual. This feeling of being a part of something important was not limited to the naval hierarchy alone - the video of the Hon'ble Defence Minister Rajnath Singh hugging one of the SPRINT winners at Def Expo is available online. These things helped the cause in no small measure. It was also realised that we must ensure that 'our' startups grow long-term so that we may get a product at the end of one year.

We may place orders including clauses for five years of maintenance. All this becomes meaningless unless the partner startup grows to be able to support the products in the coming years. Helping tie up venture capital (VC) where required, recommending the firm to other services and indeed for export orders is therefore important.

The second day of the NIIO seminar Swavlamban, it may be recalled, was focused on 'Outreach to the IOR'. This was not only in keeping with the stated policies of Security and Growth for All in the Region (SAGAR) and Make in India but also important to ensure that our partners grow. It is heartening to see that some of the startups are getting inquiries for exports even as the products are still being developed.

Last but certainly not least, I must



With IDEX – SPRINT winners at DefExpo 2022



With IDEX SPRINT winners at Combined Commanders Conference held in March 2023

acknowledge the stellar role played by the industry bodies. This was not limited to the Society of Indian Defence Manufacturers (SIDM), who not only co-organised the seminar and helped the Navy in monthly outreach to the industry but indeed to many industry bodies, including the local chapters in states. Whenever our officers visited any outstation location, these bodies hosted the event and helped gather the support of the local industry. Once again, the bottom line was that we are looking for 'partners'.

To conclude, the defining features of SPRINT have set precedence for the future. During the Swavlamban Seminar, Hon'ble Prime Minister echoed that '*Our Navy must reach glorious heights when India celebrates the centenary of our Independence in 2047*'. We will work together to ensure the Indian Navy becomes fully self-reliant by 2047.

**VAdm SN Ghormade, PVSM, AVSM, NM, ADC (superannuated on 31 March 2023), former Vice Chief of the Naval Staff, significantly contributed towards creation and sustenance of combat-ready, credible, cohesive and future-proof Navy through focused**

*impetus on integrated planning, innovation, indigenisation, adopting emerging technologies in capital acquisition, infrastructure development and optimising allocated fiscal resources. He also worked on the Theaterisation of Armed Forces, emphasising Tri-service synergy, joint-manship and integrated planning. The Navy has been at the forefront of Atmanirbharta, and as the VCNS, he gave impetus to the Atmanirbhar initiatives with dedicated efforts to encourage Indian industry along with the Defence Research and Development Organisation. Sustained momentum on indigenisation has resulted in a continuous increase in indigenous content in Naval ships. Further, Indian Navy effectively utilised the 'Make' and 'iDEX' routes to achieve the objective of self-reliance by involving greater participation of the Indian industrial eco-system, including the Private Sector. Under his supervision, Indian Navy propelled towards the induction of more than 75 new technologies/products through SPRINT challenges within a year, some of which would be game changers and even the first of their kind in the world.*

# HENSOLDT Presents Twinvis Passive Radar System: To See Without Being Seen

Staff Correspondent

HENSOLDT, the provider of the state-of-the-art Air Defence and Weapon Locating Radar COBRA, now presents its passive radar system Twinvis.

With the Twinvis passive radar, HENSOLDT has revolutionised classical radar technology. This system does not emit any signals itself, which means that it remains virtually invisible. Nevertheless, it can even locate aircraft equipped with stealth technology.

For the first time, Twinvis allows the airspace to be monitored over a radius of up to 250 kilometres, without emitting radar signals. Open for integration into several infrastructures such as buildings, shelters or vehicle, this radar's possible uses are almost unlimited, ranging from military air surveillance in critical environments to support of homeland security through windfarm resistant performance and potentially air traffic management applications.

Conventional radar systems all work using the same principle: they

**"With the Twinvis passive radar, HENSOLDT has revolutionised classical radar technology. This system does not emit any signals itself, which means that it remains virtually invisible. Nevertheless, it can even locate aircraft equipped with stealth technology."**

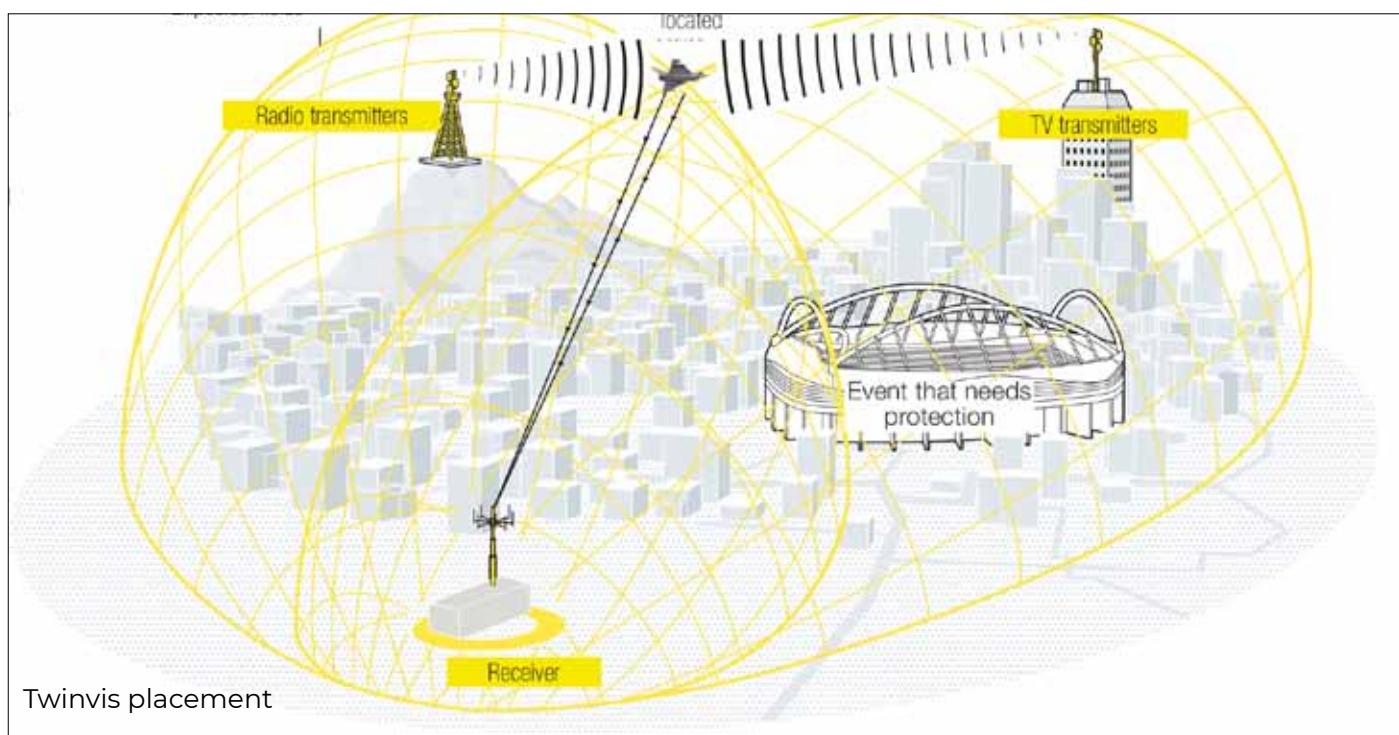
emit signals that are reflected by an object. The radar in turn visualises that object based on the echo received. Twinvis follows a radically different approach: the system uses the countless radio signals which are already in the air from broadcast and TV transmitters and evaluates their echoes when reflected by an object.

## MORE SECURITY

For politics and business events, safety is a key issue. In this context, it would be possible to use a mobile Twinvis to even track small aircraft without transmitting any signals of

its own. Thanks to its innovative, light weight and low power consumption technology, it can be installed directly in valleys and monitor the airspace, which was only possible with a great deal of effort, if at all, with conventional radar systems.

And that is just one of many applications. In addition, Twinvis could, for example, detect the aircraft of smugglers in a specific region, support GBAD systems with its silent radar component to avoid long emitting periods of the active radar assets, or cost-effectively supplement conventional radars in air traffic



control. As it doesn't broadcast any signals, it can even be used without any additional official approvals.

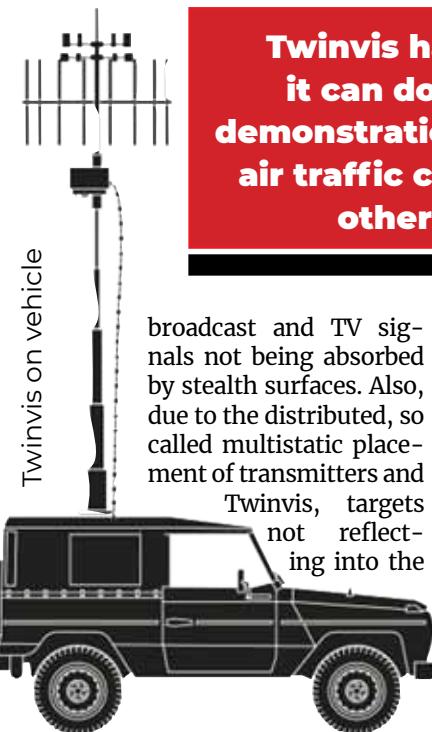
This 'super radar' is made possible by the extension of the computing performance and by a speciality of HENSOLDT: a highly sensitive, multi-channel digital receiver technology, which makes it possible to locate radar echoes that are up to ten billion times weaker than the output signal, for as many as 25 transmitters at the same time.

## NO VISIBILITY

In the military field, Twinvis even combines several advantages. In addition to its high mobility, the system itself remains 'invisible', that means that it cannot be jammed or eliminated in a targeted action. At the same time, it can also be used to discover previously undetectable stealth aircraft that conventional radar systems cannot pick up because of the low observable technology.

Stealth technology prevents an aircraft reflecting conventional radar signals into the direction of arrival. It absorbs the large part of these signals and the remaining reflected portion is scattered by the surface of the aircraft and thus undetectable.

Twinvis counters this technology by exploiting frequencies from



**Twinvis has already shown what it can do in several impressive demonstrations to military customers, air traffic control organisations and other interested parties.**

broadcast and TV signals not being absorbed by stealth surfaces. Also, due to the distributed, so called multistatic placement of transmitters and Twinvis, targets not reflecting into the direction from where they were illuminated is not obstacle to Twinvis, hence stealth aircraft become visible.

## READY TO SERVE THE MARKET

A single Twinvis can monitor airspace over a radius of up to 250 kilometres. Up to 200 aircraft are visible at the same time in 3D (range and altitude). Moreover, several Twinvis can be linked up into a networked system so as to monitor even larger

areas, coasts or borders.

Twinvis has already shown what it can do in several impressive demonstrations to military customers, air traffic control organisations and other interested parties.

## ABOUT HENSOLDT

HENSOLDT is a leading company in the European defence industry with global reach. Based in Taufkirchen near Munich, the company develops complete sensor solutions for defence and security applications. As a technology leader, HENSOLDT drives the development of defence electronics and optronics and is continuously expanding its portfolio based on innovative approaches to data management, robotics and cyber security. With more than 6,500 employees, HENSOLDT achieved a turnover of 1.7 billion euros in 2022. HENSOLDT is listed in the MDAX on the Frankfurt Stock Exchange.

[www.hensoldt.net](http://www.hensoldt.net)



# ISPA & DRDO Collaborate To Enhance India's DefSpace Capabilities: Expert Insights On Industry's Future

Aritra Banerjee

Indian Space Association (ISPA) recently joined forces with the Defence Research and Development Organisation (DRDO) to host the DefSpace Symposium 2023, a high-profile event that underscored the pressing need for India to fortify its defence space (DefSpace) capabilities. While experts acknowledged Indian Space Research Organisation's (ISRO) commendable achievements in the civilian space sector, they also said that there is a long road ahead for DefSpace technology development in the country, especially in comparison to adversaries like China.

Over the course of three days, the symposium delved into critical topics such as policy, technology, law, and strategic planning, with a strong emphasis on the development of indigenous technologies, stakeholder collaboration, and the cultivation of a skilled workforce. Stakeholders from various sectors lauded the event as an enlightening platform facilitating meaningful discussions on India's DefSpace ecosystem.

The symposium served as a timely reminder of the need for concerted efforts to enhance India's DefSpace capabilities and ensure the safeguarding of national security interests in an evolving global security landscape. With focused and collaborative efforts, India can strive to strengthen its position in DefSpace and address the technological gap with its adversaries.

## WHAT WERE THE MAJOR TALKING POINTS?

One of the major highlights of the symposium was the discussion on the 75 DefSpace Challenges and critical technology disruptions in the sector. Experts emphasised the need for India to remain at the forefront of technological advancements and leverage cutting-edge innovations



DG ISPA, Lt Gen. AK Bhatt (r), CAS, ACM Vivek Ram Chaudhari, CDS, Gen. Anil Chauhan, DRDO Chairman, Dr. Samir Kamat & Dr Hari Babu Srivastava during the MoU exchange ceremony; Photo Courtesy ISPA

to enhance its DefSpace capabilities. The strategic implications of space as a contested domain, especially in light of the emergence of space power and its use in recent conflicts, were also deliberated upon.

Experts highlighted the importance of considering legal ramifications and policy decisions in space activities extensively. Space is a global common with no sovereignty, so the need for a robust space security architecture was emphasised. The possibility of India leading in drafting future space security agreements and treaties was also discussed.

Adversaries' capabilities in space, with a particular emphasis on China, were critical to the discussions. Experts examined evolving capacities of rivals and underscored the importance of understanding and countering them to safeguard India's national interests in space. The symposium stressed on the need to develop resilience in DefSpace—the capability of dealing with and surviving adversaries' disruptive capabilities and ensuring the continuity of military

operations.

The symposium's second day focused on the research and development (R&D) ecosystem and defence procurement mechanisms. Hindrances in the military acquisition processes were examined, and experts deliberated on ways to refine the R&D ecosystem in India, enhance Intellectual Property Rights (IPR) protection, and improve the funding climate for DefSpace projects. The operational requirement for robust and seamless communication and the vital need for persistent and precision Intelligence, Surveillance, and Reconnaissance (ISR) capabilities for the Indian Armed Forces were extensively highlighted.

The third day of the symposium featured industry workshops that probed into various aspects of DefSpace. Discussions revolved around the role of satellites in Indian DefSpace, critical infrastructure requirements, ISR platform demonstrations, and the significance of Positioning, Navigation, and Timing (PNT). The latter included the proliferation of

NAVIC, India's indigenous satellite navigation system. Experts highlighted the potential of NAVIC and its evolving capabilities in enhancing India's DefSpace capabilities.

Based on the discussions and deliberations during the symposium, a volume of action points emerged, outlining India's strengths and weaknesses in DefSpace. The Thought Leaders Group (TLG) formulated recommendations for paving the way for the country in DefSpace, including the need for strategic R&D investments, strengthening legal and policy frameworks, fostering global collaborations, and building comprehensive capacities. The symposium laid a roadmap for the future, aiming to position India as a critical player in the evolving landscape of defence space.

### **WHAT DID THE 'THOUGHT LEADERS GROUP' RECOMMEND?**

The ISPA TLG concluded a roundtable discussion on critical issues within the DefSpace industry.

The group consists of luminaries such as Dr AS Kiran Kumar, Chairperson TLG former Secretary, Depart-

**"The Indian DefSpace Symposium 2023 provided a platform for thought leaders and experts to discuss critical issues and challenges facing India in DefSpace. The event highlighted the need for technological disruptions, legal and policy aspects, adversaries' capabilities, research and development ecosystem, and the role of satellites in shaping India's DefSpace capabilities."**

ment of Space (DoS) and Chairman ISRO; Air Marshal M Matheswaran (r), former Deputy Chief, Integrated Defence Staff (DCIDS), HQ IDS; Air Mshl. SS Soman (r), former Air Officer Commanding-in-Chief, Western Air Command (AOC-in-C, WAC); Air Mshl. SBP Sinha (r), DRDO Chair (Prof MGK Menon Chair) and former AOC-in-C, Central Air Command (CAC); Lieutenant General Vinod G. Khandare (r), Principal Advisor to the Ministry of Defence, former Military Advisor, National Security Council Secretariat (NSCS), and former Director General, Defence Intelligence Agency (DG DIA), HQ IDS; Air Mshl. BR Krishnan (r), former Chief of Integrated Defence Staff to

the Chairman Chiefs of Staff Committee (CISC), HQ IDS; Vice Admiral SN Ghormade (r), former Vice Chief of the Naval Staff (VCNS); Dr PVGS Jayaram, MIE (Coordinator, TLG), Chief Executive Officer and Advisor Technology, PVGS Consultants; Wing Commander Satyam Kushwaha (r), Convener, TLG and Director ISPA.

The resulting recommendations, which target various aspects of the defence space matrix, were highlighted as key points of emphasis at the end of the event.

**Credibility & Realistic Projections in the DefSpace Industry:** The ISPA TLG underscored the importance of



Luminaries across the board graced the stage at the Indian DefSpace Symposium 2023; Photo courtesy: ISPA

## **DEFENCE**

realistically projecting performance and timelines, as credibility is paramount in the DefSpace industry. This recommendation reflects the need for quality and reliability in performance projections, which can help establish stakeholder trust and build a solid foundation for the industry's growth.

**Start-ups to Form JVs, Partnerships:** The group pointed out that there are multiple companies, especially start-ups, in various specialised aspects of the DefSpace segment. However, the Armed Forces would look at a single package to be able to place an order for procurement. Thus, there is a need for the start-ups to form joint ventures (JVs), partnerships, and consortiums to provide a package of assets and services.

**Collaboration with Established Agencies:** It suggested collaboration with established agencies such as ISRO and DRDO. Leveraging their legacy and experience in complex technologies can help the DefSpace industry address challenges more effectively and expedite technological advancements.

**Clarity in Contracts & Indigenous Requirements for SSA:** Emphasis was laid on the need for precise contract language to eliminate ambiguity, particularly regarding terms such

**"Based on the discussions and deliberations during the symposium, a volume of action points emerged, outlining India's strengths and weaknesses in DefSpace. The Thought Leaders Group formulated recommendations for paving the way for the country in DefSpace, including the need for strategic R&D investments, strengthening legal and policy frameworks, fostering global collaborations, and building a comprehensive defence space capability and capacities."**

as "National Security". Furthermore, the group requested defence services to clarify requirements such as timelines for various sensors, resolutions, swathes, area, revisit time, communication, launch-on-demand needs, and for ownership of assets to the DefSpace industry. Defining indigenous requirements for Space Situational Awareness (SSA) and global partnerships would ensure a robust framework.

**Streamlining Procurement Procedures for Start-ups & Innovators:** The ISPA TLG highlighted the challenges start-ups and innovators face in navigating the routine procurement procedures outlined

in the Defence Acquisition Procedure 2020 (DAP 2020). These can be cumbersome and time-consuming, leading to delays that can be detrimental to the survival and growth of start-ups in the DefSpace sector. The group urged the ISPA and HQ IDS to streamline procurement procedures.

**Dedicated Funding for R&D:** The group urged the Indian Armed Forces to seek funding from the National Research Fund specifically for this purpose. Despite budget provisions for R&D funding, a significant portion still needs to be utilised. ISPA TLG emphasised the need for proactive efforts by the armed forces to secure these funds and allocate them



The audience included members from the media, academia, industry, & tri-services; Photo courtesy: ISPA

towards R&D in the DefSpace sector, which can drive technological advancements and innovation.

**DSA Membership in Geospatial Body:** The ISPA TLG also recommended membership of the Defence Space Agency (DSA) in the proposed national geospatial body. Considering the vital role played by the tri-services in the DefSpace sector, the importance of their representation in the decision-making process was also highlighted. This suggestion reflects the need for participation and collaboration to ensure effective governance and coordination in the DefSpace industry. Tri-services' representation in the Space Commission was another key aspect recommended by the group.

**Facilitation of Trial Facilities & Performance Requirements:** Emphasis was laid on the significance of making trial facilities available at subsidised rates or free of cost for start-ups and innovators. Trial facilities, including using aircraft for simulations, are crucial for testing products and services under space conditions. Additionally, the group stressed the need for defining performance requirements more precisely.

**Coordination, Standards & Image Requirements:** The group underscored the imperative of coordination, standards, and imagery re-



IADB was a media partner at this flagship event; Photo Courtesy: ISPA

quirements within the ISPA. Collaboration among diverse stakeholders, encompassing start-ups, innovators, ISRO, DRDO, and the Indian Armed Forces, is deemed indispensable for the triumph of the DefSpace industry. Furthermore, the group accentuated the significance of establishing robust standards and imagery requirements to safeguard that the DefSpace industry in India upholds exemplary levels of quality and reliability.

The Indian DefSpace Symposium 2023 provided a platform for thought

leaders and experts to discuss critical issues and challenges facing India in DefSpace. The event highlighted the need for technological disruptions, legal and policy aspects, adversaries' capabilities, research and development ecosystem, and the role of satellites in shaping India's DefSpace capabilities. The symposium laid the foundation for strategic recommendations and a roadmap for the future, aiming to position India as a critical player in the evolving landscape of defence space.



Civil-Military-Industry fusion took centre stage as the event wrapped up; Photo courtesy: ISPA

# Riding The LASER Wave

Commander Rahul Verma

The idea of using light as a weapon can be traced back to the ancient Greek scientist Archimedes, who lived in the third century BC. According to Lucian, a writer, Archimedes destroyed enemy ships using mirrors that collaborated as parabolic reflectors to focus the sun's rays and set the ships on fire. This use of light as a weapon may have been the first recorded example of what would eventually become laser technology. Fast forward to the twentieth century, the laser has become a key technology contributing to major world economy sectors. French physicist Louis des Brailles once said, "The laser has a great future. It is difficult to predict where and how it will find its application, but I think that it is a whole new age of technology." In the last few decades, lasers have moved from "a solution looking for a problem" to the leading technology in mechanisms that achieve indispensable roles in numerous other activities, including transportation, healthcare, and telecommunications.

However, lasers are not just limited to being a valuable tool in civilian life. They have also become an effective weapon system. In today's digital age, speed and security are two of the most critical aspects of communication, particularly in the defence industry. As threats to national security become increasingly erudite, the need for protected and dependable communication channels is more imperative than ever. One technology that promises to meet these requirements is laser communication. Laser stands for 'Light Amplification by Stimulated Emission of Radiation', a cutting-edge technology that uses light to transmit information over long distances at high speeds.

The battlefield requires advanced technology capable of detecting targets at great distances and exchanging vast amounts of information rapidly and securely. Lasers have revolutionised warfare, serving as accessories to high-energy weapons and offering a variety of other applications, including battlefield illumination, rangefinding, target designation, LIDAR (Light Detection and Ranging), communication, power

beaming, and active remote sensing. Laser systems provide broadband capacity links with Swap benefits due to their high frequency and extraordinary angular resolution, making them perfect for tactical deployment. Laser devices are also used when anti-jamming is essential or when the RF spectrum is inaccessible.

Space, the final frontier, is also where the laser is proving its mettle. The use of lasers in space has become increasingly important due to the numerous objects in orbit around the Earth. These objects move at high velocities and pose a significant threat to space assets. In addition, a collision between these objects can trigger a chain reaction that can cause extensive damage to active satellites. The risk of space debris is not limited to natural occurrences; space warfare is also a growing concern. Laser technology has been developed to address



Communication removes fog of war

these challenges for early warning detection and protection of space assets. This technology employs electronically controlled antennas to track detected objects and search for others simultaneously. Because of this, laser technology is now proving to be an effective tool for space asset protection, and it is gaining traction as a solution for both natural and human-made threats. With this kind of innovation, tracking and identifying micro-debris is now possible, too.

114 AI is an Indian Institute of Technology (IIT) Delhi-based Indian startup working on space domain awareness (SDA) that has deployed and integrated some of its products.



**Cdr. Rahul Verma,**  
TDAC, Indian Navy

They are also actively involved with the United States Air Force (USAF), US Space Force, US Air Force Research Laboratory (AFRL), and the United Kingdom's Defence Science and Technology Laboratory (DSTL). They are also working with General Atomics Aeronautical Systems (GA-ASI) on next-generation optical artificial intelligence (AI) technology.

To exploit a laser as a directed energy weapon (DEW), it requires a large amount of power, computed in megawatts (MW), to inflict substantial damage on the intended target. However, many engineering challenges still need to be tackled to compensate for beam wandering caused by environmental factors such as bad weather conditions, target movement, or platform motion. Additionally, high-energy lasers (HELs) pose a substantial hazard to sensors and military equipment on the battlefield, which may require a protection mechanism, such as a laser jamming feature, to ensure the reliability and integrity of this equipment in a hostile electromagnetic warfare setting. In the realm of cyber warfare, game-changing technologies such as quantum computing and cryptography have emerged, providing a potential safeguard for tactical communication against eavesdroppers. These technologies may offer an added layer of protection against cyber threats and enhance the security of sensitive information.

With all this ongoing development and current capacities, it's a surety

that laser technologies will dominate battle space in the future. With high energy comes the need for technological leaps and other input from microelectronics organisations. With this futuristic need for maintaining military superiority in the region, Naval Innovation and Indigenisation Organisation (NIIO) and Technology Development and Acceleration Cell (TDAC) created Challenges for homegrown Indian startups. Semiconductors are crucial in this flight to self-reliance as they are a critical component in this architecture. One of the industry innovation partners of NIIO, 3rdiTech is one of the first Indian semiconductor companies to design these kinds of sensors and chips. They are also effectively creating a complementary metal-oxide semiconductor (CMOS) chip and laser-based optical fuse.

Laser communication has found several use cases in the defence industry, one of the most noteworthy being satellite communication (SAT-COM). Laser technology offers higher data transmission rates between satellites and ground stations than traditional radio communication, allowing for real-time transmission of more data, such as high-resolution images and videos. Another potential application of laser communication is in unmanned aerial vehicles (UAVs). By utilising laser communication, UAVs can provide commanders with up-to-date information on the battlefield in real-time. Laser communication technology also has the potential use in tactical communication systems to provide soldiers with secure and reliable communication channels.

What do deep space exploration and underwater work have in common? Quite a bit. Laser communication can be used for air-to-underwater and submarine-to-submarine communication and in satellite and tactical communication systems. The limitations of traditional communication methods, such as radio and acoustic signals in underwater environments, are due to sound waves being absorbed and scattered. However, laser communication can overcome these limitations by utilising light to transmit information. The underwater telephone (UWT) is a standard communication system across navies worldwide and is microprocessor controlled. It enables communication between surface/



Atmanirbhar Bharat at chip level subsurface vessels by using under-water acoustic waves.

Utilising either the upper or lower sideband, along with a suppressed carrier frequency, ensures a high signal-to-noise ratio and transmission bandwidth. However, this method suffers from the low bandwidth of ~ Kiloherz (kHz), the low data rate of ~ kilobits per second (kb/s), as well as high latency caused by the low speed of underwater acoustic waves, multipath propagation, and Doppler spread. Underwater wireless communication is vital for oceanography research, offshore oil exploration, and seafloor monitoring, and upgrading this outdated technology has significant military advantage along with high commercial potential.

The sea remains one of the few remaining unexplored frontiers, but, in many ways, we still need to get past the paddling in the shallows stage. An example of this challenge is in the field of communication, where maintaining contact with submersibles and unmanned underwater vehicles can be difficult. The issue arises from the fact that water is hostile to electromagnetic communications. Considering this aspect, as part of the Innovations for Defence Excellence (iDEX) Supporting Pole-Vaulting in R&D through Innovations for Defence Excellence (SPRINT) Challenge, two problem statements were released: effective underwater communication to operate without compromising stealth. Also, underwater detection and ranging for mission-critical dunked and airborne applications. The most viable solution was from XD Defence Systems. They are an Indian defence sector startup founded as part of an Atmanirbhar Bharat-

inspired opportunity, having a range of laser-based products from anti-drone applications to communication to environmental monitoring.

Laser weapon systems have undergone rapid development in recent times, with dedicated research and development (R&D) significantly advancing the state-of-the-art. What was once inconceivable a couple of decades ago has now become a reality. Major General August Schomburg, who was the head of the US Army Ordnance Missile Command, wrote a letter in 1962, "I feel as do others here that the laser may be the biggest breakthrough in the weapons area since the atomic bomb." This perspective was widespread among military personnel during the early stages after the invention of the laser. As per a recent evaluation published by one of the world-renowned think tanks, every air force, army, or navy around the world is involved in or planning to initiate some form of fundamental or applied research or experimental development related to lasers and optical systems. Therefore, the laser's ability to establish fast and reliable communication could significantly transform the operations of unmanned underwater vehicles (UUVs).

*Cdr. Rahul Verma is presently posted at TDAC looking after Unmanned Systems and Aviation Innovations. He is a Seaking Pilot with 4,000 flying hours experience. The officer is also a qualified RPA crew with an extensive experience in unmanned flying operations. He holds a Masters degree in Aerospace Law and a Post Graduate Diploma in Autonomous Systems and Product management. He is also pursuing MBA from Washington University and IIT-Bombay*

# SPACE SECTION

## Indian Space Policy 2023 Gets Green Light From Government, Focus On Private Sector Participation In Space Activities

Aritra Banerjee

The Indian government, on 6 April, 2023, approved the eagerly-awaited Indian Space Policy 2023. Led by Prime Minister Narendra Modi, the Cabinet Committee on Security (CCS) endorsed a policy that aims to institutionalise and promote private sector engagement in the space domain, with the ambitious goal of increasing India's share in the global space economy from the current 2% to at least 10% in the near future. The policy document was subsequently released in the public domain on 20 April 2023.

The Indian Space Policy 2023 outlines the roles and responsibilities of three key entities:

- The Indian Space Research Organisation (ISRO), which is the national space agency

- New Space India Limited (NSIL), a space sector public sector undertaking (PSU); and
- The Indian National Space Promotion and Authorisation Center (IN-SPACe), an autonomous nodal agency meant to act as a medium between ISRO and the private space sector in India.

Space technology plays a pivotal role in various sectors, including communication, defence, disaster management, navigation, agriculture, weather forecasting, and monitoring. Therefore, the policy strongly emphasises the development of indigenous technologies to enhance capacity building in the space sector and promote self-reliance in space technology.

A notable highlight of the policy is the framework for the private sector to utilise ISRO facilities for a nominal charge. It encourages them to invest in creating new infrastructure for the sector. While ISRO will not engage in operational and production work for the space sector, it will focus on developing new technologies, systems, and research and development.

Dr S Somanath, Chairman of ISRO, stated, "a major objective is to increase our share in the global space economy from around 2% at present to at least 10% in the coming years, to do which government investment alone will not be enough, and there needs to be investment and participation from the private sector in a larger way."

The policy underscores crucial elements expected to drive innovation, investment, and growth in the industry.

Key elements of the policy are the participation of non-government entities without restrictions, enabling them to engage in all domains of space activities. This includes building rockets and satellites, launching them, owning and operating them, and delivering them commercial services. This move will unlock new opportunities for private companies to contribute to the space economy, leveraging their expertise and capabilities.

IN-SPACe is to function as an autonomous Government organisation, mandated to promote, hand-hold, guide and authorise space activities in the country. For this purpose, IN-SPACe shall periodically issue guidelines and procedures, that would



# SPACE SECTION

among other things promote ease of doing business.

NSIL, the PSU under the Department of Space (DoS) is responsible for commercialising space technologies and platforms created through public expenditure. Furthermore it shall manufacture, lease, or procure space components, technologies, platforms and other assets from private or public sector, on sound commercial principles. Lastly NSIL will service the space-based needs of users, whether Government entities or NGEs, on sound commercial principles.

The DoS will oversee the distribution of responsibilities outlined in this policy and ensure that the different stakeholders are suitably empowered to discharge their respective functions, without overlapping into others' domain. It will be the nodal department for implementation of the Indian Space Policy 2023 through detailed policy directives, within the scope of which the various stakeholders shall carry out their assigned functions.

This clear delineation and streamlined approach is expected to simplify the process for private companies to interact with ISRO and obtain necessary approvals, thus fostering a conducive environment for private sector participation in space activities.

Stakeholders had eagerly awaited the policy details, expressing gratitude to Prime Minister Modi for his visionary leadership and focus on long-overdue reforms in the Indian space sector. With the approval of the Indian Space Policy 2023, India's space sector is poised for a paradigm shift. Increased private sector participation is expected to stimulate innovation, investment, and growth, propelling the nation towards greater heights in the global space economy.

Commenting on the development, Lieutenant General Anil Kumar Bhatt (r), Director General of the Indian Space Association (ISPA), said, "this is a historic moment as the cabinet has approved the Indian Space Policy 2023. It will pave the way forward with

space bill and act would follow. Glad to finally see this come through. India has tremendous potential to leverage ISRO's expertise and experience for its private ecosystem. We'll see many more space companies being created that can compete globally."

However, experts also caution the need for careful assessment and sustainable growth of commercial space applications in India.

Omkar Nikam, an Indian-origin space and defence expert, highlighted the importance of prudent funding and business strategies for private space companies. "Considering the track record of commercial private NewSpace companies globally, India should make sure that the funding instruments and channels are utilised in a sustainable manner. There have been many instances in the space industry where a company has acquired billions of dollars of funding without even a go-to-market strategy. Such situations will downplay the progressive commercial footprint of India's space sector. Therefore, with the approval of ISP 2023, it is the responsibility of both private commercial entities as well as government agencies to assess the space company's business plan carefully and ensure the sustainable growth of commercial space applications in India," Nikam said.

**"This policy provides the much needed clarity on all space activities especially regarding space communication and other applications. The policy will help to create opportunities for private sector to engage in all aspects of the space industry."**

**— Lt Gen. AK Bhatt (r),  
DG ISPA**

much-required clarity in space reforms and augment private industry participation to drive the space economy opportunity for the country."

Private sector players are also optimistic about the prospects of the policy. Awais Ahmed, Chief Executive Officer of Pixxel, a space start-up, stated, "the policy has been long awaited. Startups such as ourselves at Pixxel have been continuing to work without a policy with one-off approvals from IN-SPACe with the promise that a policy and then, hopefully, a

The approval of the Indian Space Policy 2023 and the publication of document in the public domain has brought much-needed clarity and reforms in India's evolving space industry. "This policy provides the much needed clarity on all space activities especially regarding space communication and other applications. The policy will help to create opportunities for private sector to engage in all aspects of the space industry," Lt Gen. AK Bhatt (r), said. "We are confident that IN-SPACe and Department of Telecommunications (DoT) will work speedily to ensure necessary clearances for private players in India. We are also hopeful that the new Foreign Direct Investment (FDI) policy on space will be promulgated soon," he added before signing off. Blurb:

# SPACE SECTION

## Kalaari Capital's Ravinder Singh Predicts Arrival Of Indian Spacetech Unicorns By 2030

India's space tech industry is set for significant growth, with multiple unicorns expected by 2030, according to Ravinder Pal Singh, a partner at Kalaari Capital. The venture capitalist, who has invested in space tech start-ups, believes that unicorns will emerge in diverse areas beyond traditional launch vehicles and rockets, such as space situational awareness, data intelligence, and perceptive defence warfare. Singh also highlighted the potential for investment in the space tech sector, which he said could disrupt various sectors of the economy, including agriculture and energy. He welcomed the recent approval of India's space policy, which he said would clarify the regulatory framework and promote investment.



## CDS Calls For Enhanced Space Capabilities To Counter Adversary's Advancements: Emphasis On Quantum Encryption & Indigenously Developed Chips



India's Chief of Defence Staff, General Anil Chauhan, has highlighted the urgent need to strengthen India's space capabilities in response to advancements made by a likely adversary, China. At the Indian DefSpace Symposium 2023, Gen. Chauhan emphasised the importance of safeguarding India's space assets and developing a cyber-secure, quantum encryption-based communication system. He underscored the need for affordable low Earth orbit (LEO) satellites, miniaturised sensors, and multi-sensor Intelligence, Surveillance, and Reconnaissance (ISR) constellations.

Gen. Chauhan unveiled an indigenously developed chip by Elena Geo Systems for positioning, navigation and timing (PNT) applications, signalling a significant step towards enhancing India's indigenous space capabilities. Gen. Chauhan's call for India to focus on developing space capabilities serves as a timely reminder of the need to safeguard India's interests in space as the global space race intensifies. With cutting-edge technologies, India is positioning itself as a formidable player in the space arena.

## IN-SPACe Promotes Innovation In India's Agriculture Sector Using Space Technology



The Indian National Space Promotion and Authorisation Centre (IN-SPACe) is leading efforts to leverage space technology to revolutionise India's agriculture. With global food demand on the rise, sustainable agricultural practices are crucial. IN-SPACe is driving progress by launching a seed fund scheme to support startups in the agriculture sector. Startups with innovative ideas such as crop production forecasting, precision farming, and pest detection can apply online at [wwwinspace.gov.in](http://wwwinspace.gov.in). IN-SPACe anticipates groundbreaking solutions to create a more sustainable and efficient food system in India.

## Indian DefSpace Symposium 2023: CDS Gen. Anil Chauhan Calls For Collaborative Approach Among Stakeholders

Indian Space Association (ISPA), in association with the Defence Research and Development Organisation (DRDO), hosted the Indian DefSpace Symposium 2023 in New Delhi, focusing on augmenting India's military space capabilities. Guests, including General Anil Chauhan, Chief of Defence Staff, and Dr Samir V Kamat, Chairman of DRDO. Takeaways from the event include the need for cutting-edge technology, the miniaturisation of satellites, and closer collaboration between the defence, academia and technology sectors. The symposium also featured sessions on China's military capabilities and funding issues for new space capabilities. ISPA, launched by Prime Minister Narendra Modi, aims to make India self-reliant and a global leader in the space arena. The symposium marked a significant step towards fostering collaboration and accelerating India's military space capabilities.



# SPACE SECTION

## Elena Geo Systems Unveils Cutting-Edge NavIC Chip, Revolutionising Satellite Navigation With Indigenous Technology

Elena Geo Systems, a Bengaluru-based space startup, has unveiled an innovative NavIC chip, developed in-house, that leverages India's navigation satellite system for advanced positioning services. This breakthrough in navigation technology marks India's first fully designed and developed chip of its kind, offering small size, ultra-low power requirement, and software-based control, making it highly versatile for various applications.

The NavIC chip's multi-frequency and multi-constellation GNSS capability, specifically designed for NavIC, ensures high-accuracy reception and continuous coverage. Elena Geo Systems also showcased its NavIC Atomic Clock, providing precise and stable time reference. With potential applications in tracking vehicles, ships, drones, and weapons platforms, the NavIC chip presents a powerful solution for accurate tracking information in multiple sectors.



The chip's advanced 12-nanometer technology marks a significant milestone in indigenous navigation technology for India's civilian and defence sectors. Founder and CTO of Elena Geo Systems, Lt. Col. V.S. Velan (r), expressed excitement about the chip's potential, citing reduced dependence on foreign navigation systems like GPS as a significant advantage for India.

## India's Space Economy Gains Momentum: Union Minister Highlights End-to-End Capability & Private Sector Participation At G20 Meeting



According to Union Minister of State for Space Jitendra Singh, India's space industry is making strides as an emerging space economy with unique end-to-end capability in space technologies. Speaking at the precursor event of the G20 Space Economy Leaders Meeting (SELM), Singh emphasized the significant demand for space-based services and their commercial potential across various sectors.

The Indian government's decision to open the space sector to private companies, supported by the Indian Space Research Organisation (ISRO), is expected to further boost participation in end-to-end space activities and contribute to India's global space economy presence.

Amitabh Kant, G20 Sherpa of India, highlighted the importance of collaboration among G20 countries in manufacturing, mining, and energy in space. Meanwhile, Meghalaya Chief Minister Conrad K Sangma noted that the Indian Space Policy 2023 will facilitate increased entry of start-ups into the sector, signalling a promising future for India's space industry.

## India-Russia Space Dialogue Opens New Frontiers Of Bilateral Cooperation

India and Russia are strengthening their space cooperation, as highlighted at the India-Russia Space Dialogue event at the Russian Cultural Centre. Experts from both nations reflected on their achievements and discussed future collaboration in space, particularly in unmanned space exploration and satellite launches, and the potential for joint manned flights. The event also acknowledged the significance of April in space history for both nations. However, experts also pointed out that the evolving geopolitical landscape, including the Ukraine war and India's recent privatisation of the space industry, could impact their space cooperation. Fundamental questions remain about the future trajectory of the India-Russia space relationship, particularly in adapting to private players in India and globally.



# Fractures In Supply Chain, A Spectre For Indian Carriers: Pratt & Whitney Power Plants Servicing Way Behind Schedule!

Bikram Vohra

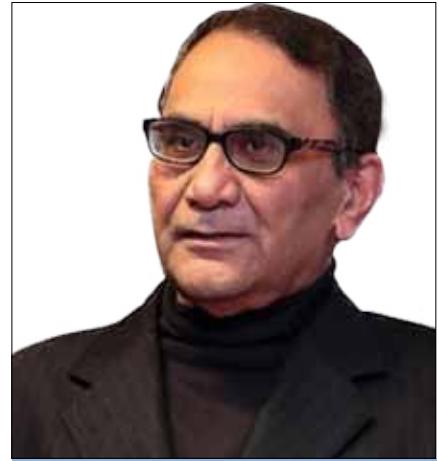
The supply chain problem is one of many things that United States power plant manufacturer Pratt & Whitney faces. Labour issues combined evilly with inflation have added to its fractured functioning. In addition, the fallout has affected carriers in India, namely Indigo and Go First. Between them, as many as 60 Airbus A320s are grounded for lack of spare parts, and there could be more. While Indigo might struggle on and manage its schedules despite the threat of this ongoing hassle, the smaller Go First is being crippled. Earlier this month, the Directorate General of Civil Aviation (DGCA) stepped in to assess and ostensibly find a solution to what could be worsening the situation. However, it also does not have a magic wand; all the players are simply swimming in a pool of goodwill and nothing more substantial.

The DGCA cannot do much except threaten Pratt & Whitney with legal action, and that really is an empty threat because the airlines cannot just saunter off to another power plant option. With Indigo having already moved away to CFM nearly four years ago when in 2019 it signed a \$20 billion deal, it is now concerned about its older but 'not so old' fleet. Much

of the 300-strong Airbus A320ceo fleet is powered by International Aero Engines (IAE) V2500 engines, of which Pratt & Whitney is integral to the consortium. Go First (formerly known as GoAir) is an Indian low-cost airline that also operates a fleet of Airbus A320 family aircraft, out of which 54 A320neos and 5 A320-200s are vulnerable to this delay. Pratt & Whitney engines, namely the PW1100G-JM and the PW6000 series, power both aircraft types.

To add to the misery, there is a whole fleet of ATR 72s with Indigo that have Pratt & Whitney engines and are now in jeopardy, especially if the sluggishness continues. Moreover, the cruel fact is that there is unlikely to be any improvement through 2023, and we have yet to even get halfway there. There was a bit of a happy spike a few months ago, and there was hope that things were coming back onto an even keel, but the euphoria did not last, and the situation has returned to the current normal means delays are integral to the situation.

Greg Hayes, Chief Executive Officer of Raytheon, the umbrella company for Pratt & Whitney, made a



**Bikram Vohra**, Consulting Editor

full disclosure when he was quoted as saying, "We continue to focus on what we can control by proactively managing the businesses through these dynamic times. While supply chain issues are frustrating, we are seeing some stabilisation." That stabilisation is rocky and of cold comfort to the two beleaguered carriers. In fairness, the power plant manufacturer has attempted to right the ship by planning a maintenance and repair facility in India, but it has not come about, the sincerity of the premise neutralised by little forward movement.

With nearly 60 planes out of action in both carriers and more aircraft likely to be put on the chocks, an airline like Go Air is practically frozen and risks being flown into bankruptcy. No wonder the DGCA has seen it best to join the impasse and see if it can expedite the solution or, at least, play host and pour in the negotiations. The sticky wicket is that it is not just the supply lines that are crushingly crippled; it is also labour problems and a cash crunch that have added to the impasse.

To sidestep its current inability, Pratt & Whitney has indicated that the delays in servicing and replacing



engines have been further compromised by the region's harsh weather and environmental pressures, thereby reducing engine time on the wing and lengthening the waiting time. This thinly veiled accusation cannot have gone down well with the two carriers seeing as how the weather or the temperatures are no more grueling in other parts of the world and where the mercury arc is wider, that effect is factored into the agreement. Pratt & Whitney has also tiptoed past the fact the availability of complex metal components used to produce aerospace turbofans is in short supply and will stay so through 2023.

An Asian News International (ANI) report quoting an unidentified spokesperson at Indigo sets out the current situation succinctly. "Globally, the aviation industry continues to face significant supply chain disruptions. While it is our immediate priority to deploy adequate capacity to serve our customers, we are actively engaged with our Original Equipment Manufacturer (OEM) partners to work on mitigation measures that should ensure the continuity of our network and operations."

There is also the elephant in the room, which is awkward and potentially the most worrying. The reliability and durability of these engines, particularly those on the Airbus A320neo planes, have reported technical glitches and snags. These squawks, as they are called, have extended to issues with bearings, with combustion chambers and even oil systems, according to some reports. Ergo, no responsible carrier will take

**"To sidestep its current inability, Pratt & Whitney has indicated that the delays in servicing and replacing engines have been further compromised by the region's harsh weather and environmental pressures, thereby reducing engine time on the wing and lengthening the waiting time. Pratt & Whitney has also tiptoed past the fact the availability of complex metal components used to produce aerospace turbofans is in short supply and will stay so through 2023."**

a chance and take off in these circumstances. It can be recalled that in February 2020, 11 aircraft in the A320neo fleet were grounded because of safety concerns. Incidents of inflight shutdowns and engine failures have led to diversions. All this bruises the peace of mind of these airlines, and the need to address the impact and fallout cannot be left to simmer on the back burner.

Is there a way out? An airline like airBaltic, also hurting in a similar fashion on the compromise to its A220 fleet, had this to say, "We are strongly committed to our contractual obligations to passengers and partners. However, the extended turnaround times for Pratt & Whitney servicing the engines are causing operational disruption for airBaltic. They, as a long-term partner of airBaltic, could not keep the given promise again on the improved turnaround times. Therefore, airBaltic is contracting replacement capacity in

the form of Aircraft, Crew, Maintenance and Insurance (ACMI) wet-lease aircraft."

Two other carriers from Africa also adversely affected are Air Tanzania and Air Senegal; they have even stated they will take the legal route. Of concern from the safety angle is the Turkish Airline advisory mentioning glitches and technical issues with its A320s. This carrier plans to lease engines. For India, the arrival of the DGCA on the table is encouraging in the optics, but what can it truly achieve by way of a solution. Power plants are not something that are just lying around the place. It is not easy to replace them, and for now, the odds are that the carriers so affected will have to just hope that Pratt & Whitney can get an act together and narrow the time frame...or go in for the leasing option.

*Bikram Vohra is the Consulting Editor of Indian Aerospace & Defence*



# EU-India Aviation Summit Promotes Air Transport Relations, Tackles Shared Challenges & Industry Opportunities

Aritra Banerjee

NEW DELHI—The EU-India Aviation Summit, a two-day event focused on bolstering air transport ties between the two regions and discussing shared challenges and opportunities, launched on Thursday, 20 April in New Delhi. The summit, attended by government officials and industry executives, aimed to foster partnerships between European Union (EU) and Indian players in what the Indian Civil Aviation Minister Jyotiraditya Scindia called the fastest-growing aviation market in the world.

During the summit, the Airport Authority of India (AAI) and Eurocontrol signed a declaration of intent, while the Directorate General of Civil Aviation (DGCA) and European Union Aviation Safety Agency (EASA) signed a letter of intent and memorandum of understanding (MoU) for closer cooperation.

**"Jyotiraditya Scindia emphasised the Indian government's initiatives, including Prime Minister Narendra Modi's leadership to promote aircraft manufacturing in the country. He mentioned regulatory reforms to create a conducive environment for MROs and introduced new MRO guidelines for the rationalisation of the charges leviable on MRO service providers for ease of doing business."**

Addressing the EU-India Aviation Summit virtually, Scindia highlighted the strong historical ties between India and the EU and how these are being strengthened through the aviation industry, thanks to robust physical, digital, and people-to-people connectivity. He also invited EU play-

ers to partner with India in creating adaptive technologies and help tackle emissions from the aviation industry.

Scindia further emphasised the Indian government's initiatives, including Prime Minister Narendra Modi's leadership, to promote aircraft man-





Pictures from the Event

ufacturing in the country. He mentioned regulatory reforms to create a conducive environment for Maintenance, Repair and Overhaul (MRO) and introduced new MRO guidelines for the rationalisation of the charges leviable on MRO service providers for ease of doing business.

Scindia also called on EU industry players to seize the opportunities presented by India's ambitious goals of using 100% green energy at airports by 2024 and achieving net-zero carbon emissions by 2030. The Minister reported that 25 AAI airports were already using 100% green energy and that India aims to make 121 airports carbon neutral by 2025. He also mentioned that the government was encouraging the use of sustainable aviation fuel and that Indian airline operators had already conducted demonstration flights using bio-fuel blended with Aviation Turbine Fuel (ATF).

**"Rajiv Bansal, Secretary of the Ministry of Civil Aviation, concluded the summit by underlining India's rapid growth in the aviation sector and the government's commitment to improving infrastructure and connectivity with a renewed focus on innovation."**

The summit featured a speech by Andreas Carlson, Sweden's Minister of Infrastructure and Housing, who highlighted the long-standing history of bilateral relations between India and the EU and expressed confidence in a bright future of even stronger co-operation and collaboration. European Union Commissioner for Transport Adina Valean addressed the summit virtually, emphasising the successful history of partnership and cooperation between the two regions and expressing hope that aviation would

become one of the most successful partnerships.

Rajiv Bansal, Secretary of the Ministry of Civil Aviation, concluded the summit by underlining India's rapid growth in the aviation sector and the government's commitment to improving infrastructure and connectivity with a renewed focus on innovation. The EU-India Aviation Summit demonstrated the strong potential for cooperation between the two regions and the opportunities for mutual benefit.

# Airbus & Boeing: No Longer Is The Cupboard Bare

Bikram Vohra

Any regular aviation writer worth his ink will acknowledge that the Airbus versus Boeing dramatics at every air exhibition is a bit of a stage show. Yet, both their major media conferences are the spice of the five-day event every time. Whether Farnborough, Le Bourget, Singapore or Dubai, the script is much the same. The media plays along, and the crowded conferences are awaited because the shrill accusations and the sharp and caustic comments generate a slanging match that makes for great copy. It is a colourful relief from otherwise relatively dreary press releases shoved into cubbyholes.

Between 2007 and 2018, this verbal pugilism became increasingly vitriolic and occasionally bordered on the uncomfortable as both the big boys accused each other of being bankrolled and engaging in unfair practices.

The Covid pandemic hit hard and thereby created a certain sobriety. Since then, there has been a drop in the often manufactured 'for the occasion' hostility.

That said, the residual bantering continues, but the sting has gone as both Boeing and Airbus become aware of the reality bite. In an

**"Airbus' latest development of the A321XLR underscores efficiency and a low carbon footprint. Such aircraft have improved range and can comfortably go transatlantic and move into the preserve of routes typically served by widebody aircraft."**

odd fashion, they need each other to make the fulcrum of not just balance but also market stability. One company by itself could not feed the market.

The losses in the 2019 to 2021 timespan were massive.

The crisis dropped Boeing from a \$12 billion profit to a \$2 billion loss. Airbus weathered the crisis a little better but lost \$1.7 billion by mid-2021.

For four years running from 2018, Airbus won on deliveries, and the general impression was that the United States manufacturer had been dethroned, especially as it retreated from the scene following the fallout from the 737max crashes to Ethiopian and Lion Air.

In 2020 Airbus strengthened its lead by delivering 663 aircraft, compared to Boeing's 480 planes. In 2021, Boeing and Airbus delivered 340 and 611 aircraft.

In light of the Airbus streak of wins, the 2023 first quarter sale of Boeing aircraft at 130 aircraft as opposed to Airbus at 127 becomes a significant reason for a whoop of triumph. Long time since it came close, let alone take the lead. Now, three ahead may not be much, especially since one of the planes is a P8 Poseidon and one a 767 freighter, neither of which constitute the usual battlefields of the 737 family versus the A320 and the widebody segments options. But a lead, however slender, is a lead and does give the impression that the competitive edge is being honed. In fact, Boeing managed to transfer seven Dreamliners in this period, although the





737max at 52 made up a major part of the deliveries.

Airbus was just a little behind and kicked in with a surge for the A350. Airbus' aircraft deliveries fell by 11% to 127 compared to 142 deliveries in the same period in 2022.

It blamed global supply chain disruptions for the slack, but with March doubling the output for February, it looks on track to close in the 2023 promise of 720 deliveries in the year with a far better showing in Q2. Over the year, Boeing now targets an average rate of between 33 and 38 737s per month or 400-450 for the year. It plans to increase output to 47 jets per month by the end of 2023.

According to a news service report, Airbus delivered 11 widebody jets, including five A350s, in the first quarter of 2023, 10 small A220 jets and 106 of its best-selling A320neo-family aircraft. And while Casey hasn't struck out for either of them, and another pandemic being unthinkable, the area of concern is the change that could happen in the demand for the aircraft type.

The average seat capacity was pegged at a low of 141, with the A320 and 737 families being favourites and the E150/E170 also gaining popularity. On the top end, the A350 and the Dreamliner share the honours. The big losers are the 777, the A330/340, and we all know the sad story of the A380.

Carriers have become very sensitive to fuel costs, efficiency, and en-

**"Boeing introduced the 777X, which is supposedly 10% more fuel efficient than the Airbus A350. It is also the largest twinjet boasting new technologies, advanced wingtips and a massive wing-based power plant on each side."**

vironmental carbon footprints, and with power plant manufacturers responding to the new priorities, the odds favour single-aisle planes that can do the reasonable long haul of six to eight hours because they tick all the bottom line boxes. It is just cheaper to fly smaller planes.

Therefore, in the new thinking, many of the orders may change not slightly but dramatically. Safer and cleaner power plants and the advent of sustainable alternate fuels will also impact the sort of fleet mix, and the four-engine long-haul twin-aisle monopoly could well be broken by smaller single-aisle new-gen aircraft that are as comfortable and less expensive to fly. In the transformation period, fuel-efficient aircraft will be the key as smaller aircraft and more frequency dictate the next five years.

To quote the International Civil Aviation Organisation (ICAO): Engines and aircraft will become lighter, quieter and more efficient. Emerging technologies are reshaping with robotics, artificial intelligence, the Internet of Things (IoT), unmanned aircraft systems (UAS) and the push for hybrid and electric airplanes. The

four-engine era is passe. Commercial narrow bodies have improved to a great degree with the A320neo and the 737 Next Generation, and 737 MAX aircraft are now the main choice.

Boeing introduced the 777X, which is supposedly 10% more fuel efficient than the Airbus A350. It is also the largest twinjet boasting new technologies, advanced wingtips and a massive wing-based power plant on each side.

Airbus' latest development of the A321XLR likewise also underscores efficiency and a low carbon footprint. Such aircraft have improved range and can comfortably go transatlantic and move into the preserve of routes typically served by widebody aircraft.

For now, the slanging match can resume, as both the plane makers know they are riding the wave and, whatever the size, they are ready for it. And when they hold their respective press conferences at le Bourget next month, the media will be there... waiting for snarky sound bites.

*Bikram Vohra is the Consulting Editor of Indian Aerospace & Defence*

## NEWS BRIEFS

### Garuda Aerospace Receives Government Subsidy, Paving The Way For Agricultural Drone Revolution In India



Garuda Aerospace, a pioneering drone start-up in India, has received the country's first government subsidy for Agri-drones, marking a significant milestone for the industry. The Ministry of Agriculture and Farmers Welfare subsidy aims to promote the adoption of drone technology in agriculture, potentially enhancing crop yield and quality. This move is expected to revolutionise the agricultural sector, providing much-needed relief to farmers by making Agri-drones more accessible at a reduced cost. Using drones in agriculture streamlines crop monitoring and analysis, providing farmers with real-time information to improve crop yield and profitability. Garuda Aerospace's range of Agri-drones has made significant progress in the sector, covering large land areas with reliable and up-to-date crop information. The subsidy underscores Garuda Aerospace's vision to promote drone technology in the agricultural sector and sets the stage for further innovation and growth in the industry.

### MoCA Pushes For Norm Relaxation To Allow Foreign-Registered Private Jets To Bypass MoD Approval For Airport Access

The Indian Ministry of Civil Aviation (MoCA) is seeking to waive Air Operations Routine (AOR) requirements that mandate prior clearance from the Ministry of Defence (MoD) and Air Force or Naval Headquarters for private jets registered in foreign countries. This proposal aims to streamline non-scheduled aircraft operations in India, particularly in popular destinations for inbound tourism and trade. The potential waiver would be a boon for high-net-worth individuals (HNIs), corporates, and tourist charters visiting India. Private jet travel has witnessed a surge in demand since the onset of the COVID-19 pandemic. The civil aviation ministry's introduction of fractional ownership of business jets and helicopters in 2022 reflects the increasing demand for exclusive travel options among the affluent.

### Big Bang Boom Solutions Launches Naval Research & Development Centre In Chennai: Upping The Ante In Innovation



Chennai-based start-up Big Bang Boom Solutions has launched its Naval Research and Development Centre. Former Navy Chief Admiral Karambir Singh inaugurated the event. The facility aims to lead research and development projects in areas like electronic warfare systems, passive naval deterrence, and more. Big Bang Boom Solutions is a leading developer in the defence industry, focusing on advanced technologies such as electric propulsion, artificial intelligence, and UAV technology, and catering to clients in Israel, Australia, Finland, and the UK. The company has also gained investor support, raising INR 11 crores in 2020 from investors including Keiretsu Forum, Mumbai Angels, PitchRight Ventures, Udtara Ventures, and high-net-worth individuals (HNIs).

### DRDO Achieves Successful Test-Firing of Indigenous Anti-Submarine Rockets From INS Chennai, Enhancing Navy's Warfare Capabilities



The Defence Research and Development Organisation (DRDO), through its Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL), successfully test-fired the Extended Range Anti Submarine Rocket

(ER-ASR) from INS Chennai on 3 April 2023. The ER-ASR is an indigenous rocket system that intercepts submarines at specific depths, replacing the existing Russian-origin Rocket Guided Bombs (RGBs) and boosting India's anti-submarine warfare capabilities. The ER-ASR is deployed in anti-submarine operations from indigenised rocket launchers installed on various Indian naval ships. This successful test marks a significant step towards enhancing the Indian Navy's warfare capabilities and achieving self-sufficiency in defence.

## Indian Armed Forces Set To Acquire Two Units Of Pralay Ballistic Missiles, Boosting Rocket Force Capabilities



India's defence forces are set to acquire two units of the Pralay ballistic missiles to boost rocket force capabilities at a cost of over INR 7,500 crore. The missiles, developed by the Defence Research and Development Organisation (DRDO), boast a

range of 150 to 500 kilometres and exceptional evasion capabilities. Efforts are underway to extend the range by several hundred kilometers. This strategic move responds to China and Pakistan's ballistic missile capabilities and marks a significant milestone in India's pursuit of a robust and modern rocket force, aligned with its vision of a formidable defence arsenal.

## Wadia Group In Talks To Offload Stake Or Exit Go First Airline As Operational Challenges Worsen



Wadia Group, parent company of Go First, is in talks with potential strategic partners to sell a significant

stake or potentially exit the airline altogether. Go First has struggled with operational challenges, with nearly half of its fleet grounded due to Pratt & Whitney engine supply chain disruptions. Despite receiving support, including loans and infusions from Wadia Group, the airline is exploring all options, including a potential exit from the airline business. Go First's Initial Public Offering (IPO) plans, filed in May 2021, were delayed due to investor concerns about engine supply issues. The airline is committed to finding solutions to navigate the challenging aviation industry.

## Domestic Passengers Traffic Between January-March 2023 Shows 51.70% Annual Growth



Domestic airlines in India carried 375.04 lakhs of passengers from January to March 2023, up 51.70% Year on Year (YoY), according to the Directorate General of Civil Aviation's Traffic Report for March 2023. Passenger complaints have decreased significantly, while complaint resolution has increased to approximately 99% in March 2023. Vistara, Air India, Air Asia, and Star Air have increased passenger load factors, while Indigo, SpiceJet, and Go Air have decreased. Market share has increased for Indigo, Vistara, and Air Asia but has declined for Air India, SpiceJet, and GoAir. On-time performance for most airlines has decreased compared to March 2019, except for Indigo and Air India.

## Avolon Delivers 15 Airbus A320neo To Vistara, Bolstering Fleet For India's Growing Aviation Market



## NEWS BRIEFS

Dublin-based aircraft leasing specialist Avolon has delivered 15 A320neo aircraft to Indian carrier Vistara, a joint venture between TATA Sons and Singapore Airlines. The new aircraft will support Vistara's expansion plans in India's growing aviation market. The Airbus A320neo family is known for its efficiency, reliability, and comfort and is equipped with the latest technology to reduce fuel consumption and emissions. This delivery advances Tata Group's plan to upgrade and modernise its fleet as it moves towards the ultimate merger of Vistara and Air India. Once completed, the merged full-service carrier plans to operate a combined fleet of 218 aircraft. Avolon owns, manages and has committed a fleet of 830 aircraft globally.

### Air India Considers Teaming Up With Either Lufthansa Technik Or Air France-KLM MRO For AIESL Bid



Air India, owned by Tata, is considering partnerships with either Lufthansa Technik or Air France-KLM's engineering unit to acquire AI Engineering Services Limited (AIESL), a maintenance, repair, and operations (MRO) unit. Singapore Airlines' engineering arm, SIA Engineering Company Limited, which holds a 25.1% stake in Air India, will also participate in the consortium. Lufthansa Technik is evaluating the privatisation of AIESL, India's largest MRO provider, to strengthen its presence in India. The Indian government is preparing to sell AIESL, generating between INR 18 billion and INR 19 billion, along with AI Airport Services. AFI KLM E&M and Lufthansa Technik are MRO providers headquartered in Paris and Hamburg.

### Tata Group Plans To Establish A New Aviation Academy & Ground Handling Services For Air India



According to a report, Tata Sons plans to revamp Air India's ground-handling unit and aims to establish an aviation training academy within the proposed entity. Tata aims to offer shared ground-handling services to other airlines while strengthening Air India Air Transport Services (AIASL), which may be up for auction. The intentions are part of Air India's ambitious goals to be a top global airline and will require several home-grown pilots, engineers, cabin crew, airport managers, and other function specialists. Air India has raised INR 14,000 crore from the State Bank of India (SBI) and Bank of Baroda (BOB) to refinance old loans and obtain fresh loans.

### India & US To Manufacture High-Tech Defence Equipment, Strengthening Bilateral Ties



India and the United States are set to strengthen their defence partnership with India's production of high-tech defence equipment. Donald Lu, the Biden administration's South and Central Asia representative, revealed an imminent official announcement. This reflects India's focus on self-sufficiency, supported by the US. The collaboration is part of the Initiative on Critical and Emerging Technology (ICET) Dialogue and underscores the two nations' commitment to a mutually beneficial defence partnership. Based on the New Framework for India-US Defense Cooperation, the partnership has seen several defence accords and military exercises. This latest development will further cement India's status as a significant player in the global defence industry and bolster the bilateral relationship.

### Civil Aviation Ministry Teams Up With Petroleum Ministry To Boost Sustainable Aviation Fuel



India is set to encourage sustainable aviation fuel (SAF) by blending it with traditional aviation turbine fuel (ATF) as part of its Ethanol Blended Petrol (EBP) program. The Indian Ministry of Civil Aviation and the Ministry of Petroleum & Natural Gas have collaborated to develop guidelines for the initiative. However, India faces challenges in SAF production and transportation logistics, while the cost of producing SAF can be up to ten times more than traditional jet fuel. Despite this, leading Indian carriers have signed MoUs for SAF research, development, and deployment, as they target net-zero CO<sub>2</sub> emissions by 2050. The Indian aviation minister is also mapping the country's airport assets to achieve a carbon-neutral aviation sector.

## Solar Industries Indigenous Drone Wins Indian Army Contract, Out-pacing Offerings By Israel & Poland



Indian explosives and explosive systems manufacturer, Solar Industries Nagpur, has secured an order from the Indian Army for its indigenous unmanned aerial vehicle (UAV), the 'Nagastra.' The order was won in competition against rival offerings from Israel and Poland, highlighting the advanced technology of the Indian-made drone. The Nagastra-1, the first indigenous loitering munition (LM) designed and developed by Solar Industries Nagpur subsidiary Economics Explosives Ltd (EEL), boasts world-class features, including GPS-enabled precision strike accuracy within 2 meters in a "Kamikaze mode." The drone has a 60-minute endurance, man-in-loop range of 15 km, and autonomous mode range of 30 km. It is equipped with day-night surveillance cameras and a fragmenting warhead, making it a formidable tool against soft-skin targets. The drone's superior abort, recover, and reuse features allow it to be called back and made to land with a parachute recovery mechanism, enabling it to be reused multiple times. The Nagastra-1 provides the Indian Army with a powerful and agile drone capable of quickly neutralising hostile threats. The drone has already been showcased at the Army Commanders Conference held in New Delhi, where it was well received. Solar Industries Nagpur's efforts to develop a range of weaponised drones will boost the indigenous capability of using drones/UAVs as war machinery. The Nagastra-1 is an excellent example of the cutting-edge drone technology that India is capable of producing.

## Indira Gandhi International Airport Set To Open Fourth Runway & Terminal By September



The Indira Gandhi International Airport in Delhi, India is set to become the only airport in the country with four runways, as a new terminal and fourth runway are expected to become operational in September 2023. The new runway is expected to be 4,400 metres long and 75 metres wide, and will ease the pressure of rising flight operations, reducing waiting times for takeoff and landing. The expansion plan is part of an INR 9,800 crore investment to increase the airport's capacity to 100 million passengers per year. The project was delayed due to COVID-19. The airport was recently ranked ninth among the world's busiest airports by passengers handled in 2022.

## Indian Pilots' Federation Raises Concerns Over Prolonged Notice Period Requirement, Calls It Unsafe & Exploitative



The Federation of Indian Pilots has written to Civil Aviation Minister Jyotiraditya Scindia, urging him to intervene in the matter of the prolonged notice period requirement of Indian pilots. The federation argued that the current industry norm of a minimum notice period of six months

## NEWS BRIEFS

for pilots, while no such requirement exists for employers to terminate pilots, is an exploitative and unsafe practice that puts the aviation industry and the public at risk. Employers are also accused of using unreasonable bonds and coercive tactics to prevent pilots from leaving their jobs, leading to mental stress and compromising their competency. The FIP recommends a one-month notice period, which may extend to two months in rare cases.

### Jyotiraditya Scindia Invites EU To Partner with India In Creating Adaptive Technologies At EU-India Aviation Summit



India and the European Union (EU) have signed a letter of intent memorandum of understanding for closer cooperation between the Directorate General of Civil Aviation (DGCA) and the European Union Aviation Safety Agency (EASA). During the EU-India Aviation Summit, Union Minister of Civil Aviation and Steel Jyotiraditya Scindia invited EU players to partner with India in creating adaptive technologies and tackling emissions from the aviation industry. Scindia also mentioned India's efforts to promote aircraft manufacturing, the use of renewable energy, and encouraging the use of sustainable aviation fuel. European Union Commissioner for Transport, Adina Valean, expressed hope for successful partnership and cooperation in various aviation sectors.

### India & Thailand's Defence Dialogue Yields Encouraging Outcomes In Bangkok, Strengthening Bilateral Ties

India and Thailand express satisfaction with bilateral defence ties during their 8th Defence Dialogue in Bangkok. The two sides reviewed the progress of existing cooperation initiatives and discussed ways to enhance collaboration, particularly in the defence industry, maritime security, and multinational cooperation. Thailand expressed confidence in the capability of the Indian defence industry, and the co-chairs discussed emerging areas of cooperation and global issues.

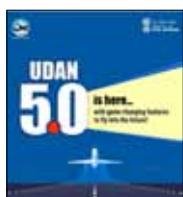


### CAPA India Urges New Aviation Policy to Manage 1.3 Billion Passengers within 20 Years



CAPA India has presented a roadmap for a new civil aviation policy at its 35th Research Briefing, aimed at supporting India's aviation sector to handle over 1.3 billion passengers with a commercial fleet of almost 4,000 aircraft within 20 years. This would represent a market approximately 20% larger than the US was pre-COVID-19 and generate an annual contribution of \$1 trillion to the Indian economy by FY2043. CAPA India identifies key issues for the policy, including planning for airport capacity, developing an international air services strategy, restructuring airspace design, and establishing a new aviation safety and security regime. The Ministry of Civil Aviation's recent efforts and privatisation of Air India provide an environment for a long-term policy to support India's aspirational vision for its aviation industry.

### Centre Launches UDAN 5.0 to Expand Air Connectivity to Remote Areas; Raises Viability Gap Funding Cap and Waives Stage Length Cap



Ministry of Civil Aviation launches UDAN 5.0, the fifth round of the Regional Connectivity Scheme (RCS), increasing Viability Gap Funding to 600 km and waiving the stage length cap of 600 km. This round focuses on Category-2 and Category-3 flights, without predetermined routes, and requires airlines to submit an action/business plan after 2 months. The scheme also includes a list of airports that are ready for operation or soon will be. UDAN aims to connect small and medium-sized cities with major cities via air service, with the goal of placing small-town India on the map of aviation.

**Don't miss out  
on the latest aerospace and defence news.**



**Subscribe today.**

**Send an email to [subscribe@iadb.in](mailto:subscribe@iadb.in) for details**

## NEWS BRIEFS

### ISRO's PSLV-C55 Rocket Successfully Places Two Singapore Satellites In Low-Earth Orbit



ISRO's PSLV-C55 rocket successfully deployed two Singapore satellites, TeLEOS-2 and Lumelite-4, into low-earth orbit from Sriharikota's Satish Dhawan Space Center on April 22, 2023. TeLEOS-2, a synthetic aperture radar satellite developed through a partnership between DSTA and ST Engineering, will provide all-weather day and night coverage to support Singaporean government's satellite imagery needs. Lumelite-4, co-developed by the Institute for Infocomm Research and the Satellite Technology and Research Centre of the National University of Singapore, is an advanced 12U satellite intended to enhance Singapore's e-navigation maritime safety and benefit the global shipping community by demonstrating the High-Performance Space-borne VHF data Exchange System (VDES).

### Industry Titans Convene For EAMRO 2023 Conference Hosted By Aviakul Group, Tackling Emerging Trends In MRO Industry At Indian Aviation Academy



Aviation industry luminaries convened at the Indian Aviation Academy for the 2nd International Conference on Emerging Trends in Aviation MRO Industry, orchestrated by the Aviakul Group of Companies. The conference discussed recent trends in the industry, such as the convergence of civil and defence in MRO, digitisation of MRO, and obstacles to implementing cutting-edge

solutions. The event featured a keynote lecture on Women in Aviation and panel discussions on digital MRO and challenges in implementing new-age MRO solutions. Over 300 participants, including industry experts, Indian Armed Forces veterans, and aviation professionals attended the conference, setting the bar high for the next edition of the Global Sustainable Aviation Conclave – Chapter 2.

### DRDO & Indian Navy Achieve Successful Maiden Flight Trial Of BMD Interceptor Missile From Naval Platform



India has achieved a breakthrough in missile defence technology with a successful sea-based interceptor missile flight trial, demonstrating the country's capabilities in neutralising hostile ballistic missile threats. This achievement has put India in the elite group of nations that possess Naval BMD capability, elevating its stature in the global defence arena. The Defense Research and Development Organisation (DRDO) and Indian Navy collaborated on this significant advancement, representing a major step towards India's goal of becoming a key player in the global defence industry.

### ePlane Co, Backed By Ubifly Technologies, Plans To Revolutionise Air Travel With Electric-Flying Taxi & Drones



ePlane Co., backed by Ubifly Technologies, plans to disrupt the air travel industry with its electric-flying taxi and drone technology. The Chennai-based company's electric-flying taxi can transport passengers within city limits at 2-2.5 times the

cost of a regular taxi fare. The company also plans to launch drones and a two-seater electric plane to ferry cargo within the next two years. The team has created three unmanned aerial vehicle (UAV) models, including the flagship e200, an all-electric flying taxi designed to transport passengers and cargo ten times faster. ePlane Co aims to join the ranks of leading air-taxi startups such as Joby Aviation and EHANG.

## Dhruva Space Tests Satellite Deployers, Radio Frequency Modules On Board PSLV



In less than a year, Hyderabad-based full-stack Space-Engineering solutions provider Dhruva Space's third mission to Space marks the company's intention to fly their own or their customer payloads on every PSLV mission of ISRO. The C55 mission of PSLV flew two variants of Dhruva Space's Satellite Orbital Deployers and one variant of their upcoming Radio Frequency modules. 3U Satellite Orbital Deployer (DSOD-3U) and 6U Satellite Orbital Deployer (DSOD-6U) Interfacing the Spacecraft with the launch vehicle is critical to the deployment of satellites. Dhruva Space has indigenously-developed satellite deployment systems compatible with Indian

Polar Satellite Launch Vehicle (PSLV); these are in form factors 1U, 3U, 6U, 12U and 16U.

## India's Defence Ministry Seals Deals For Akash & BrahMos Missiles & Multiple Ships



The Ministry of Defence (MoD) has awarded contracts for the acquisition of missile systems and ships. State-run Bharat Dynamics Limited (BDL) has been awarded an INR 81.6 billion contract for the supply of the Akash short-range air defence weapon to the Indian Army. The ministry has also awarded a INR 17 billion contract to Indo-Russian joint venture company BrahMos Aerospace for an unspecified number of BrahMos next-generation maritime mobile coastal batteries of the long-range variant. In addition, the ministry has signed an INR 97.8 billion contract with state-run shipbuilders Goa Shipyard as well as Garden Reach Shipbuilders and Engineers (GRSE) for 11 next-generation offshore patrol vessels (OPVs). Cochin Shipyard Limited (CSL) won a deal worth about INR 98.1 billion to supply six next-generation missile vessels to the Indian Navy. These contracts will enhance India's military capabilities and generate significant employment opportunities.

## Ministry Of Civil Aviation Disbursed About INR 30 Crores During FY 2022-23 Under PLI Scheme For Drones & Drone Components



The Ministry of Civil Aviation (MoCA) has dispersed INR 30 crores in FY 2022-23 to beneficiaries under the Production Linked Incentive (PLI) scheme for drones and drone components. The scheme, which offers a total incentive of INR 120

## NEWS BRIEFS

crore over three financial years, aims to boost the country's indigenous drone industry. The PLI rate is set at 20% of the value addition, which is calculated as annual sales revenue from drones and drone components minus the purchase cost. The scheme includes coverage for developers of drone-related software, and PLI for a manufacturer is capped at 25% of the annual outlay.

## India Takes Measures To Ease Congestion at Major Airports Including Delhi & Mumbai



Measures to decongest major airports in India, such as Delhi and Mumbai, include the deployment of additional traffic marshals, display boards with real-time data on waiting times, and additional entry gates. Airports have also opened new security zones and installed more X-ray machines for baggage check. The Mumbai Airport operator has commissioned a Domestic to Domestic transfer facility, and airlines have been advised to deploy sufficient manpower at check-in and baggage drop counters. The DGCA has also laid down air safety norms based on ICAO's standards to ensure the safe operation of aircraft.

## PM Inaugurates New Terminal Building Of Chennai Airport



Indian Prime Minister Narendra Modi inaugurates new integrated terminal building at Chennai International Airport, increasing passenger capacity to 30 million per annum at a cost of Rs. 1260 crores. The terminal incorporates traditional Tamil cultural elements, such as the Kolam, Saree, Temples, and highlights of the natural surroundings.

# APPOINTMENTS



## FORMER VICE CHIEF OF THE AIR STAFF AIR MARSHAL SANDEEP SINGH (R) HAS BEEN APPOINTED AS MILITARY ADVISER IN THE NATIONAL SECURITY COUNCIL SECRETARIAT

Air Mshl. Sandeep Singh, a former Vice Chief of the Air Staff (VCAS), has been appointed Military Adviser in National Security Council Secretariat (NSCS). He is an alumnus of the National Defence Academy (NDA), Khadakwasla, Pune. The former Indian Air Force (IAF) Vice Chief has extensive experience spanning almost four decades in the service. Air Mshl. Singh's predecessors at NSCS were from the Indian Army. The former VCAS brings a wealth of knowledge to the NSCS and is poised to offer critical advice on military matters. Notably, he has flown a range of aircraft, including Su-30 MKI, MiG-29, MiG-21, AN-32, Avro, Jaguar and Mirage 2000, accumulating almost 4,900 hours of operational and test flying experience. Furthermore, Air Mshl. Singh played an integral role in the induction, production and weaponisation of the Su-30 MKI in India.

## VADM. SANJAY JASJIT SINGH, ASSUMES CHARGE AS VICE CHIEF OF THE NAVAL STAFF

VAdm. Sanjay Jasjit Singh assumed the appointment of the Vice Chief of Naval Staff (VCNS) on 1 April 2023. On assumption, the Vice Chief paid homage to the Bravehearts at the National War Memorial and reviewed the Guard of Honour at South Block, New Delhi, on 2 April 2023. VAdm. Singh is a graduate of NDA and was commissioned in 1986 in the Executive Branch of the Indian Navy. In his career spanning 37 years, he has served on most classes of ships of the Indian Navy and has held a range of command, training and staff appointments, including Assistant Chief of Naval Staff (ACNS) Communications Space and Net-centric Operation (CSNCO), Flag Officer Sea Training, Flag Officer Commanding Western Fleet, Commandant Naval War College (NWC), and Controller Personnel Services. Before taking over as the VCNS, he was Deputy Chief of Integrated Defence Staff (Operations).



## VADM SURAJ BERRY ASSUMES CHARGE AS CHIEF OF PERSONNEL

VAdm. Suraj Berry, assumed charge as Chief of Personnel (COP) on 1 April 2023. The Flag Officer was commissioned on 1 January 1987 and is a specialist in Gunnery and Missile Warfare. His sea commands include that of the missile vessel INS Nirbhik, missile corvette INS Karmuk, stealth frigate INS Talwar, and the aircraft carrier INS Vikramaditya of which he was the commissioning Commanding Officer, having been associated with the Project for nearly four years. His Staff and Operational appointments include those as the Flag Lieutenant to the Flag Officer Commanding-in-Chief (FOC-in-C), Western Naval Command (WNC), Operations Officer of the Mobile Missile Costal Battery, Fleet Gunnery Officer of the Western Fleet, Defence Advisor to the Indian High Commissioner in Sri Lanka and Maldives, Director at the Directorate of Staff Requirements, Naval Assistant to the Chief of the Naval Staff (CNS) and Principal Director Strategy, Concepts and Transformation at the Naval Headquarters (NHQ).



## VADM. ATUL ANAND TAKES OVER AS DIRECTOR GENERAL NAVAL OPERATIONS

VAdm. Atul Anand assumed charge as the Director General Naval Operations (DGNO) on 1 April 2023. He was commissioned on 1 January 1988 into the Executive Branch of the Indian Navy. He is an NDA alumnus (71st Course, Delta Squadron), the Defence Services Command and Staff College (DSCSC), Mirpur (Bangladesh) and the National Defence College (NDC), New Delhi. He has also attended the prestigious Advance Security Cooperation (ASC) Course at the Daniel K. Inouye Asia-Pacific Center for Security Studies (DKI APCSS), Hawaii, United States of America (USA). His educational qualifications include a Master of Philosophy (M. Phil) and Master of Science (MSc) in Defence and Strategic Studies, Masters in Defence Studies and a Bachelors (BSc)..



## VADM. KRISHNA SWAMINATHAN ASSUMES CHARGE AS CONTROLLER OF PERSONNEL SERVICES

VAdm. Krishna Swaminathan assumed charge as Controller of Personnel Services on 17 April 2023. The Flag Officer was commissioned into the Indian Navy on 1 July 1987 and is a specialist in Communication and Electronic Warfare (EW). He is an alumnus of the NDA, the Joint Services Command and Staff College (JSCSC), Shrivenham, United Kingdom (UK), the College of Naval Warfare, Karanja; and the United States Naval War College (NAVWARCOL), Newport, Rhode Island, USA. The Admiral has held several key operational, staff and training appointments in his naval career including the command of missile vessels INS Vidyut and INS Vinash; the missile corvette INS Kulish; the guided missile destroyer INS Mysore; and the aircraft carrier INS Vikramaditya.



# EVENT CALENDAR



## DEFEA - DEFENCE EXHIBITION ATHENS 2023:

**9 May - 10 May**

### Location:

Metropolitan Expo, Athens, Greece

**About:** A high-profile international defence exhibition where International companies present land, naval, aerospace, national and cyber security defence systems. DEFEA will take place 9th to 11th May 2023. It is organised under the auspices of the Hellenic Ministry of National Defence, with the cooperation of the Hellenic Manufacturers Association of Defence Material and is organised by ROTA Exhibitions Greece.



## ASSURED PNT SUMMIT 2023:

**10 May - 11 May**

**Location:** National Harbor, MD, United States

**About:** The 3rd Annual Assured Positioning, Navigation and Timing (APNT) Summit will bring together members of the Military Services, DoD, Federal Government, Industry and Academia in a town-hall style forum to discuss the latest developments of PNT systems and GPS alternatives. PNT is a critical enabler for all warfighting functions across all domains and ensures the central component of situational awareness to the Warfighter: accurate and trusted positioning.



## ISDEF BANGKOK 2023:

**16 May - 18 May**

**Location:** Bangkok,

Thailand

**About:** After conducting comprehensive, in-depth research and collecting data from customers (government officials, security forces, suppliers and agents) worldwide and

specifically in Asia, ISDEF has created a clear demand list for the most sought-after and relevant services and products. With this in mind, we are proud to bring leading companies, ground-breaking services and innovative solutions to Bangkok Expo 2023 – The first international HLS, Civil Security and Cyber



## COMBINED NAVAL EVENT 2023:

**23 May - 25 May**

**Location:** Farnborough, United Kingdom

**About:** This is the 10th iteration of this meeting, the second time we have co-located three events, and the first time we have launched our Surface Fleet Technology meeting. With the Naval Damage Control Event taking place at the same venue, this will maximise the benefit to our attendees. It is a pleasure to welcome you once more to Farnborough, which with its size and links will be our home for the foreseeable future. We are looking to welcome 1,500 attendees representing 50 nations and 200 companies.



## SPACE OPERATIONS SUMMIT 2023:

**24 May - 25 May**

**Location:** London, United Kingdom

**About:** Space Operations Summit 2023 is the only conference to look at space both as an independent operational domain, and as an enabler for joint all-domain operations. The conference brings together space professionals and joint operators who depend on space to deliver effect in the air, on land, at sea, providing a platform for space SMEs to engage with launch service providers, defence space leaders, and end-user customers to be all under one roof at one time. Unlike other conferences on space, the conference agenda adopts a multifaceted approach which looks to solve challenges in space through cross-fertilisation across policy makers, militaries and industries.



## LIMA 2023:

**23 May - 27 May**

**Location:** Langkawi Island, Kedah, Malaysia

**About:** For five days every 2 years, LIMA transforms into an exciting hub for the most innovative technology in our industry, attracting market-leading companies from all sectors and providing an unparalleled opportunity to meet and forge new relationships with key decision makers face-to-face. The show welcomes companies from the most diverse sectors of the aerospace and maritime industry, including Space, Civil, Military, Manufacturing Technology, Rotary, and MRO.



## PARIS AIR SHOW:

**19 June - 25 June**

**Location:** Le Bourget, Paris, France

**About:** It is one of the largest and oldest air shows in the world. Among other things, the latest technologies of the aerospace industry and related equipment, such as aircraft engines, satellite and navigation technology, aircraft cabins and seats and weapons systems are presented here.



## ARMORED VEHICLES USA CONFERENCE:

**21 June - 22 June**

**Location:** Austin, Texas, US

**About:** Following the Russian invasion of Ukraine, which has demonstrated the continued tactical and operational importance of armored capabilities in the modern battlespace, along with growth and delivery of key armored vehicle programs, it is imperative that the US and allied nations continue to modernise their armored vehicle forces.



# Make in India, for the World

**Si2 – The Design to Market Solutions Provider In Industrial, Automotive, Communications, Aerospace and Space Markets**

## Products that offer value & reliability, delivered within lean timeframes

Si2 offers the convenience of a "One Stop Shop" from design to product, encompassing systems engineering, prototyping and packaging, and manufacturing for international markets. The company is certified per ISO 9000-2008, AS9100 D and CEMILAC.

Si2 delivers in the areas of : ASIC / FPGA development, System in Package (SiP), PCB Design and fabrication, Electronic assembly, Microelectronics, Sub-systems and complete systems.



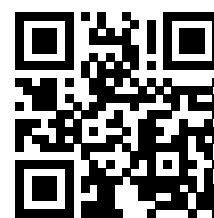
## PRODUCTS MANUFACTURED

- Full Turnkey Design & Manufacturing
- System in Package (SiP)
- QFN
- BGA
- Thick Film Hybrid Microcircuits
- MCM

## CLIENT LIST

- Hitachi
- Mavenir
- Titan
- L & T
- Bosch
- Honeywell
- Godrej
- IBM
- ADS
- SEG
- Portescap
- Cadence
- Redpine Signals
- Analog Devices
- Texas Instruments
- Elta

- Ellisra
- MBDA
- DRDO Labs
- BEL
- HAL
- ISRO



For more Information,  
Call: +91 80 6717 1123

Or go to  
[si2microsystems.com](http://si2microsystems.com)

Or scan the QR code with the  
QR Code Scanner on your  
smartphone or tablet

# Let us help you deliver your message



Get in touch with us today.

+91 9871447500 | [advertise@iadb.in](mailto:advertise@iadb.in)