DAY 2
19th October 2022

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AEROMAG SHOW DAILY

DEFEXPO 22 INDIA Ministry of Defence

# India takes its 'Path to Pride' at DefExpo 2022

With an aim to give impetus to the defence sector, the latest edition of India's "biggest ever" defence exhibition - DefExpo 2022 kickstarted in the twin cities of Ahmedabad and Gandhinagar, Gujarat. The 12th edition of the flagship event of the Ministry of Defence has been organised on the theme 'Path to Pride'. Prime Minister Narendra Modi will grace the inaugural ceremony today.

Defence minister Rajnath Singh said the DefExpo 2022 will showcase the growing prowess of the domestic defence industry, which is one of the major drivers of the nation's resolve to achieve 'Make in India, Make for the World' as envisioned by the Prime Minister.

The biennial exhibition has been organised to support, showcase and forge partnerships for the Indian aerospace and defence manufacturing sectors with Indian as well as global customers to achieve the overall objective of catering to domestic requirements while fulfilling the needs of friendly foreign countries

The 12th edition of the DefExpo aims to bring new technologies and solutions in the field of defence exclusively for Indian companies in line with the clarion call of Atmanirbharta in defence manufacture. At DefExpo-2022, the participants will get an opportunity to showcase their equipment and platforms and be able to explore the strengths and capabilities of the expanse of Indian Defence industry for forging business partnerships.

A live demonstration by the Army, Navy, Air Force, Coast Guard and DRDO, showcasing land, naval and air procedures, and systems in action are being held in the evening at Sabarmati River Front on all days of the expo. The joint live demonstration will include combat freefall, Sarang helo aerobatics, slithering from helo into a boat, high speed boat runs and neutralising enemy post.

## Defence Secretary Inaugurates HAL's Indigenisation Stall

Dr Ajay Kumar, Defence Secretary, inaugurated the HAL Indigenisation Stall at the ongoing DefExpo 2022.

More than 200 items which are planned to be indigenized with private industries are at display at the HAL Indigenisation Stall.

Apart from this, more than 26 parts which are already indigenised by HAL are displayed at the stall.

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Ministry of Defence

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# IAI announces new subsidiary in New Delhi


**Aerospace Services India (ASI) will provide product life cycle support services for the air-defense systems in India**

Israel Aerospace Industries (IAI) opens a new subsidiary located in New Delhi India, Aerospace Services India (ASI). IAI's investment in Aerospace Services India is a strong demonstration of IAI's support for the Indian government's 'Atmanirbhar Bharat'- MAKE IN INDIA vision. This also shows the commitment to the strong partnership between IAI and DRDO in developing and supporting advanced systems for the Indian armed forces.

Boaz Levy, IAI's President and CEO: "Aerospace Services India is leveraging top technology, innovation, and talent to deliver customer satisfaction so that they can focus on their mission. IAI has a well-established operation in India, working with various partners and customers in the Indian market. Through the years, IAI has pursued a flexible and adaptive business policy to comply and respond to PM Modi's 'Self-Reliance' vision."


# Merlinhawk Aerospace Inaugurates its EOU Cable Harness Manufacturing Facility

Merlinhawk Aerospace Pvt Ltd inaugurated its Export oriented cable harness manufacturing facility on 15th October 2022. Pursuing the goals of Athma Nirbhar Bharath, this facility is expected to meet the global customer requirements for manufacture of Cable harnesses & Box Building for defence, aerospace & Defence sector.

Merlinhawk is already operating a cable shop for domestic customers like HAL and other defence customers. The new shop, set up over 7500 sqft in Merlinhawk's Bangalore facility, will also be certified to AS9100 rev D standards.

The shop has world class machinery including a high-speed laser marker, automated cable testers, braiding machines for enhanced productivity and quality. This shop is expected to create employment for about 50 new technicians immediately and will ramp up over a period of time.

"With years of experience in the defence industry, Merlinhawk is well positioned to become a part of Indian and global supply chains of Indian and global OEMs" said Ram R Ramineni, Managing Director at Merlinhawk Aerospace.

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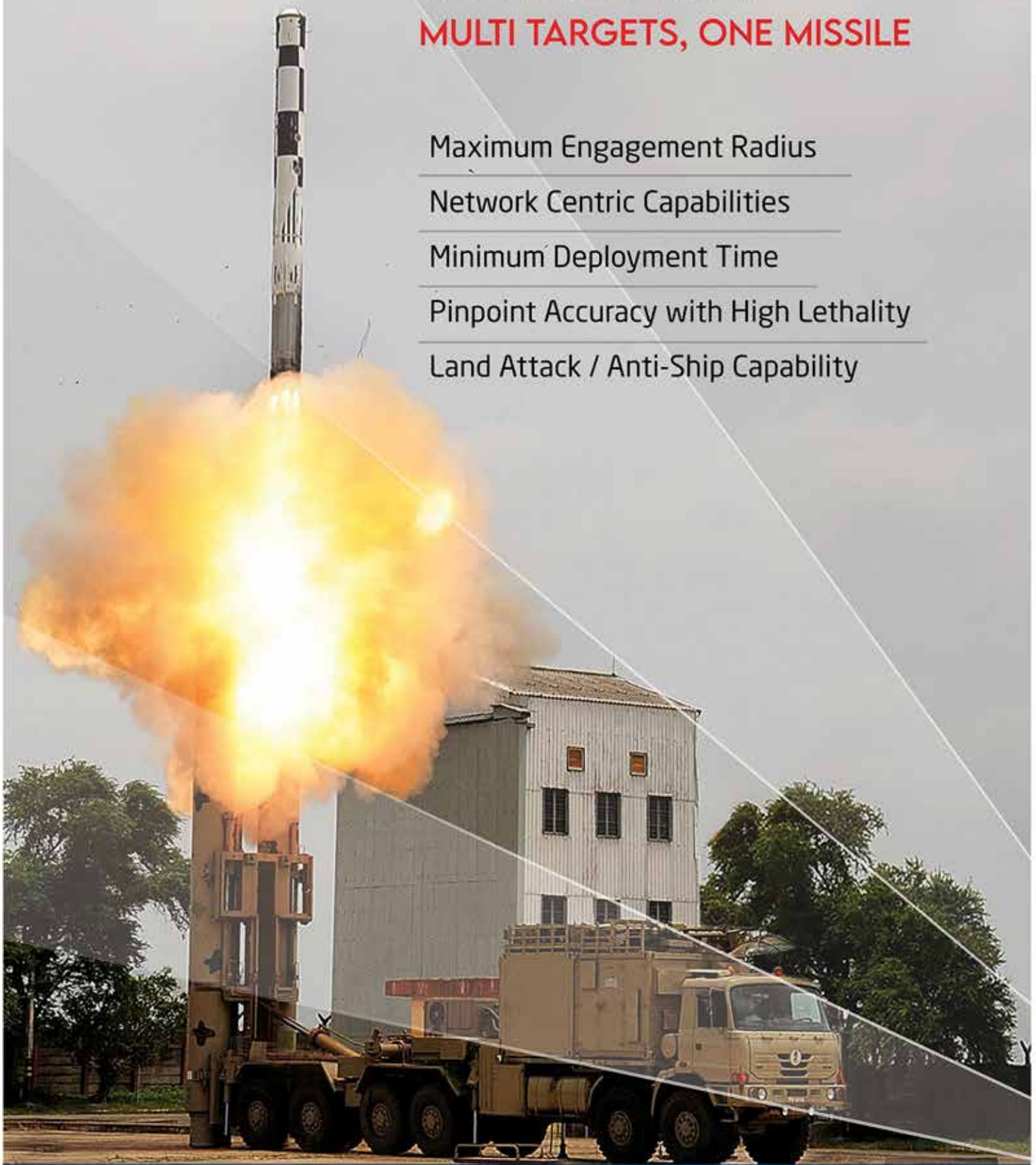

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# DRDO Displays 430 Products; '3D' Major Theme at DefExpo

3D (DRDO, Designed and Developed) highlights DRDO's strong linkages with industry as well as academia

Defence Research and Development Organisation (DRDO) is displaying a wide range of 430 products, including strategic and tactical weapon systems, defence equipment and technologies developed by it, at the DefExpo 2022 being held in Gandhinagar. DRDO's major theme at this edition of DefExpo is '3D (DRDO, Designed and Developed) ecosphere' which highlights its strong linkages with both industry as well as academia.

Further, DRDO showcases the advancements in technologies made by its laboratories as well as its partnerships with the industry in recent years while representing a high-level of indigenousness in state-of-the-art and futuristic defence products and technologies that contribute towards Aatmanirbharta in Defence.

The 12th edition of DefExpo is highlighting the theme 'Path to Pride' aligned with 'India at 75' and 'Aatmanirbhar Bharat'. It aims to further the narrative of 'Make in India, Make for the World'. In this backdrop, DRDO is showcasing several initiatives to deepen its strategic partnerships with industry and academia. These include initiatives such as Technology Development Fund, Dare to Dream, DIA- Centres of Excellence and other similar schemes to support academia, startups, MSMEs and large industries to continuously upgrade technology readiness levels of present and futuristic technologies in the country. All these DRDO-led initiatives have led to operational readiness of many Indian industries, especially in the areas of systems, radars, sonars, missiles and aircraft, some of which are displayed at the DRDO Pavilion in DefExpo22.

**Static displays to experience zone**

At the event, DRDO also provides numerous static displays, live demonstrations, seminars as well as immersive experience zones spread across three locations - Mahatma Mandir Convention & Exhibition Centre, Helipad Exhibition Centre and Sabarmati Riverfront.

The venue for DRDO Pavilion is Hall no. 10 of Helipad Exhibition Centre which is segmented into 17 display zones to showcase 376 products. These 17 zones are: Engines & Propulsion, Aerospace & Aeronautics, Sensors, Devices & Advanced Electronics, Naval Weapons & Systems, Armoured Vehicles & Land Systems, Armament, Guns & Ammunition, Materials, Missiles, BrahMos, Industry Partners in R&D (17 partners - three startups and 14 MSMEs), Soldier Support and Dual Use Technologies, Experience Zone (Simulator, Virtual Reality and Audio-Visual), Software AI & Cyber, Academic Zone, Academic Outreach, Industry Outreach and Public Interface.

This year, several technologies developed for land-based, naval and air-based systems are showcased through

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experience zones which provide a closed room immersive cinematic experience. In a first, Advanced Combat Aircraft (AMCA) simulator is also made available along with other virtual reality Naval, Land and Air product simulators. A holographic deck providing a 3D experience of over 30 defence products is present at the hall to gain insights into the intricacies of weapon designs.

Moreover, in a sprawling area of 1200 sq m outdoor display, 18 outdoor static exhibits (actual products) are on display at the Helipad Exhibition Centre. These include Border Surveillance System (BOSS), Laser Fence System (LFS), IRDE Tableau, BrahMos Air Version Missile, Mobile Autonomous Launcher (MAL) for BrahMos, CBRN Water Purification System, Infantry Combat Vehicle with Composite Hull (CICV), Advanced Composites Modular Bridge System (ACMBS), 155mm X 52 Cal Advanced Towed Artillery Gun System (ATAGS), CBRN Water Purification System, CBRN Recce Vehicles, 70 T Tank Transporter, Wheeled Armoured Platform (WhAP), Prahar Missile, Rudram III Missile, Quick reaction Surface to Air Missile (QRSAM), Medium Range Surface to Air Missile (MRSAM), Mounted Gun System (MSG) and Unmanned Ground Mobile Platform (UGMP). DRDO is also presenting Live Demo as well as Static Display of equipment at the Sabarmati Riverfront.

In addition, India Pavilion at Helipad Exhibition Centre is displaying a combined strength of DRDO along with public and private sectors. DRDO has placed 22 actual high-value products on static display. They are VIBHAV- Anti Tank Point Attack Munition, VISHAL- Anti Tank Bar Mine, PRACHAND- Anti Tank, 9 x 19 mm Machine Pistol- ASMI, Mine Field marking Equipment Mk II, Light Tank, Daksh Defuser, MBT Arjun Mk-1A, Light Machine Gun, Pralay, QRSAM, Carbine- 5.56x 45 mm, AIP System- Air Independent Propulsion, TAPAS, ASTRA Mk-I and LCA Mk2.

DRDO is also conducting a seminar on the theme 'Aatmanirbhar Bharat in Defence R&D: Synergistic Approach' at Mahatma Centre chaired by the Defence Minister. Programmes at the seminar include presentation of awards to winners of 'Dare to Dream 3' contest by the Minister, exchange of MoUs by DRDO with six IITs and Bharathiyar University for establishing new DIA-CoEs and declaring open 'Dare to Dream 4' contest by the Minister. Meanwhile, the programme 'Bandhan' is scheduled to hand over licences of DRDO-developed technologies to industries.

# Flight Tests of Very Short-Range Air Defence System by DRDO Successful

DRDO conducted two successful test flights of the Very Short-Range Air Defence System (VSHORADS) missile from a ground based portable launcher at the Integrated Test Range, Chandipur, off the coast of Odisha. VSHORADS is a Man Portable Air Defence System (MANPAD) designed and developed indigenously by DRDO's Research Centre Imarat (RCI), Hyderabad in collaboration with other DRDO laboratories and Indian Industry Partners.

VSHORADS missile incorporates many novel technologies including miniaturized Reaction Control System (RCS) and integrated avionics, which have been successfully proven during the tests. The missile, meant for neutralizing low altitude aerial threats at short ranges is propelled by a dual thrust solid motor.

The design of the missile including launcher has been highly optimized to ensure easy portability. Both the flight tests have completely met the mission objectives.

Defence Minister Rajnath Singh appreciated the efforts of DRDO and industry partners and said that this new missile equipped with modern technologies will give further technological boost to the Armed Forces.

Secretary DDR&D and Chairman DRDO congratulated the entire VSHORADS team for this tremendous success.

# Navy's Leviathan to Rule the High Seas

Commissioning the largest ship ever built in the maritime history of India at a mega event held at Cochin Shipyard Limited (CSL) on September 2, Prime Minister Narendra Modi said that INS Vikrant was not just a warship but a testament to the hard work, talent, influence and commitment of 21st century India. The mighty vessel will not only function as a powerful deterrent but also as a floating airbase in the high seas. Moreover, the successful completion of the vessel – though it took much longer than expected, is a glowing testimonial for India's dreams in attaining Atmanirbharata in defence. However, the real challenge before the Navy is to make the ship fully operational by integrating into the fleet, which will take its due time, and giving its own Carrier Battle Group (CBG). What is even more important is to complete the flight trials, which is yet to begin, at the earliest. Above all, it is a fact that the Indian Navy does not have enough fighter jets to operate on Vikrant, which stresses on the need for increasing the pace of the ongoing modernisation and defence indigenisation.

The maritime environment is constantly evolving and threat perceptions keep changing, making it extremely important for India to keep her naval fleet stronger than ever. The Indian Navy now has two fully-operational aircraft carriers to bolster her maritime capabilities as Prime Minister Narendra Modi commissioned the first Indigenous Aircraft Carrier as INS Vikrant into the naval service on September 2 in Kochi. A force multiplier like INS Vikrant provides India the flexibility to deal with multiple challenges and, even more importantly, acts as a strategic deterrent – the ship's very presence would make any enemy think twice. With its fang-like ski-jump, the ship resembled a giant sea serpent waiting to prowl in the high seas.

With the commissioning of Vikrant, the Indian Navy will have two aircraft carriers, each to guard its western and eastern seaboards as envisaged. Alongside INS Vikramaditya, which entered the service in 2013, INS Vikrant will provide a significant boost to the country's naval might and reach in the decades ahead. However, what good is an aircraft carrier if it doesn't have a strong fleet of aircraft. INS Vikrant could face the same issue as the Indian Navy lacks enough fighter jets to keep both its carriers operational at the same time and it raises questions about the slow pace of the force's modernisation.

## Vikrant's Challenges Ahead

Naval experts are of the opinion that lack of enough fighter jets could make Vikrant toothless and the navy will not be able to tap the true potential of its new moving airbase without a strong air fleet. So there is an urgent need of at least 26 fighters under Navy's ongoing Multi-Role Carrier Borne Fighters (MRCBF) programme for carrier-based operations.

Both Vikrant and Vikramaditya can carry around 30 aircraft each. As of now the navy has only around 45 Russian-made MiG-29K multi-role fighters, which are the only carrier-based aircraft in service. The naval variant of Light Combat Aircraft (LCA) Tejas, built by Hindustan Aeronautics Limited (HAL) proved unviable for the navy's requirements.

The Twin-Engine Deck-Based Fighter (TEDBF), being developed by the Aeronautical Development Agency, is expected to be inducted by 2030, but not even the prototype is ready yet. It means the only option to meet the requirements is to procure ready-to-operate fighters from foreign countries. Both French-made Rafale Marine (M) and US-made F/A-18 Super Hornets have successfully completed operational demonstration tests and the navy is looking at buying either of these aircraft under Inter-Governmental Agreement. But then again how long it will take is uncertain, because India's defence modernisation is yet to attain the pace it should have had since years ago.

Moreover, the real challenge before the Navy is to make the ship fully operational by integrating into the fleet, which will take its due time, and giving its own Carrier Battle Group (CBG). The process might take more than a year and what is even more important is to complete the flight trials, which is yet to begin, at the earliest. So, the prime focus of the navy will be to make INS Vikrant combat ready and fully-operational as soon as possible.

Captain Vidhyadhar Harke, the commanding officer of the ship, during the commissioning told the media that the navy had been able to test and validate the efficiency of the majority of the equipment and the machinery during various trials held. The next stage would be to integrate the flight trials and undertake the ships integration with the fleet. It will take inherently finite time to completely operationalise its combat potential and to be fully integrated with the fleet.

## A Testimonial to Atmanibhar Bharat

INS Vikrant is a glowing testimonial to India's ambitious indigenisation dreams in the defence sector. Right from the military grade steel to the 2500km-long cables used in the ship have been developed in India by defence PSUs, private companies and even MSMEs. The making of Vikrant over the last 15 years has created a new industrial ecosystem in warship building in India and it will further facilitate higher levels of Atmanirbhar

Bharat initiatives in the defence sector.

A major spin-off of the project was the development and production of indigenous warship grade steel for the ship through partnership between Navy, DRDO's Defence Metallurgical Research Laboratory (DMRL) and Steel Authority of India Limited (SAIL). Vikrant is the first Indian ship to be built using indigenised DMR 249 steel. India is now self-sufficient with respect to the warship-grade steel, which is now used to make all naval warships.

According to Madhu S Nair, CSL's chairman and managing director, Vikrant' has a large number of indigenous equipment and machinery, involving major industrial houses in the country viz. BEL, BHEL, GRSE, HAL, MIDHANI, Keltron, Kirloskar, Tata Advanced Systems L&T, Wartsila India, Johnson Controls India Limited etc. as well as numerous MSMEs. The indigenisation rate of 76% achieved during the ship's construction could be called the USP of Vikrant, but it also means that two-third of the total Rs.20000 crores spent on the project returned to the country's economy.

### The Need for a Third Aircraft Carrier

The navy has already reiterated its need for a third and bigger carrier. Multiple Carrier Battle Groups (CBG) of a maritime nation can definitely help in shaping perception of others about that nation. The mere show of presence of a CBG will restrain enemies from doing things not in India's liking.

Having multiple CBGs will play a crucial role in boosting India's maritime diplomacy and countering threats, especially the hegemonic blue-water ambitions of the Chinese Navy in the Indian Ocean Region (IOR). However, the age-old debate over the domination of aircraft carriers over submarines and vice versa is still in the air considering the huge cost involved in building, operating and maintaining a carrier and its high vulnerability to threats. Even the late CDS General Bipin Rawat had earlier favoured spending on cruise missile submarines than a carrier.

However, the naval fraternity is very clear about its priorities. According to them, both carrier, a sea control weapon, and submarine, a sea-denial weapon, have merits and demerits and both cannot replace each other. The carriers have never lost its relevance, if otherwise China, India's main competitor in the region, would not have been going aggressively with its carrier plans- a dozen carriers by next decade.

So the Indian Navy not only needs a third carrier, but it should be bigger and better than the existing ones. It should have CATOBAR (Catapult Assisted Take-Off but Arrested Recovery) instead of Short Take-Off but Arrested Recovery) as the former provides greater flexibility in carrier operations and allows fighter jets to have a greater payload for more ordnance and/or fuel. Moreover, the operations of carrier-borne airborne early warning and control (AEW&C) aircraft are possible only on CATOBAR carriers.

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# MAG5 Innovations: Creating innovative container-based shooting ranges

A typical shooting range is stagnant, space-consuming and immovable. Setting it up is also a time-consuming affair. However, a container-based shooting range with interactive retrieval system has advantages such as effective time management, mobility and space-saving. Moreover, it is operational anytime and anywhere with the most-modern smart range management information system.

MAG5 Innovations Pvt. Ltd. now offers innovative solutions in manufacturing and conceptualizing container-based shooting ranges which are in the process of obtaining an Indian patent. The research, design and product development in this area by the company are of high standards and among the best in the world.

MAG5 Innovations is registered with Startup India and works in the field of digital innovations in shooting ranges. "The technical specifications of the innovative shooting ranges are exceptional and would be of more meaningful use to the paramilitary forces and Army," said the company authorities.


## Shooter's fitness test

Mental conditioning is the foremost requirement for users of any firearms shooting range. Considering this fact, MAG5 Innovations has designed a software test to assess their mental condition. As a result, a shooter can enter the shooting range only after passing the test.

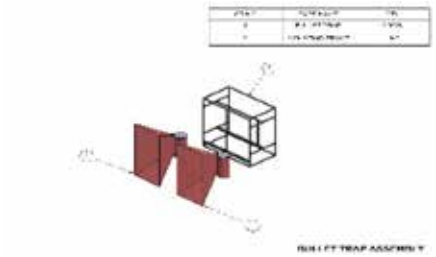
## Interactive target retrieval system

This system auto tunes the distances of the shooting targets with precision as per the command. Target orientation is auto

tuned for weapons as diverse as pistols to assault rifles. Patent has been applied for this innovation.

## Protection

successfully tested AR500 armour steel makes the range safer. unparalleled multi hit capabilities.360-degree protection.



5mm in sides and 6 mm in bottom.

Bullet Tarp System designed in a conical shape is safer to bucket the fired and mis fired bullets. 360-degree angle full proof safe for any misfiring.

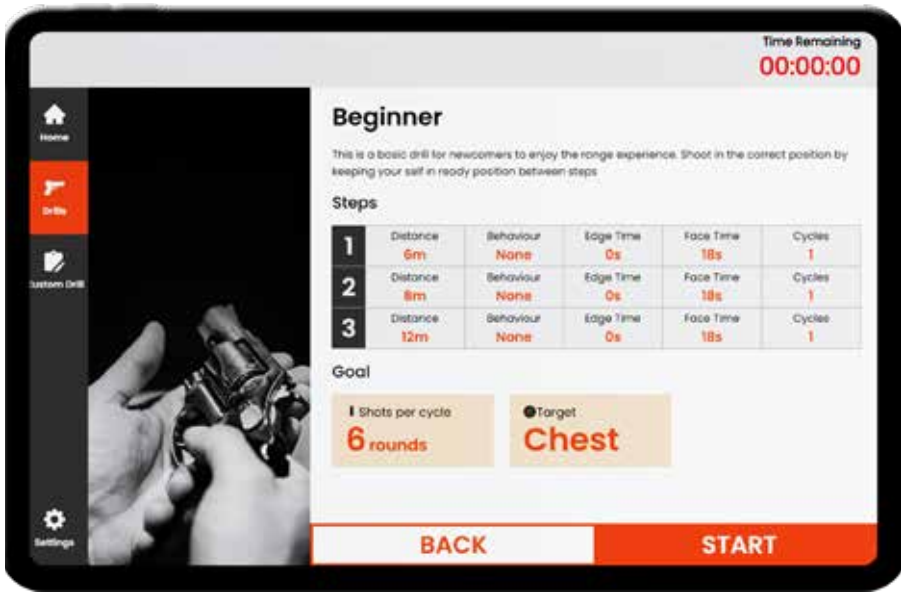
weapon locking & unlocking protection protocol which maintain the firer to keep it safe and range safe with auto locking and unlocking command.

Beginner mode will have all the learning and tutorial yardsticks as per the international standard

Normal mode firer will be tutored to train effectively with upgrading auto function.

Advanced mode is specific for a trained shooter and situations are created to give multi-dimensional real situations as challenges for the shooter.

Distraction mode-. A Patent applied innovation. Completely controlled with innovative lighting techniques. A real war, riot situations are created to distract the shooter and this mode will enable the shooters to train effectively and efficiently in real time situations by instilling the psychological frame of mind and situational improvisation through reciprocal action in the shaking platform.



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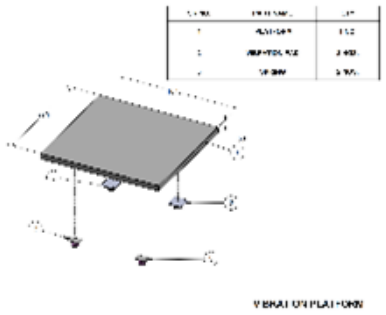
Empowering the Nation's Defence Forces

This unique feature can create distraction through visual/sound impact at the time of shooting. 8D audio used to have the rhythmic synchronization of the sound and the lights with actual situations and the firer will have the clear feel of the situational demands and pressure and it will enable the firer to be well equipped and be accurate in the real time situations. the principles of binaural recording to trick our brains into thinking that sounds are coming from different places in three-dimensional space. specially designed to reduce high-frequency diffraction.

## Automated Shaking Platform

8 D sound is synchronized with the shaking platform and as and when it is been activated as per the bombing and riots situational sounds with intelligent pixel control lighting system will give the effect of the riot situation and the shooter will have the situational impact to shoot at



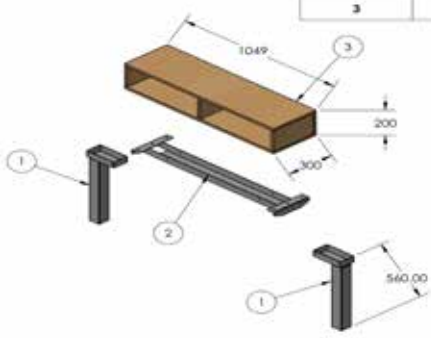
the point of the time.

## Automated Desk shoot mode

This mode is especially for the shooter to keep his elbow and shoot and he can keep the accessories in that desk. this is an automated desk which will be auto ready when the mode is selected by the shooter.

Gunshot detection is an automated counting of the shots fired by the firer and its auto calculate the bullets for prompt and steady training. Based on sound from the Gun, fixed dB will be produced. Comparing the sound captured from a directional microphone and comparing it with the dB level of the actual gun the number of rounds fired are captured with precision.

| SR NO. | PART NAME | QTY |
|---|---|---|
| 1 | LIFTING COLUMN | 2 NOS |
| 2 | DESK MOUNTING FRAME | 1 NO. |
| 3 | WOODEN DESK | 1 NO. |

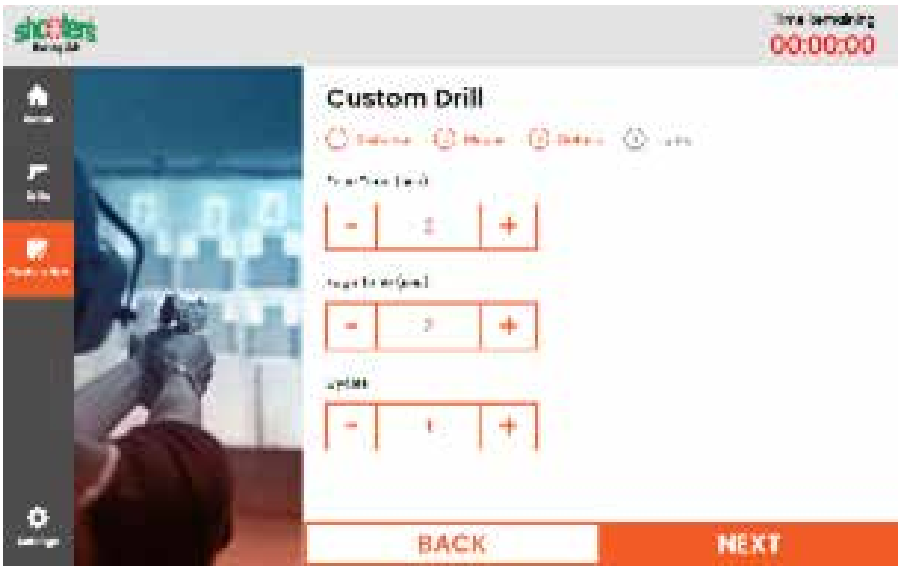



AUTO ADJUSTABLE DESK

## Image shot detection

After every firing, the visuals of the same can be assessed by the firer. advance guidance check and correct the positioning will be advised with point systems. Complete details will be provided after the firing to the individual and this will be stored in the server for MIS as per the protocols.

Smart Range Software MIS allows the shooter to see immediate and detailed visualized feedback on the entire aiming process. This intuitive data enables the user to see and eliminate both simple and deep-rooted aiming errors. Progress is achieved much faster than with usual training. Performance driven analysis in micro macro level with one touch operations.



Azadi Ka Amrit Mahotsav

एचएएल HAL

# एरोस्पेस एवं रक्षा में उत्कृष्टता के साथ अग्रसर
# Driving Excellence in Aerospace and Defence

*HAL's proven expertise, indigenous programs and thrust on excellence are redefining the Indian defence and aerospace industry. HAL is nurturing a competitive aerospace and defence ecosystem in India by partnering with private industries and MSMEs.*

FOR INFO. SCAN QR CODE

# Merlinhawk: Experts in Airborne and High-Tech Ground Testers

**By partnering with Indian Armed Forces, DPSUs, DRDO, paramilitary and civil customers for over 30 years, the Indian firm Merlinhawk Aerospace Private Ltd. has contributed immensely to the country's indigenisation efforts. R. Ramachandra Rao, Managing Director of the company, elaborates**

**R. Ramachandra Rao**
Managing Director
Merlinhawk Aerospace

Merlinhawk AEROSPACE

Merlinhawk has been a partner of OEMs, user agencies and operators in the aviation and defence sectors for customized solutions, for over three decades. What are the major achievements and milestones of the company?

It is a matter of pride for Merlinhawk, a 100% Indian company, that we have worked for more than three decades as a partner of Indian Defence, DPSUs, DRDO, paramilitary and civil customers. We have been supporting the Indian armed forces and have successfully indigenized and flown a fighter-based SSFDR (solid state flight data recorder) and have also developed complicated engine testers, saving millions of dollars in terms of foreign exchange. Merlinhawk is also committed to providing timely support for ease of maintenance and post warranty support.

Merlinhawk's core expertise is in airborne and ground-based testers for various aviation and defence platforms. Could you elaborate on this?

Merlinhawk has proven capabilities for design, development, integration, certification, production and support of airborne and high-tech ground testers for various platforms. We have a fully-dedicated team of R&D professionals who are further supported by highly-trained technical experts for certification, integration and support. We also utilize the services of a number of technical consultants based on the project requirements. We also fund our own design and development activities completely through our own internal resources. Our reputation in this regard is well established and something we are proud of.

What are the products and services offered in ground support equipment and defence electronics?

The list of our indigenous products for defence electronics and high-tech testers include tank-based electronics for the T-90 tanks, testers for various Russian and Indian fighters and other ground support equipment. Many of these products are based on our own R&D and have replaced imported items at a fraction of their cost. All hardware and software solutions are our own and indigenous. Our website explains some of these technologies and achievements.

How strong is the company's export business? Who all are the clients and what

**are the products and services exported?**

Merlinhawk has a subsidiary company based in Kuala Lumpur, Malaysia for the last 20 years, looking after export of our products and capabilities in regional as well as international markets. We do substantial business in the Southeast Asian region. We engage in aggressive marketing for our export-oriented business. Almost all of our capabilities and products are available for exports as they can be used on various fixed wing and rotary wing platforms. Apart from product exports, we are also part of a supply chain doing contract manufacturing for foreign OEMs. We have also established an EOU for manufacturing in the defence sector.

**Could you explain how the company associates with defence PSUs and armed forces?**

Merlinhawk has excellent working relationships with armed forces, Defence PSUs and other customers like DRDO and ordnance factories. Many of our products and solutions are proof of the fact that we are working as partners and not just suppliers. In several of these projects, Merlinhawk has been funding the development costs.

**How does the company support indigenization in the defence sector?**

As mentioned earlier, Merlinhawk is an Indian technical organization with our own R&D and a large production base. We are in sync with the Make in India efforts to achieve Aatma Nirbharta (self-reliance) in Defence as per the aspirations of Government of India. All our achievements clearly indicate our support for indigenous products. We are also in the process of manufacturing certain critical items under license from foreign OEMs, apart from joint ventures with some OEMs.

**What can we expect from Merlinhawk at DefExpo 2022? How do you look at the expo as a platform to expand your business?**

We are looking forward to DefExpo 2022 as this event, along with Aero India, opens up many new opportunities and helps display our upcoming additional capabilities. All this would strengthen our resolve to support indigenization in defence. Our highlight at the DefExpo is the Electro - Optics POD and fire control system developed by Merlinhawk with AVNL (formerly Ordnance Factory Medak) for a 30-mm cannon that is being displayed at the India pavilion, showcasing the home-grown technology. We will be announcing our partnership with L3 Harris Wescam and our investment in a service centre in India for their EO/IR range of systems.

**What can we expect from your partnership with L3 Harris Wescam and how would it benefit India?**

This partnership with L3 Harris Wescam for setting up an authorized service center (WASC) in India will help us mainly to cater to our customers' needs in terms of providing the maximum up-time for their products. Further, we would be learning from these repairs and eventually working towards in-country manufacturing of these advanced EO/IR systems. Through the in-country manufacturing, there would be various skill sets that would be developed by the Indian industry and help us also to cater to the wider export markets.

# Rafael Acquires Pearson Engineering, UK

Rafael Advanced Defence Systems Ltd. has completed the acquisition of Pearson Engineering Ltd. (PER). The acquisition was executed under a stock purchase agreement (SPA), transferring 100% of the ownership. The acquisition includes PER's subsidiary company Responsive Engineering Ltd.

**About Pearson Engineering**

For more than three decades, Pearson Engineering has provided Armed Forces with the mobility and counter-mobility equipment they need to succeed in their missions around the world.

From our home in Newcastle upon Tyne in the United Kingdom, we are proud to be recognised around the world for our contribution to armoured vehicle programmes.

We design products which help combat forces to defend, move and fight and to adapt quickly to maintain their battlefield advantage.

Our innovative approach to providing 'scalable battlefield mobility' is based on delivering attachments for armoured vehicles which enhance their agility, adaptability, and flexibility and which provide essential mission capabilities to Commanders.

We are located at Armstrong Works in Newcastle, which is a purpose-built armoured vehicle manufacturing facility. Together with our daughter company, Responsive Engineering, we combine our armoured vehicle experience with our class-leading manufacturing expertise, to also provide manufacturing, assembly, integration, and test services for armoured vehicle programmes.

In 2022, Pearson Engineering was proud to receive the Queen's Award for Enterprise in the International Trade category, in recognition of our exceptional export performance. This was the third Queen's Award in the company's history.

# Exports Boost Production of Kalashnikov's Small Arms

The Kalashnikov Group has achieved a significant increase in the manufacture of small arms in 2022, chiefly through meeting export contracts for the supply of military products and due to a hike in exports of civilian weapons.

"We strive to fulfill our obligations to our external customers in a quality-bound and timely manner, and this year we are witnessing an increase in demand in the civilian small arms market compared to last year. Thus, our production capacities are being fully utilized this year," said Alan Lushnikov, President of the Russia-based Kalashnikov Group.

"This intensive pace of work can be maintained thanks to a responsible team and the effective organization of processes at all levels," he added.

In India, Kalashnikov Group has created a joint venture named Indo-Russian Rifles Private Ltd. (IRRPL) for the production of AK203 assault rifles. The AK203 is part of the larger AK200 assault rifle family. Since 2019, Russia has been marketing the AK200, AK203, AK204 and AK205 rifles.

According to Rosoboronexport, the AK200 series rifles have retained all the advantages of the traditional AK pattern such as reliability, durability and ease of maintenance. The rifles are equipped with integral Picatinny rail and can be fitted with necessary detachable equipment for the effective use of the weapon in various conditions, including reduced visibility.

The butt plate and a number of ergonomic solutions for optimizing controls enable the users to fully realize their shooting skills, irrespective of their physical features and choice of personal clothing, gear and equipment

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# President of India Inaugurates HAL's Integrated Cryogenic Engine Manufacturing Facility

The President of India, Droupadi Murmu inaugurated HAL's Integrated Cryogenic Engine Manufacturing Facility (ICMF) in Bengaluru and said it is not only a historic moment for HAL and ISRO but for the whole of India. "India is the sixth country in the world to have Cryogenic Engine Manufacturing capabilities. The glorious past of HAL and ISRO gives us an assurance that they will play a crucial role in the future", she said.

The President also went around the HAL facility. She virtually laid the foundation stone for Zonal Institute of Virology (South Zone) of NIV, Bengaluru. The Governor of Karnataka Thaawarchand Gehlot, Chief Minister of Karnataka, Basavaraj Bommai were present on the occasion.

Referring to Bengaluru as Space City, Bommai said the state contributed most of the space and defence related manufacturing activities in the country and Karnataka will continue to support the development of science and technology projects in the state to realise the 'Aatmanirbhar Bharat' vision.

Dr. Bharati Pravin Pawar, Union Minister of State for Health and Family Welfare also spoke on the occasion. Dr. Sudhakar K, the Minister for Health, Family Welfare and Medical Education (Govt of Karnataka) was present.

Chairman of ISRO and Secretary, Dept of Space, S Somanath said India can emerge as a superpower in rocket technology only with the help of HAL which has shown ability to absorb complicated space technology with perfection. ISRO therefore is confident that the entire rocket manufacturing will happen at HAL's facility, he added.

C. B. Ananthakrishnan, CMD, HAL welcomed the gathering.

## About ICMF

HAL's ICMF will cater to the entire Rocket Manufacturing and assembly under one roof for ISRO. The facility will boost self-reliance in manufacturing of High-thrust Rocket engines.

The facility is set up over an area of 4500 sqmts housing over 70 hi-tech equipment and testing facilities for manufacturing Cryogenic (CE20) and Semi-cryogenic Engines (SE2000) of Indian Space Launch Vehicles.

In 2013, an MOU was signed with ISRO for establishing the facility for manufacturing of Cryogenic Engine modules at HAL, Aerospace Division. The MOU for the Cryogenic Engine facility was subsequently amended in the year 2016 with an investment of Rs. 208 crores towards setting up of Integrated Cryogenic Engine Manufacturing Facility (ICMF).

The commissioning of all the critical equipment for the manufacturing and assembly requirement is completed. The pre-production activities which involve preparation of the process plans, drawings, quality plan etc. has also commenced. HAL will start realising the modules by March 2023.

HAL Aerospace Division manufactures liquid propellant tanks and launch vehicle structures of PSLV, GSLV MK-II, GSLV Mk-III, and stage integration for GSLV Mk-II. The Aerospace Division entering manufacture of Cryogenic Engines is a major step in technology up-gradation cum modernization.

Cryogenic Engines are the most widely used engines world over in the launch vehicles. Due to the complex nature of the cryogenic engine, till date only few countries USA, France, Japan, China & Russia have mastered the cryogenic technology. On January 5, 2014, India successfully flew GSLV-D5 with a cryogenic engine (made by ISRO through private industries) and became the sixth country in developing cryogenic engines. Space exploration in the future is mostly dependent upon cryogenic technology.

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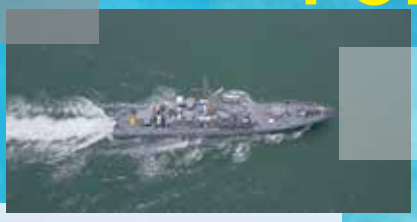




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# ADTL Urges MoD to focus more on Direct Offsets

**Alpha Designs Technologies Ltd. (ADTL) is today one of the foremost Defence Electronics and Aviation R&D and production company in India. "ADTL's turnover for this and earlier years, more than 70% is from exports! Major exports are through direct offsets. In quite a few cases, such offsets have resulted in direct orders for exports from same OEM's as they were happy with ADTL's manufacturing expertise and quality of products supplied. This is the reason why ADTL always emphasizes to MoD to place more importance on Direct Offsets rather than spending offset credits on ToT to DRDO / establishing test facilities etc., which do not bring work to industries," said Col. HS Shankar (Retd.), Chairman and Managing Director, Alpha Designs Technologies (ADTL). Speaking to Aeromag, he talks about the latest operations and expansion plans of the company.**

**Col. H S Shankar (Retd)**
CMD, ADTL

How does ADTL respond to the needs of India's defence and paramilitary markets?

The company responds in a positive way by offering Indigenous solutions so that needs of our Armed Forces are met.

The Indian Army has signed a pact of 100 explosive-laden drones which will be jointly manufactured by ADTL and Israel's Elbit Security Systems. Could you talk more about the project and the drones?

Manufacture of these Loitering Munitions is in advance stages of manufacture at ADTL's JVC with ELBIT (Alpha ELSEC) at Bengaluru. As an extension of work which Alpha ELSEC is already doing, a large number of such systems are already being made for the export market.

Apart from the Indian Army's contract, Alpha Design's JV has independently got two more defence contracts from the Indian Air Force recently. Could you elaborate of them too?

ADTL signed Contracts with IAF / MoD for 6 No's VHF Radars and 61 No's IFF. All these are in manufacturing stages and proceeding smoothly.

What are the latest highlights of your export operations? How does ADTL expand its global reach?

Out of ADTL's such turnover for this and earlier years, more than 70% is from exports! Major exports are through direct offsets. In quite a few cases, such Offsets have resulted in direct Orders for Exports from same OEM's as they were happy with ADTL's manufacturing expertise and quality of products supplied. This is the reason why ADTL always emphasizes to MoD to place more importance on Direct Offsets rather than spending Offset credits on ToT to DRDO / establishing test facilities etc., which do not bring work to industries.

ADTL is developing smart indigenous solutions driven by the latest technologies like AI and edge computing. How important are these techs in the present day scenario? What are your operations in these?

ADTL has strong Software R&D groups working on these critical technologies. Exciting breakthrough is expected shortly to meet the ever expanding Indigenous and exports markets in this field.

Could you talk about your operations in Electronic Warfare Systems (EWS) and Military Communication?

ADTL has a dedicated EW R&D and manufacturing EW facility at Hyderabad, where large number of co-development projects are being undertaken along with DLRL (DRDO Lab) and also directly for Service HQ. Regarding Military Communications, ADTL has manufactured and supplied recently 4974 No's CNR Radio's, 2000 No's ULSB MkIII and is developing SDR's and HCRR Indigenously.

Could you shed some light onto your association with the Defence PSUs in terms of research and development?

ADTL works with DPSU's like BEL, HAL and ECIL on critical technology projects such as Missile Launch Detection System (MILDS), TR Modules, Optronics Systems, Avionics Upgrades, etc.

What can we expect from ADTL at the Def Expo 2022? What are the objectives ahead for ADTL?

Upgrades of Russian systems, TI based Fire Control Systems for tanks, Software Defined Radio's, Satellites, PSLV / GSLV parts manufacture, Simulators etc

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# Redefining the Future in Composite Part Manufacturing

**Fabheads Automation has been taking composite part manufacturing to next level with its indigenously developed continuous fibre 3D printers and the company's printers have already proven its worth in a variety of industries including aerospace. At DefExpo 2022, the company focused on introducing its state-of-the- art 3D printer machines F Series and G Series, which will enable companies working in defence sector, especially to accelerate their prototyping and production capabilities. "We are looking forward to meeting the top defence companies in India, where we can offer our services in the field of Carbon Fibre manufacturing. Moreover, we are also excited to meet other SME's to find holistic partnership to work with them on their design and fabrication needs pertaining to composite requirements," said Dhinesh Kanagaraj, CEO & Founder, Fabheads Automation. Speaking to Aeromag, he talks about the company's success journey, products, focus areas etc.**

**Dhinesh Kanagaraj**
CEO & Founder
Fabheads Automation

Fabheads has been building automated manufacturing solutions for fabricating composite products and has marked its own footprints over the last six years. Could you share the milestones in this success journey?

Fabheads was founded in late 2015 as a startup. Since I am from an Aerospace background, working for a few years with ISRO before founding Fabheads, I understood several problems faced by the Indian Composites industry. This is one of the main reasons why Fabheads' primary vision was to automate the manufacturing processes in the composites industry especially around Carbon Fibre materials. Carbon fibre as you may know is used across several light weight and high performance applications like in Tennis racquets to guns to UAVs to fighter jets to satellites.

But the primary issue is most of these carbon fibre parts are still fabricated today by manual processes and hence comes with high rejection rates, low precision and high cost.

We were determined to focus our early years purely on R&D and finding a good automated manufacturing process to solve these issues. We decided to work on 3D printing technologies around carbon fibre, as additive manufacturing is best suited for composite materials like carbon fibres much better than isotropic materials like metals or plastics. This eventually led to the indigenous development of our 3D printing technology for continuous Carbon Fibre - Adaptive Tow Placement (ATP) by late 2017. ATP is a one of its kind process that allows automated manufacturing of both large and small intricate parts effectively. This was the first ever development of its kind in India and still continues to be the only such technology of its kind for fibre 3D printing developed indigenously in India.

We developed our first machine FibrBot 300 using this ATP technology by late 2018 and started a very extensive field testing to validate the technology. During the next year, we catered to several clients across drones, robotics and shipping industries where we fabricated components for these clients using our technology, and they offered valuable feedback to improve the process.

By late 2019, after about a year of field testing and several improvements in our technology, we started commercialising the technology through our in-house fabrication services. Here, we catered to several clients by manufacturing carbon fibre parts for them across drones, robotics, shipping and few other sectors.

We had originally planned to immediately start selling these machines in early 2020, but we had to defer our plans due to the pandemic. And recently, we started our own brand 'FabMachines', under which we have now made these technologies accessible to anyone who wishes to buy the machines directly for their use cases.

Could you talk about the company's retainer model?

Being a deep technology company, our engagement with our clients are as unique as our product portfolios. As composite technology requires iterations and multiple tooling, we have a range of engagement with our clients which entail design, analysis, prototyping and volume productions. Our Retainer models describe all the perks for clients who are in different stages of component fabrication, which gives Fabheads to hand-hold or partner with clients to envision the complete

product.

How advanced is the Fabheads X-Series printers?

An advanced large format 3D Printer, Fabheads X Series adapts the technology of FDM, uses pellets as feedstock instead of filaments. Fabheads X Series printer can be configured to print as long as 10 meters in one shot. Fabheads X Series printer is built on a large scale of additive manufacturing architecture which is equipped with swappable print head in three different formats.

There is Continuous Carbon Fiber [CCF] Printing, which can print high performance large components. The Pellet Printing produces cost-effective moulds in short duration. Filament Printing focuses on intricate features.

One of many advantages of the Fabheads X Series printer are High deposition rate, Lesser Lead time and Cost effective compared to traditional FDM machines. Printing volume of the printer is around: 2 x 2 x 2 m. Fabheads X-Series has had a varied use case in the limited time of the commissioning such as 3D Printing the tooling for the Boat Hull of 2m in total length, 3D Printing parts for a large format medical equipment, 3D Printing furniture and aesthetics house appliances (Lamp, Vase) using pellet-based technology.

Hybrid fabrication and multiple material combinations are few of your key strengths. Could you elaborate? Also, please share the details of your production facilities and quality standards.

Traditional 3D Printing and Composite fabrication processes have their advantages and disadvantages. Traditional 3D Printed components have very limited strength for limited real time use purposes and with composite components, the time taken to fabricate and also complexity in fabrication is limited. By combining these two technologies, we can achieve a highly complex part which is possible through 3d printing and translate to a high strength component by adding composite technology. So, the result will be a highly complex and strong part which will not be possible with either of the technologies alone, this is the true strength of hybrid fabrication.

What are the highlights of your participation at DefExpo 2022? How do you look at the expo to find new business opportunities?

We are looking forward to meeting the top defence companies in India, where we can offer our services in the field of Carbon Fibre manufacturing. We would also like to introduce our state-of-the- art 3D printer machines F Series and G Series, which will enable companies working in defence sector, especially to accelerate their prototyping and production capabilities. Moreover, we are also excited to meet other SME's to find holistic partnership to work with them on their design and fabrication needs pertaining to composite requirements.

# HAL Showcases Indigenous Products


Hindustan Aeronautics Limited is displaying its indigenous products at the 12th edition of DefExpo.

HAL's participation will focus on technological excellence and indigenisation initiatives, under its business verticals such as fighters, trainers, transport aircraft, helicopters, engines, systems and avionics besides projecting the company's futuristic programs.

HAL have a dedicated 'Indigenisation Exhibition Stall' at HALL-2 for active participation and interaction of Indian industry partners. More than 200 imported items planned to be indigenised with private industries are displayed in this stall to attract Indian industry.

Twenty six already indigenised items are displayed for understanding and encouragement of private industries. There is one-to-one interactions and instant clarifications to the Industry partners at the venue.

Dr Ajay Kumar, Defence Secretary, inaugurated the HAL's dedicated Indigenisation Stall on the first day of DefExpo. Launching of a document on indigenisation success stories of HAL, handing over of "Project Sanction Orders" of Positive Indigenisation List (PIL) items to the Indian Private Partners, handing over of approvals / clearance certificates to the industry partners for items indigenised and launch of Indigenisation - Supplier Relationship Management (ISRM) portal are also part of HAL activities.

HAL's Light Combat Helicopter 'Prachand' is showcased in the Outdoor Display area during the show. The scaled models of LCA, LCH, LUH, ALH, Do-228 and HTT-40 during the show. Some of the avionics/ accessories/ components/ products such as Indigenous Engine & Flight Display Unit (EFDU), Mission Computer & Interface Computer, Digital Map Generator (DMG), FBW DAU (Fly by Wire Data Acquisition Unit), E-FDR (Enhanced Flight Data Recorder), Gunner Pilot Control Unit (GPCU), Automatic Identification System (AIS), Solid State Data and Video Recording System (SSDVRS), Full Authority Digital Engine Control System (FADEC), Integrated Control Computer (ICC), ICCATS-Jaguar, APU, GTSU-127 etc. are also on display.

At the India Pavilion (HEC), HAL is displaying 29 products of which 17 are scaled models and 12 are through display posters and product videos. Scaled models of HTT-40, ALH (WSI), IMRH, LUH and RUAV, also showcased during the show. Other products include Main Landing and Nose Landing gears of ALH, Air Starter Turbine –AMCA, Digital TGT Amplifier (TGTA), Ring Forgings, Shape Memory Alloy Ferrule Rings, Solid State Cockpit Voice & Flight Data Recorder, HPTR BLADE-AL31FP ENGINE, Main Rotor Blade (ALH), TACAN, VOR ILS and Air to Air Heat Exchanger.

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**Centre of Excellence (CoE)** in **Cyber Security** is the first **ISO-IEC 27001** certified lab in India at NFSU. CoE in Cyber Security provides Cyber warfare training and cyber technology development. It provides tools that help strengthen the stability, security and performance of Cyber infrastructures and IT systems used by government, Defence, CAPF and Law Enforcement agencies & undertake training, R & D and test cyber technologies to ensure consistent operations and readiness for real world deployment & developed **Cyber Kiosk.**

**Ballistics Research & Testing Centre** undertakes testing of various armoured vehicle, Bullet proof jacket, Rifles, and other weapons of Armed Forces & CAPF.

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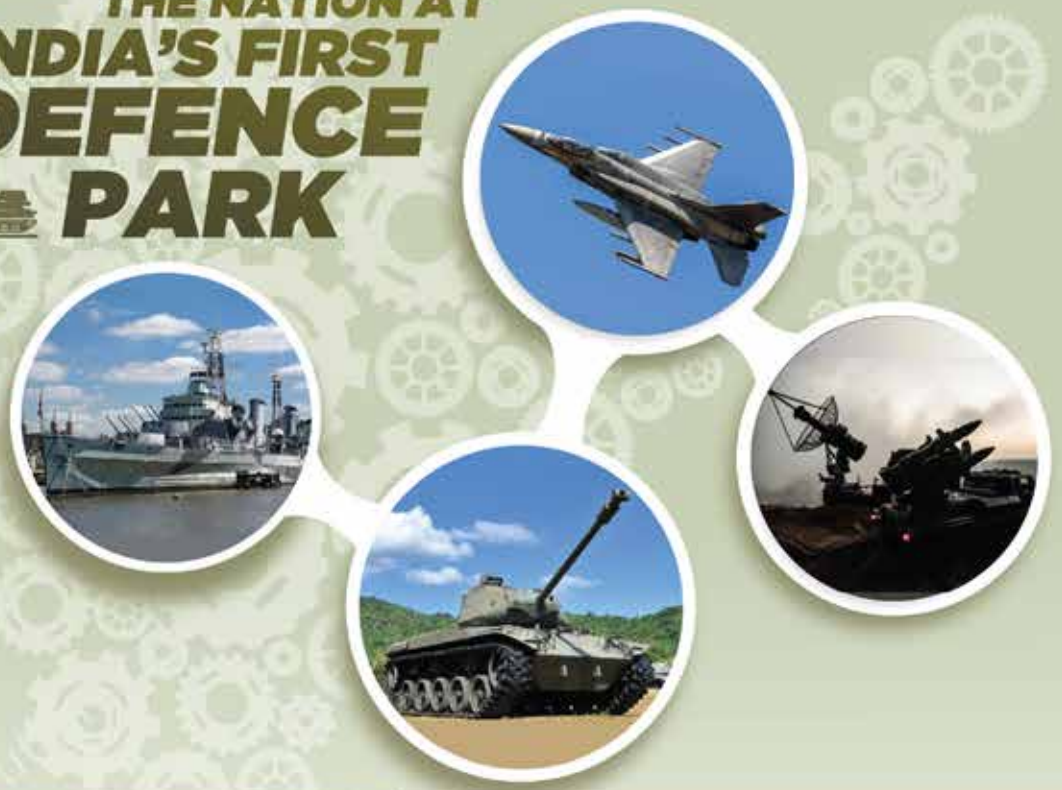

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