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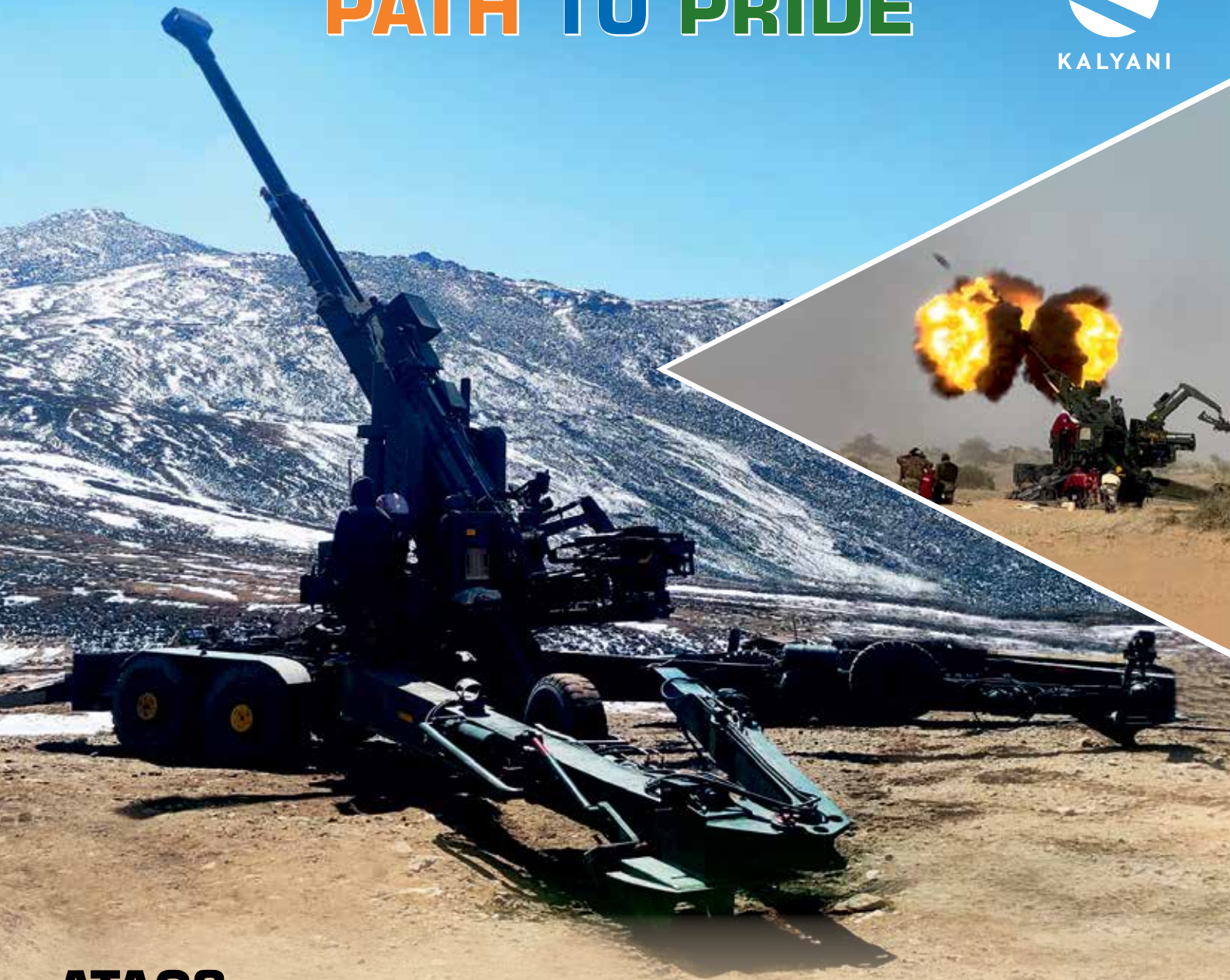


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# 'Made in India' - A Trusted Brand in Global Defence Market



Prime Minister Narendra Modi



Giving a major fillip to India's dream of becoming major a defence exporter under the guidance of Prime Minister Narendra Modi, the Ministry of Defence recently announced that the export of military equipment and technology has increased significantly in recent times. India clocked Rs 13,000 crore during 2021-22, which is the highest ever export number recorded in Indian defence history. However, there is a lot of ground yet to be covered in terms of new products development and the scale of production. Hence, boosting defence exports, which is vital for desired expansion of the defence industrial base, is inevitable to give impetus to enhanced participation by domestic private industry in design, development and manufacture of defence products. India's defence exports target of Rs 35,000 crore by 2025 may appear very ambitious, but considering the potential of Indian industry and recent triumphs, it is not impossible to achieve.

Defence exports are a major pillar of India's drive to attain self-sufficiency in defence production. Over these years, India has emphatically embarked on the path of self-reliance and indigenisation in defence with focus on 'Make-in-India' and 'Atmanirbhar Bharat'. The consistent efforts of the central government under the leadership of Prime Minister Narendra Modi have helped the country in harnessing the potential of the Indian industry, both public and private, and clocking its best in terms of defence exports recently. Touching Rs 13,000 crore during 2021-22, which is the highest ever export number recorded in Indian defence history, is a significant milestone for a country that was, at one point, totally dependent on imports.

However, there is a lot of ground yet to be covered in terms of development of new products and the scale of production. Hence, boosting defence exports, which is vital for desired expansion of the

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**Rajnath Singh**  
Defence Minister

defence industrial base, is inevitable to give impetus to enhanced participation by domestic private industry in design, development and manufacture of defence products. India's defence exports target of Rs 35,000 crore by 2025 may appear very ambitious, but considering the potential of Indian industry and recent triumphs, it is not impossible to achieve.

Boosting exports is crucial as the Indian Industry cannot rely solely on domestic demand, because then the industry will have little incentive to invest in R&D and production facilities due to obvious lack of economies of scale as well as low frequency of award of contracts. It would further result in reduced probability of winning prospective supply orders and feasibility of under-utilisation of manufacturing capacity. Traditionally, India has been among the global top five arms importers, but the latest figures showed that there is an increasing global interest in what India has to offer thus making 'Made in India' a reputable brand in the global defence arena.

#### **A Growth of 334% in Five Years**

India's defence exports have grown by 334 per cent in the last five years and

the country is now exporting to over 75 countries due to collaborative efforts. It is a testimonial that India can make significant gain in defence export business. With the private sector accounting for 70 percent of the exports, it further hints at the potential Indian industry has.

According to the Defence Minister Rajnath Singh, the nation's global standing has grown manifold under Prime Minister Narendra Modi and India's defence exports will reach Rs.40000 to 50000 crore by 2025. He added that a target of Rs 2.75 lakh crore worth of defence exports by 2047 has been set, exuding confidence that India is well on course to achieve the objective. Singh said that the country having exported defence items and technology worth Rs.13,000 crore in 2021-22 was a record leap from the Rs. 800 crore defence exports about eight years ago.

The Defence Minister asserted that the foundation of 'Atmanirbhar Bharat' has been laid under the leadership of Prime Minister Narendra Modi and this strong & self-reliant 'New India' is moving shoulder-to-shoulder with powerful countries. "We took a pledge to make the country self-reliant and the results are there for all to

see. Our PM decided that it was time we stopped purchasing all missiles, all aircrafts and fighter planes from other countries. We used to spend a fortune in purchasing them. But now things have changed," Rajnath said.

According to Prime Minister Narendra Modi, India is moving fast from being biggest defence importer to big exporter. India's defence imports have decreased by about 21% in the last four to five years and this has happened in such a short time, he said. Talking of the push for domestic defence manufacturing, Modi said in the last eight years, they have not only increased the defence budget, but also ensured that this budget is utilised for the development of the defence manufacturing ecosystem within the country.

"Our defence exports have increased seven times in the last eight years. Very recently, our countrymen were filled with pride when they came to know that last year, we had achieved defence exports worth 13,000 crore and of this 70% was from the private sector. Today, a major part of the budget is earmarked for the purchase of defence equipment from Indian companies only," he said.

The PM stressed on the fact that the goal of self-reliance of the Indian armed forces is very important and essential for the 21st century. "Learning from the approach of the past decades, today we are developing a new defence ecosystem with the strength of everyone's efforts. The defence research and development has been opened for private sector, academia, Micro, Small and Medium Enterprises (MSME) and start-ups," Modi said.

Defence Secretary Ajay Kumar recently announced that they are in the process of starting the development of a marine diesel engine within the country. Till now India has been dependent on imports, and the proposed engine when ready would power naval ships.

"We are also in the process of manufacturing heavyweight helicopters of 10 tonnes and above to meet requirements of all three services, which will be taken up shortly in partnership with the industry. Hindustan Aeronautics Limited (HAL) has taken up the design and development of an indigenous Multi-Role Helicopter intended to replace the Mi-17s in service," Ajay Kumar said.

#### **India's Defence Exports**

The increased partnership with the private sector has led to a substantial rise



in India's defence exports. The consistent progress in the indigenisation of weaponry is in line with the mission to become self-reliant, reduce dependence on imports, and give more weightage to the export of military equipment to friendly countries. India has imposed a phased import ban on 310 different weapons and systems during the last two years, which helped boost export. These weapons and platforms will not only be indigenised in phases over the next five to six years, but also will be made available for exports.

India accounted for 0.2% of defence exports in the world during 2017-21. India exported defence equipment to a total of 84 countries. The main exports in the last financial year were to the United States followed by the Philippines. In January 2022, India signed a USD 374.96-million deal with the Philippines, its single biggest defence export order, for the supply of three batteries of shore-based anti-ship variant of the BrahMos supersonic cruise missile. The Brahmos missile deal with Philippines further opened the doors for sales to various other Asian countries.

Over 30 Indian defence companies

have exported arms and equipment to countries like Italy, Maldives, Sri Lanka, Russia, France, Nepal, Mauritius, Sri Lanka, Israel, Egypt, UAE, Bhutan, Ethiopia, Saudi Arabia, Philippines, Poland, Spain and Chile. As of now, the exports include missiles, personal protective gears, surveillance systems, defence electronics systems, engineering mechanical equipment, offshore patrol vessels, advanced light helicopters, avionics suits, radio systems and radar systems, tear gas launchers, simulators, loading mechanisms for aircraft, torpedoes, night vision binoculars, fire control systems for armoured vehicles, high-frequency radios, weapon locating radars, and coastal radar systems.

Among the systems and weapons that cannot be imported, there are missile destroyers, light transport aircraft, light combat aircraft, long-range land-attack cruise missiles, multi-barrel rocket launchers, mini-UAVs, next-generation corvettes, and artillery guns, specified types of helicopters, airborne early warning and Control (AEW&C) systems, assault rifles, sniper rifles. India is going to



update this list with more items.

There is a paradigm shift in India's defence exports but a quantum jump in the exports is only possible if Indian industry is ready to export large weapon systems and platforms. In 2020 December India approved the export of Akash surface-to-air missile systems to friendly foreign countries. Besides Akash, India has a lot of potential in exporting, Astra beyond visual range air-to-air missile systems, tanks, sonars, radars and Light Combat Aircraft (LCA) Tejas. Six countries including the USA, Australia, Argentina, Egypt, Indonesia and the Philippines showed interest in buying the indigenously developed LCA Tejas. Malaysia already placed an order for procuring 18 Tejas twin-seater variant fighter jets. ■



# AEROMAG ASIA

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# BEL puts Thrust on Product Diversification



BEL is India's pioneer in defence electronics. Today, there's not an area in defence which is untouched by BEL — Radars, Missile Systems, Military Communications, Naval Systems, Electronic Warfare & Avionics, C4I Systems, Electro Optics, Tank Electronics & Gun/Weapon System Upgrades, Electronic Fuzes, you name it, the company has made some of the most iconic products in all these areas. The ET Iconic Brand of India 2022 award won by BEL is also recognition for the complete trust that customers have reposed in the company. And like all good brands, BEL has been constantly evolving over the last seven decades and has been diversifying into allied areas of defence and non-defence to keep pace with the changing times. The total opportunity available in the non-defence business segment, being pursued by BEL in the next 8-10 years, is more than Rs. 2 Lakh Crores. The company aims to increase its non-defence share in the overall business in the coming years, said Dinesh Batra, Chairman and Managing Director, Bharat Electronics Limited (BEL). Speaking to Aeromag, he talks about.

**Dinesh Batra**  
CMD  
BEL

## How did BEL perform in the FY 2021-22?

FY 2021-22 saw an impressive performance by BEL with the company registering a record turnover of Rs. 15,044 Cr, and turnover and profit witnessing a strong Year-on-Year growth of 9% and 14%, respectively. This, despite challenges posed by the pandemic, global chip shortage and stiff competition. This has instilled confidence among stakeholders, resulting in the highest PE ratio of 29 of BEL's share price among all manufacturing PSUs. The company recorded an export turnover of 33.30 Million USD and became the first Defence PSU to cross the landmark market capitalisation figure of Rs.80,000 Crores and declaring the highest ever dividend of 450%. On my part, I have steered the Board, Administrative Ministry and Shareholders' approval to increase the authorised capital three-fold

to Rs.750 Cr and issue of bonus shares in the ratio 2:1.

## What all factors have helped BEL to record such a stellar performance?

The growth in turnover during FY21-22 was mainly on account of timely execution of the existing order book as well as new products introduced in the current FY. The major orders executed during FY22 were Long Range Surface-to-Air Missile (LRSAM), Air Defence Weapon System, Integrated Air Command and Control System, AFNET, Coastal Surveillance System Phase II, Integrated Perimeter Security Solution, Smart City projects, Oxygen Concentrators and Ventilators. New products introduced include Laser Fence System, IR Jammer for Active

Tank Protection System, Solid State Power Controller Cards for Akash NG/ QRSAM, S-Band 150 W Power Amplifier, GNSS Receiver and IP EPABX System. As

far as profitability growth in the current year is concerned, increase in turnover as compared to the previous year was to the tune of more than Rs. 1,200 Cr, which has brought in economies of scale and corresponding increase in profit.

## BEL has been recognised by Economic Times as the ET Iconic Brand of India (2022). How do you see this award?

I see this prestigious award as recognition of the iconic status that Brand BEL enjoys as the country's premier professional electronics company. BEL is India's pioneer in defence electronics. Today, there's not an area in defence which is untouched by BEL — Radars, Missile Systems, Military Communications, Naval Systems, Electronic Warfare & Avionics, C4I Systems, Electro Optics, Tank Electronics & Gun/Weapon System Upgrades, Electronic Fuzes, you name it, the company has made some of the





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most iconic products in all these areas. It is also recognition for the complete trust that customers have reposed in BEL. And like all good brands, BEL has been constantly evolving over the last seven decades and has been diversifying into allied areas of non-defence to keep pace with the changing times.

**What is your turnover projection for FY 2022-23? How good is the current order book position?**

We are midway into meeting our targets for this financial year and I am confident that we will achieve around 15% growth in our turnover and increase in EBIDTA (as a % of turnover) from the present 22% to 23% by the end of March 2023. BEL's order book as on April 1, 2022, stood at Rs. 57,000 Cr. This year, we are expecting around 15,000-20,000 crores worth orders.

**What are your top strategic priorities to create new avenues of growth?**

BEL's investment in R&D during the current FY has been to the tune of over Rs. 1,000 Crores (7% of its turnover). We have also been investing every year more than Rs. 500 Crores in capital. Going forward, we would like to maintain the same level of investment in both R&D and capital, which will help us develop new products, indigenise, bring about design change and achieve cost reduction. This will aid in creating new avenues of growth, reduce costs and increase our profitability.

**How strong is BEL's export business? How do you intend to expand your global footprints?**

We are seeing a very good opportunity in exports. Our present export order book is worth more than USD 265 Million. During the current FY, as part of its Offset commitments, under the prestigious C295 aircraft programme, Airbus Defence and Space has signed a contract with BEL for the manufacture and supply of Radar Warning Receiver and Missile Approach Warning System. To enhance its geostrategic reach, BEL has strategically opened overseas marketing offices in the Indian Ocean Region, South East Asia, Middle East Region and USA. BEL has six overseas marketing offices in Vietnam, Myanmar, Sri Lanka, Oman, Singapore and New York, and is planning to further expand its global footprints.

**What are BEL's plans to diversify into**

**the civilian business?**

Defence, being the mainstay of BEL, has traditionally been contributing to around 80% on an average of the company's annual sales revenue. BEL, however, has been continuously exploring diversification into allied Defence and non-defence areas. The total opportunity available in the non-defence business segment, being pursued by BEL in the next 8-10 years, is more than Rs. 2 Lakh Crores. The company aims to increase its non-defence share in the overall business in the coming years. Some of the areas BEL is focusing on in non-defence include solutions for Civil Aviation sector including Air Traffic Controller Radars, Anti Drone systems, Space / Satellite Electronics, Space Launch Vehicles, Satellite Communication Services, Spacegrade Solar Cells, Satellite Assembly & Integration, Solar Business, Railway and Metro solutions,



Software as a Service, Network & Cyber Security, Energy Storage products for Electric Vehicles (Li-ion & Fuel Cells, Charging Stations, etc), Homeland Security & Smart City businesses, Smart Meters, a range of Medical Electronic and health care solutions. BEL is entering into partnerships with various OEMs / technology solution providers to expand the business in the identified non-defence business segments. This wide bouquet of businesses in non-defence would play a key role in driving BEL's growth in the coming years.

**In recent years, the Government of India has stressed on the need to involve the MSMEs, private industry and start-ups in the defence sector. What are BEL's initiatives to promote such initiatives?**

The defence sector has been being opened up for private sector participation with the evolution of Defence Procurement Procedure. In this changing business scenario, BEL is focusing on enhancing interactions at various levels and building long-term relationships with customers, emerging strategic partners and other key stakeholders in the Indian defence industry as a trusted and committed partner. Be it the efforts that the company has been putting in to engage in collaborative R&D in addition

to augmenting its own R&D set up — its recent attempts to outsource work to Indian private industries and MSMEs, or the path-breaking decision to go in for Public-Private partnerships to execute turnkey projects, BEL is leaving no stone unturned to ensure that it is in sync with the government's larger goal of indigenisation and self-reliance. BEL has formulated a long-term Outsourcing and Vendor Development Policy and has been taking several initiatives in order to broaden the domestic vendor base by implementing online vendor registration and e-procurement processes including using GeM portal.

This is in line with the 'Make in India' initiative where enhanced thrust has to be put to develop domestic players. BEL has also made provisions for entering into Long-Term Agreements (LTAs) with reputed vendors with an objective to secure the supply of items or services over a specified period of time as per mutually agreed terms and conditions.

Make in India Display Cells have been established at all Units of BEL. BEL also takes part in various events organised by the Government of India to promote MSMEs. Startup India is a flagship initiative of the Government of India, intended to build a strong ecosystem that is conducive for the growth of startup businesses, to drive sustainable economic growth and generate large scale employment opportunities.

BEL has identified several areas for partnership with start-ups in new emerging technology areas in both defence and non-defence businesses through various engagement models. Defence Innovation Organisation (DIO) is a Section-8 company, created jointly by BEL and HAL to support the country in building an eco-system of entrepreneurship and innovation in defence in India by implementing the iDEX framework. iDEX is aimed at fostering innovation and technology development in defence & aerospace by engaging industries including MSMEs, Startups, individual innovators, R&D institutes and academia and providing them R&D grants.

The company is also working on emerging technologies such as Artificial Intelligence, Big Data Analytics, Internet of Things, 5G Wireless Communication, Robotics & Computer Vision, Augmented & Virtual Reality, Quantum Cryptography, etc, under R&D collaboration with Industry, Academia and Start-ups.



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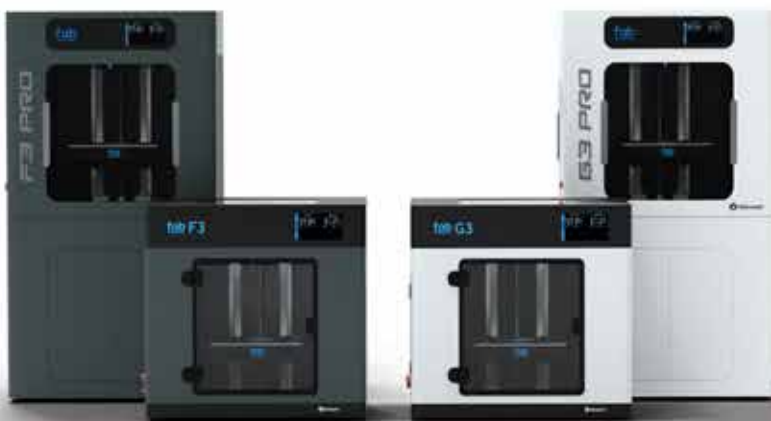
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# Redefining Modern Warfare Strategies



The BrahMos, billed as the world's fastest projectile of its kind, it comes with a lethal trident-like combination of speed, precision plus power and has emerged as the ultimate game-changer for India. It is one of the most successful missile programmes in the world which has fortified India's deterrence power in 21st century. The new BrahMos unit set up in the Lucknow node of Uttar Pradesh Defence Industrial Corridor (UP DIC) will cover over 200 acres and produce the new BrahMos -NG (Next Generation) variant. "Our goal will be to achieve significant technological prowess with continuous upgrades for modern-day network-centric warfare operations. Our vision is therefore to be the world leader in the field of Cruise Missile Systems, excelling through R&D efforts in design and upgrades and delivering a state-of-the-art weapon complex," said Atul Dinkar Rane, Chief Executive Officer and Managing Director, BrahMos Aerospace. Speaking to Aeromag, he talks about the operations and future plans of the company.

**Atul Dinkar Rane**  
CEO & MD, BrahMos Aerospace

A naval variant of the advanced supersonic BRAHMOS cruise missile was test-fired from a stealth guided-missile destroyer of the Indian Navy recently. What are the highlights of the new

variant?

BRAHMOS is a very versatile weapon. It has continued to evolve in terms of its overall capability and functionality. We have been constantly upgrading and

enhancing various technologies, systems and sub-systems involving the supersonic cruise missile in order to achieve higher capabilities (for the weapon) and further bolster the capabilities of our Armed





Forces. The successful test firing of an advanced BRAHMOS anti-ship missile variant from Indian Navy's guided missile destroyer INS Visakhapatnam on January 11, 2022 is a reflection of these advancements that we have achieved over time.

India recently inked the \$375 million contract to export BRAHMOS supersonic cruise missiles to the Philippines. Could you talk more about the project?

We have signed this landmark deal with the Dept. of National Defence of the Republic of Philippines to supply shore-based anti-ship BRAHMOS systems to that nation. The historic deal was signed on January 28, 2022. This is the first export deal involving the BRAHMOS weapon system. BRAHMOS has thus become India's first full-scale major weapon system to be exported to a foreign nation. Under this deal, BrahMos Aerospace (BAPL) is going to deliver the shore-based BRAHMOS anti-ship strike weapon to the Philippines for coastal defence purpose.

How do you look at the export prospects of the BrahMos missile? Could you share the details of your export business?

The multi-million dollar contract signed



between the Department of National Defence of the Republic of Philippines and BrahMos Aerospace Private Limited (BAPL) will pave the way for more such missile exports. The contract is an important step in India's plan to

become major player in arms exports. Some more countries in South East Asia and in the Latin American region have expressed their strong interest in the BRAHMOS Missile System. We are advancing in our discussions with all of them for any potential export order. We at BrahMos Aerospace are fully prepared and committed to fulfill all export related demands as and when they arise.

Could you talk about the plans regarding Brahmos-II? What progress have we made regarding the hypersonic cruise missile project?

The BRAHMOS, billed as the world's fastest projectile of its kind, it comes with a lethal trident-like combination of speed, precision plus power and has emerged as the "ultimate game-changer" for India. The missile system is being evolved through constant interaction with our design agencies, DRDO, India and NPOM, Russia. The technology bricks are being developed and then a configuration will be finalised. BRAHMOS-II will be a larger force to reckon with in the future.

Could you talk about the Defence Technology and Test Centre and BrahMos manufacturing centre that will be established in Lucknow?

Indian Defence Minister Rajnath Singh laid the foundation stone for Defence Technology & Test Centre and BRAHMOS Manufacturing Centre, established by Defence Research & Development Organisation (DRDO) in Lucknow, Uttar Pradesh on December 26, 2021. The new BRAHMOS unit set up in the Lucknow node of Uttar Pradesh Defence Industrial Corridor (UP DIC) will cover over 200 acres and produce the new BRAHMOS-NG (Next Generation) variant.

We will work in close coordination with DRDO to set up this new missile production unit over the next 3 to 4 years following which it will be attested for integration and production of the BRAHMOS missile. This new missile, having smaller, lighter and smarter dimensions, would be designed for deployment on a wider number of modern military platforms.

Could you shed some light onto BrahMos's indigenisation efforts and support given to Aatmanirbhar Bharat? How do you associate with private industry in defence manufacture?

BRAHMOS supersonic cruise missile is a testimony of India's defence potential





and Prime Minister's Atmanirbhar Bharat resolve. BRAHMOS has achieved historic milestones in the flagship "Make In India" programme by successfully indigenising major sub-systems, thus proving the competency of the missile with advanced features. It has taken Indian contribution to seventy percent. All launcher systems for the weapon are also being manufactured domestically. 100% of ground support equipment for the weapon complex are being made in India.

BrahMos Aerospace, in close co-ordination with DRDO, JV partners and industrial partners have achieved many breakthroughs in developing and successfully testing some of the critical technologies.

The JV entity has created a robust defence ecosystem in the country by forming a "Missile Industrial Consortium" (MIC) which involves over 200 small and medium Indian public and private defence sector enterprises and institutions that have been making tireless efforts to develop, produce and supply various valuable components and parts for the versatile BRAHMOS Weapon System including a world-class integration, and check-out facilities with stringent quality control. By establishing such a huge defence-supply chain, BrahMos remains at the forefront of defence indigenisation.

**What are the expansion plans of BrahMos Aerospace in terms of R&D and**

**manufacturing facilities?**

The BRAHMOS Manufacturing Centre is a modern, state-of-art facility in the Lucknow node of Uttar Pradesh Defence Industrial Corridor (UP DIC). The centre will be dedicated to manufacture the BRAHMOS weapon systems. Subsequently, it will also cater to the production of the new under design BRAHMOS-NG (Next Generation) variant, which will carry forward the lineage of the BRAHMOS weapon system.

**Could you share with us your vision and priorities during your term at the helm of BrahMos?**

BRAHMOS, as the most formidable deterrent weapon, has completely redefined modern warfare strategies. It is one of the most successful missile programmes in the world which has fortified India's deterrence power in 21st century.

Our goal will be to achieve significant technological prowess with continuous upgrades for modern-day network-centric warfare operations. In terms of futuristic developments, work is advancing on the smaller, lighter variant of the weapon -- BRAHMOS-NG (next-generation). Our vision is therefore to be the world leader in the field of Cruise Missile Systems, excelling through R&D efforts in design and upgrades and delivering a state-of-the-art weapon complex.

**What can we expect from BrahMos at DefExpo 2022? Could you talk about your participation?**

BrahMos Aerospace will be exhibiting the 'world-class' BRAHMOS supersonic cruise missile in air, land, sea and sub-sea variants of the universal weapon at the 12th edition of DefExpo India 2022 in Gandhinagar, Gujarat. BrahMos Aerospace is participating in the mega event with special focus on the vital contributions made by the public and private sector industries in making BRAHMOS a formidable weapon. One of the major highlights is the BRAHMOS Missile System consisting of the land-attack BRAHMOS variant, in addition to the BRAHMOS Land Mobile Complex and BRAHMOS Ship-based Weapon Complex consisting the ship-to-land and ship-to-ship variant of the weapon which will be on display at the BrahMos pavilion. Also on focus will be the replica of BRAHMOS on the Su-30MKI fighter aircraft alongwith the indigenous BRAHMOS air-borne launcher and other equipment manufactured by BATL for Defence and Space applications including systems and sub-systems manufactured by Indian industries associated with BrahMos. The remarkable journey of the India-Russia Joint Venture (JV) BrahMos and its achievements, which has become the best role model to emulate the India's "Atmanirbhar Bharat" resolve, will be showcased at the defence exhibition.





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- Acquisition of TAAL Manufacturing Facility at Hosur, India
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# HAL Aims to be Lead Aerospace Integrator



The history and growth of Hindustan Aeronautics Limited (HAL) is synonymous with the growth of aeronautical industry in India for more than 80 years. Over the years, HAL has produced more than 4,250 aircraft, 5,350 aero-engines and has carried out over 11,850 overhauls of aircraft and 35,350 overhauls of engines, besides manufacturing and overhauling of related accessories and avionics.

In this exclusive interview, HAL Chairman and Managing Director C.B. Ananthakrishnan talks about HAL's achievements over the years, the government's support for indigenous systems, and more.

C.B. Ananthakrishnan  
CMD  
HAL

The history and growth of Hindustan Aeronautics Limited (HAL) is synonymous with the growth of aeronautical industry in India for over eight decades. With India celebrating 'Azadi Ka Amrit Mahotsav', how does HAL plan to take forward its legacy and strengthen Indian aerospace industry?

Yes, it's a matter of pride for HAL to be the flagbearer of the aerospace industry

in the country. HAL has been meeting the requirements of the defence services who are our prime customers for over 80 years and the credit goes to my team at HAL. HAL, since its inception in 1940, has evolved into a large aeronautics complex in South Asia. The company has built up comprehensive skills in design, development, upgrade, manufacture, and maintenance of fighters, trainers,

helicopters, transport aircraft, engines, avionics systems and accessories. HAL, over the years, has produced over 4,250 aircraft, 5,350 aero-engines and has carried out over 11,850 overhauls of aircraft and 35,350 overhauls of engines, besides manufacturing and overhauling of related accessories and avionics. These include 17 types of aircraft/ helicopters from indigenous R&D and 14 types of







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aircraft/ helicopters under Transfer of Technology from foreign OEMs.

HAL's major supplies and services are to the Indian Defence Services – IAF, Army, Navy and Coast Guard. The company has also established a foothold in export in more than 20 countries, having demonstrated its quality and price competitiveness. HAL is a major partner for the Space Vehicle programmes of ISRO. It has also diversified into the Industrial & Marine Gas Turbine business. Over 90 percent of HAL's current sales are to the Indian Defence Services.

HAL has 20 production divisions, 10 R&D Centres and one Facility Management Division. HAL is setting up a facility at Tumakuru near Bengaluru to manufacture helicopters.

The platforms currently being manufactured by HAL are Light Combat Aircraft (LCA) -Tejas, Light Transport Aircraft Do-228, Advanced Light Helicopter (ALH), Light Combat Helicopter (LCH) and Light Utility Helicopter (LUH). The major ongoing R&D programmes of the company are Hindustan Turboprop Trainer (HTT-40), LCA Tejas Mk 1A variant, Indian Multi Role Helicopter (IMRH), 25 KN turbofan engine HTFE-25, 1200 KW turboshaft engine HTSE 1200 KW etc.

HAL has developed an aerospace ecosystem to boost the growth of the industry in the country. Presently, HAL has a vendor base of over 7,250 vendors, which includes over 2,100 MSMEs. On average, HAL's annual domestic procurement from MSMEs is around 32%.

HAL has also been instrumental in nurturing a competitive aerospace ecosystem in India by way of collaborating with private industries as outsource partners even for several critical work

packages. HAL believes in inclusive growth and collaborates with private players, government labs and academia to effectively address the strategic needs of Defence Forces through synergising. HAL aims to be a lead aerospace integrator, primarily through robust private partnerships. Some of the critical manufacturing work packages outsourced by HAL for major platforms include structural packages, Rudder, Flaperon, Air Intake, etc. of Su-30MKI aircraft, Centre Fuselage, Rear Fuselage, Wings, Front Fuselage, Air Intake assemblies, etc. of LCA and MGB Housing, Gears, Harness, etc. of ALH.

HAL has also been engaging private organisations (including MSMEs) in the design and development of products and technologies. Some of these major design partnership initiatives include Smart Cockpit Display System, Control & Display Unit, Data Interface Unit, and Multi-Function Display for LCH, and Solid State Flight Data Recorder for Su-30 MKI, etc.

The Indian defence industry partners are expected to contribute significantly towards the LCA MK1A orders. Further, the Indian defence industry will also see opportunities to contribute towards other HAL programmes such as LUH, LCH, and HTT-40. Thus, HAL continues to aspire for more and more participation of private partners and build a healthy and robust ecosystem in India towards the mission of Atmanirbhar Bharat.

**How do you look at the Narendra Modi government's decision to review all foreign procurement programmes in favour of indigenous systems? What are HAL's plans for the possible bid for Navy's procurement of 111 Naval Utility Helicopters?**

The government's decision to review all

foreign procurement programmes in favour of indigenous systems is a good move as it builds self-reliance, improves import substitution, generates employment opportunities within the country and creates opportunities for Indian Industry including MSMEs and startups.

HAL has proven experience and expertise in concept to product and beyond for rotary-wing platforms and is keen on participating in the NUH programme offering a proven indigenous platform to suit the specific requirements of naval customers. Request for Information (RFI) was released by MoD (Navy) for participation in the acquisition scheme for 111 Naval Utility Helicopters (NUH), simulators and associated equipment for the Indian Navy (IN) through the "Strategic Partnership Model" in August 2017.

A suo moto proposal for NUH was submitted by HAL to Navy in November 2018 offering a derivative of its indigenously designed, developed and manufactured Advanced Light Helicopter (ALH) Mk-III Fixed Wheel variant in a similar weight category with suitable upgrade/ adaptations/ modifications to meet the Naval Utility Helicopter RFI.

HAL submitted the RFI response to Navy in December 2018, proposing a five-ton variant of indigenously developed ALH for shore and ship-based operations of Navy.

Subsequently, during October 2021, a joint team of IN and HAL formulated a draft Preliminary Staff Qualitative Requirements (PSQR) towards design, development, modification and marinisation of the existing ALH Mk-III to increase the power margins of ALH for deck-based operations and named the helicopter as Utility Helicopter-Maritime. The design studies towards the same are under progress at HAL.

**HAL expects to deliver all Light Combat Aircraft (LCA) Tejas in the Final Operational Clearance (FOC) variant to the Indian Air Force (IAF) in 2022. How does HAL plan to increase production?**

Capacity augmentation from eight to 16 aircraft per annum is under progress at HAL. HAL has established an additional production line at HAL, Aircraft Division. An additional facility (LCA Plant II) spread across 35 acres, with a built-up area of over 34,000 Sqm is being established to cater to aircraft assembly, allied production activities like heat treatment, process shop, stores, machine shop, sheet metal shop etc. and to meet the 83 LCA



# Thank you, Stakeholders. We owe it to you.



## BEL is ET 'Iconic Brand of the Year'

Bharat Electronics Limited (BEL), a Navratna Defence PSU which shaped the growth of Defence electronics in India, is once again in the limelight for its iconic brand value, as "The Economic Times - Iconic Brand of India - 2022". This is a testimony to the unwavering trust that customers and other stakeholders have reposed in BEL.

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Mk1A delivery schedule. This facility will also cater to the export orders expected in the future. Further, HAL has developed various supply chain partners within the Indian industrial ecosystem mainly in three categories – detail part manufacturing, equipment (LRU) manufacturing and major structural modules manufacturing to support the ramped-up rate of production. For manufacturing and supply of major structural modules, HAL has developed production partners like Dynamatic Technologies Ltd for the front fuselage, VEM Technologies for centre fuselage, Alpha Tocol for rear fuselage, Larsen & Toubro for wings and TAML for Rudder & fin assembly of LCA Tejas aircraft. In addition, HAL has partnered with numerous Indian OEMs for the development, manufacture and upgradation of LRUs/ rotables for complex sub-systems of LCA-Tejas. These activities are aimed to resolve supply chain issues, self-reliance and ensure an enhanced production rate for LCA Tejas.

Could you share the latest updates of LCA MK-1A, with specific enhancements, that will take flight by middle of this year?

LCA Tejas Mk1A is an improved version of Mk1 with AESA Radar, EW suite, BVR missile capabilities and various maintenance improvements. The contract for 83 LCA Mk1A was signed in February 2021. Currently, Design & Development activities of Mk1A version is under progress.

There are reports that LCA Mk-2 will roll out by year end or early 2023. Could you talk more about the project and the

aircraft specifications?

All system-level Critical Design Reviews (CDRs) followed by Aircraft level CDR of LCA Mk-2 are completed. At present, detailed design for all individual systems, design and CAD model updation etc. are under progress.

LCA Mk-2 has a tail-less compound delta-wing configuration with a single vertical stabiliser and closed coupled canards for static instability, short take-off and landing capabilities and high maneuverability. LCA Mk-2 is designed for improved maintainability aspects and fatigue life. It has air superiority and ground attack as its primary role and it possesses reconnaissance capability as a secondary role. It offers improved range, endurance and lethality to provide IAF an ideal platform to replace Mirage 2000, Jaguar and the MiG-29.

What are the latest updates of the Intermediate Jet Trainer (IJT), designed and developed by HAL?

HAL has undertaken major modifications on the aircraft to bring its spin characteristics to an acceptable level. Post modifications, flight testing has resumed and in January 2022, HJT-36 demonstrated its ability to carry out six turn spins to both sides. We have plans to complete the remaining activities to achieve the certification at the earliest.

What are HAL's plans for this year's DefExpo? What all can we expect at your pavilion?

HAL has booked space in the indoor as well as the outdoor area for showcasing its range of products. HAL will be in Hall 2, Stall No. 2R. 21/22/29/30. HAL will showcase models of platforms/products LCA, LCH, LUH, ALH, Do-228 and HTT-40 during the DefExpo 2022.

Some of the avionics/accessories/components/products such as Indigenous Engine & Flight Display Unit (EFDU), Mission Computer & Interface Computer, Digital Map Generator (i-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-FGFA, GTSU-127 etc. are also planned to be put up in the HAL stall. Further, the Light Combat Helicopter (LCH) is planned to be showcased in the Outdoor Display area.





# NFSU: Fostering Education through Investigation



Hon'ble Prime Minister Shri Narendra Modi at Cyber Defence Centre, NFSU

virtual environment that is used for 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. CoE provides various solutions to Defence & CAPF agencies to undertake training and develop & test cyber technologies to ensure consistent operations and readiness for real world deployment & developed Cyber Kiosk.

The Ballistics Research & Testing Centre undertakes testing of various armoured

Since its inception, the National Forensic Sciences University (NFSU) has been scaling new heights with its extraordinary and exemplary performances in the field of academic forensic sciences. NFSU is the world's first and only university dedicated to Forensic, Behavioural, Cyber Security, Digital Forensics, and allied Sciences. In Def Expo'22, NFSU will be showcasing various Defence technologies, solutions & capabilities at Gujarat Pavilion at Helipad Exhibition Centre (HEC). Also, various Defence delegations & dignitaries will be hosted at NFSU's – which is near to HEC.

**W**ith the sole aim of creating professional experts in the field of forensic sciences, National Forensic Sciences University (NFSU) came into existence as a unique and first of its kind academic institution dedicated to Forensic Sciences across the globe.

NFSU is an Institution of National Importance (INI) under Ministry of Home Affairs (MHA). Located in Gandhinagar Gujarat where Defence Expo 2022 will be hosted; NFSU is the world's first and only university dedicated to Forensic, Behavioural, Cyber Security, Digital Forensics, and allied Sciences.

To strengthen India's defence forces and contribute towards national security, various centres and schools of NFSU are developing innovation solutions, software applications & systems for the Indian Air Force, Indian Army, Navy and CAPF Establishments; and offering important training solutions for our Armed Forces. NFSU has forged important alliances & MoU's with Indian Air Force, Indian Army, Navy, NSG, SPG & other Law Enforcement establishments to provide training, cutting-edge technologies in areas of Integrated Intelligence, Operational Software, Cyber Defence, Digital Forensics, and Behavioural Sciences & Ballistics Testing & Research.

The Centre for Futuristic Defence Studies

(CFDS) at NFSU undertakes development of Combat Applications, Drone Platforms, Anti-Drone Technologies & Systems, 3D Scanning Sensors. NFSU has niche expertise & experience in Drone Forensics utilized to generate an extensive Drone Database and Threat Library – which is used to develop indigenous Drone Detection Systems, Drone Jammers, and Anti -Drone Command & Control (C2) technologies, training programs on Drone technologies, Drone Forensics and Anti-Drone Systems.

The Centre of Excellence (CoE) in Cyber Security is the first ISO-IEC 27001 certified lab in India at NFSU. CoE in Cyber Security provides a physical and

vehicle, Bullet proof jacket, Rifles, and other weapons of Armed Forces & CAPF. The School of Police Science & Security Studies undertakes training programs on Homeland security, Land Border & Maritime security, Armed Force, CAPF, LEA. The School of Behavioural Science (SBS) imparting research in the area of human behaviour and cognition, brain functioning, clinical psychology and Neuropsychology.

In Def Expo'22, NFSU will be showcasing various Defence technologies, solutions & capabilities at Gujarat Pavilion at Helipad Exhibition Centre (HEC). Also, various Defence delegations & dignitaries will be hosted at NFSU's – which is near to HEC.



Home Minister Shri Amit Shah inaugurating Narcotics (NDPS) Lab at NFSU

# PBS India: Reliable Partner of Indian Defence and Aerospace Industry



PBS INDIA PRIVATE LIMITED is an Indian manufacturing company, part of PBS GROUP, a Czech engineering manufacturer that operates globally in aerospace, precision casting, cryogenics and energy. With more than 200 years of history, it belongs to the oldest engineering brands in the world.

**Petr Motyl Ph.D.**  
Member of the Board, PBS INDIA

**P**BS INDIA has been in the aerospace industry as a part of PBS Group for over 50 years. It is worldwide recognized designer and manufacturer of high-quality aircraft engines, auxiliary power units (APU), environmental control systems (ECS) and specific custom-made aircraft solutions. It is a successful and reliable partner to many significant aircraft manufacturers and final assemblers. The unique ability of PBS to design, develop, manufacture and test small turbojet, turboprop, and turboshaft engines, auxiliary power units, and environmental control systems in accordance with global aerospace standards has greatly contributed to its enduring success on the global market.

## Turbine engines

PBS corporation is the world's well-known turbojet engine supplier and has achieved worldwide success with its highly

acclaimed TJ100 engine which it has manufactured over 1,300 units – including more than 20 customer modifications such as saltwater recovery, extended time before overhaul (TBO), fuel lubricated version, etc., for manned and unmanned applications in many countries around the world since deliveries commenced in 2004. A wide range of produced jet engines in the thrust range of 400 to 1500 N with many type modifications allows the manufacturer to pursue a very wide range of current and future applications in the UAV and UCAS projects. The latest addition to the PBS turbojet engines portfolio has been the new PBS TJ80 engine family characterized by high development potential. The newest member of the PBS TJ80 engine family is the PBS TJ80-120 turbojet engine. This latest modification features an increase in the engine's thrust by 35%, from 900 to 1,200 Newtons, and a reduction in



the specific fuel consumption, while the weight and outer diameter of 235 mm of the basic engine model have remained unchanged. This development gave rise to the engine, which is currently the best engine in the world in terms of thrust to outer radius and weight. PBS INDIA is building on its successful activities in India as suppliers of turbine engines for UAVs, UCAVs, aerial targets and missiles.

## Products for helicopters and jet aircraft

The Safir 5K/G MI auxiliary power unit (APU) has been designed for Mi-8, Mi-17 and Mi-171 helicopters which are among the most successful helicopters in the world in terms of both the number of units sold and the number of countries in which they fly. You can find the Mi-17 in more than 60 countries, including the Indian Air Force.

However, the range of products for helicopters and jets is much wider. It includes the environmental control systems (ECS), fuel system instruments, starter generators and other devices. They are incorporated into various configurations not only in several types of helicopters, but also in training and combat planes including the new





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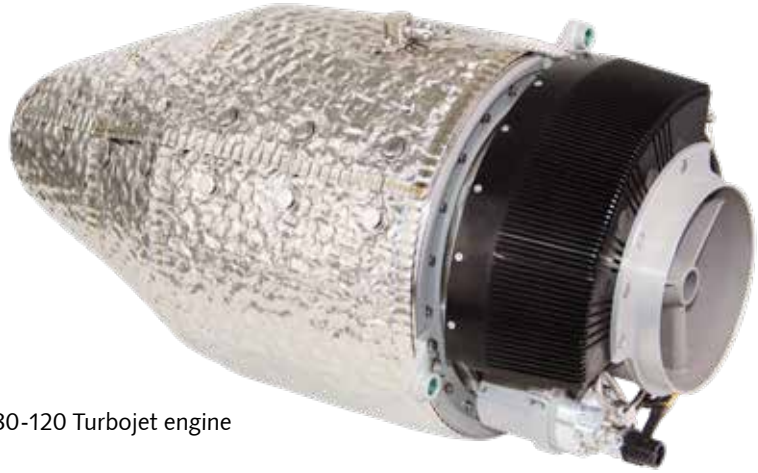
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generation of worldwide successful Czech training aeroplane Aero L-39NG.

### Cryogenics and investment casting

PBS has been in cryogenic business for more than 35 years and is a leading supplier of cryogenic turboexpanders, compressors and pumps for major global customers in the field of cryogenic systems including prestigious research institutes including Linde Kryotechnik, CERN, Rosendorf Research Centre and the Max Planck Institute.

PBS investment casting foundry with more than 50 years' experience focuses mainly on blades and segments of stationary gas turbines, turbocharger wheels for automotive, impellers and guide wheels for aircraft engines, spinner discs for the glass industry and femoral components for the healthcare sector. Also in these areas is PBS India a reliable partner to other Indian companies.



PBS TJ80-120 Turbojet engine

aircraft products in accordance with global aerospace standards. PBS continuously invests in development, has high quality technical support and is ready and willing to support the Indian aerospace industry. New product development is intensive in all product sectors, be it engines, APUs, ECS or cryogenic products.

presence and plans to expand the business in the country. It's been only 3 years since its establishment, but the business is steady growing and new partnerships are formed. We regularly participate in major aerospace and defence exhibitions. Last year it was Aero India in Bengaluru, this year is PBS preparing to showcase its capabilities at DefExpo that will be held in Gandhinagar. From the business perspective, PBS India is actively offering replacements of old APUs used in MI-8 and MI-17 helicopters for technologically superior PBS APUs and is participating in several tenders announced by the Indian MoD. In the field of UAV applications, PBS India is currently expanding our cooperation with a number of Indian aerial target drone and Missile manufacturers.

Moreover, the relationship between India and the Czech Republic is developing well and PBS is received in a very friendly way by Indian customers. Due to the trends of Make in India, we also see a great opportunity in production cooperation on specific projects. Our interest is mainly in long-term cooperation and its further all-round development. We are interested in working with young talents from this beautiful country.

**Learn more about PBS INDIA products and solutions on [www.pbsindia.com](http://www.pbsindia.com)**



PBS TJ80-120 Turbojet engine

### Development and innovations

PBS has been a leading manufacturer of products and equipment for the international aerospace industry for almost 50 years with ability to carry out in-house development, manufacture and testing of

### PBS India future

PBS recognise the growing role of India in the worldwide economy, as well as the fact that it will very soon become the most populated country on our planet. So PBS India definitely intends to strengthen its





# MDL Diversifies its Products to Boost Export Business



VAdm Narayan Prasad AVSM NM, IN (Retd),  
CMD, MDL

Over the last six decades, MDL has delivered over 799 ships/submarines/platforms to various customers both in India and abroad. Out of which 43 have been delivered to the Indian Navy, which forms a formidable part of the Fleet of the Indian Navy. However, MDL is trying to penetrate other markets as well for increasing export. MDL is participating in Defexpo 2022 for marketing the products constructed by the shipyard for exploring the opportunities to increase the exports. MDL is working on diversification of products which would enhance exports. VAdm Narayan Prasad AVSM NM, IN (Retd), Chairman and Managing Director, Mazagon Dock Shipbuilders Limited. Speaking to Aeromag, he talks about the company's latest operations and how MDL is keen on expanding its export business.

Over these decades, Mazagon Dock Shipbuilders Limited (MDL) has grown to become the premier war-shipbuilding yard in India. What are the major milestones in the success journey?

MDL, today, is the premier shipbuilding yard in the country, producing world class state of the art warships and submarines. Over the last six decades, MDL has delivered over 799 vessels which include 26 capital warships and 06 submarines. In commercial sector, 631 vessels have been built out of which 243 vessels have been exported to countries such as Mexico, France, UK, Iran, Yemen, Mozambique etc. Presently ships built at MDL form sharpest cutting edge platforms for the Indian Navy.

Following are MDL's major milestones in the last couple of decades:

- a) Delivery of four Scorpene class submarines to Indian Navy under project 75.
- b) Delivery of first Visakhapatnam class Destroyer to Indian Navy under project 15B.
- c) Delivery of three in Nos Kolkata class Destroyers to Indian Navy under Project

15A.

d) Delivery of three in Nos Shivalik class Frigates to Indian Navy under project 17.

e) Commissioning of Mazdock Modernisation Project (MMP) which has enhanced MDL's capacity of warship building from 8 to 10 and submarine building from 6 to 11. With the commissioning of MMP, MDL has become India's only shipyard to possess two independent submarine assembly & launch lines.

f) Successful launch of MDL IPO in end Sep 20; listing on 12 Oct 20 at NSE & BSE which was Oversubscribed by more than 157 times.

g) Successful launch of 01 Missile Guided Destroyer, 02 Stealth Frigates & 1 Submarine in the year 2022.

The fifth of six Scorpene-class submarines completed its first sea sortie recently and will now undergo rigorous trials before being delivered to the Navy





later this year. Could you talk more about the vessel and the project?

The state-of-art features of the Scorpene include superior stealth features and the ability to launch a crippling attack on the enemy using precision guided weapons. While the attack can be launched with both torpedoes and tube launched anti-ship missiles, and whilst underwater or on surface, the stealth features give it an invulnerability, unmatched by most classes of submarines. The Fifth Submarine is slated for commissioning shortly and the sixth and final Submarine is in the advance stage of trials and outfitting.

Which are the on-going defence projects at MDL? Could you talk about the operations at the submarine arm of MDL?

The order broadly comprises of the construction of 04 Nos Visakhapatnam Class (Project 15B) stealth Destroyers (one out of four already delivered), 04 Nos Nilgiri Class (Project 17A) stealth Frigates. The licensed construction of six Scorpene class Submarines (Project-75) in collaboration with French Collaborator M/s Naval Group, France is in progress at MDL. MDL has successfully delivered four out of six Scorpene Class Submarines of Project 75 to the Indian Navy. The initial feedback of Navy on P75 is satisfactory.

Medium Refit & Life Certification (MRLC) of one Submarine in collaboration with German Collaborator M/s tkMS, is also in progress.

MDL is committed to indigenize equipment and systems on warships and submarines and support Atmanirbhar Bharat and Make in India initiatives. What are the activities in this regard?

A separate indigenization cell has been constituted to give boost to indigenization of equipment/ item at company level, apart from efforts made at MOD/IN level.

Also, a separate "Atmanirbhar Bharat" Webpage has been launched by MDL in the company's website. The process of indigenisation, various items/equipment indigenised, items required to be indigenized (EoIs) are displayed under the webpage.

Success stories of indigenization are published on MDL website as a compendium of items indigenized. The under-construction warships under project 15B and 17A will possibly have an indigenous content between 70 to 75%.

MDL has proactively pursued indigenous development for items/ equipment of foreign OEMs. Collaborations are being progressed with a range of private players for indigenized development of Equipment/spares for the warship

Projects. Efforts are also being made to take up Indigenization of equipment for future projects under 'Atmanirbhar Bharat' and 'Make in India' programs.

Could you shed some light onto MDL's order book? Who all are the major clients?

MDL has an order book of Rs. 42,900 crores approx. The major client for construction and repair of Ships and Submarines is Indian Navy.

How strong is the export division of the MDL? Could you give us the details of the export operations and clientele base?

A dedicated section has been formed for business development and providing competitive bids to customers. MDL is also making all-out efforts to tie-up with various private companies to grab opportunities/orders from international market.

MDL has submitted proposals for Exports to various countries viz. Brazil, Peru, Argentina, Philippines, Hungary, Sierra Leone, Chile, Cameroon, etc. for construction & delivery of OPVs, FPVs, FICs, Floating Docks, Flat Bottom Shallow Boats, FAC and Corvettes.

MDL has been selected as the preferred production partner to undertake major ship construction activities for M/s SSK Zvezda Shipbuilding Complex,





Russia. Zvezda Shipbuilding complex (SBC) is ambitious on development of a shipbuilding cluster in the Far East Russia and the project will open up a large scale export business opportunity for India and specifically to MDL in future as the envisaged quantum of work is really huge spanning for years. MDL intends to take this business opportunity forward.

MDL is trying to penetrate other markets as well for export and some of their offerings are as follows:-

- a) Refit & Repair of Submarines
- b) Autonomous Underwater Vehicle.

- c) Electric & Solar powered vehicles
- d) Air Boat (Fan Boat)
- e) Heavy Engineering works

**How did the Covid-19 pandemic affect MDL's operations? What are the major operations in the post-pandemic times?**

During the first wave, Covid-19 pandemic had affected the company's ability to maintain continued operations or otherwise operate or conduct its business at pre-pandemic levels as manpower was deployed for only essential work of the organisation. However, remote work

arrangements kept the conduct of the business going to a certain extent.

Thereafter, there had been a surge in the number of Covid cases in Mumbai and its suburbs during the second wave. MDL had resorted to reduced strength of executives and non-executives in accordance with the Government of Maharashtra Covid-19 guidelines issued from time to time and in order to break the chain.

Presently, based on the directives of the Govt, Shipyard has been fully operationalized with complete manpower. The company by all means is leaving no stones unturned to achieve the targets vis-a-vis following all Covid-19 protocols and safety measures at workplaces. The scenario is more or less similar across the complete spectrum of all manufacturing sectors. MDL could tide over the pandemic situation and reach closely towards defined VoP targets.

**What are the highlights of MDL's participation at DefExpo 2022? How do you look at the expo to expand the global reach of the company?**

MDL is participating in Defexpo 2022 for marketing the products constructed by the shipyard for exploring the opportunities to increase the exports. MDL is working on diversification of products which would enhance exports.

## Scheibel Awarded Search & Rescue Contract by Spain



Scheibel was awarded with the iSAR Research and Development programme, which builds on the current CAMCOPTER® S-100 Unmanned Air System (UAS) with the aim of further developing its maritime Search and Rescue

(SAR) capabilities, offering a higher level of automation.<sup>555</sup>

The scope of this multi-million Euro contract includes the further development and delivery of the high performance CAMCOPTER® S-100 UAS, including the

integration of the latest high-tech sensors, allowing the detection and identification, both day and night, of castaways, drifting objects and polluting substances in the high seas; as well as monitoring toxic and hazardous atmospheres, emissions from ships and sea surface pollution. Furthermore, this project includes a data collection and distribution system combining information from the S-100 sensors, the manned AW139 and CN235 helicopters, as well as sensor data from two ships.

The S-100 payloads will include an Overwatch Imaging PT-8DN Oceanwatch, a Trakka TC-300 EO/IR sensor, an Aeromon BH-12 Emission Measuring Device, and a set of SENSIA Gas Imaging Devices.

# Pioneer in High Quality Electromechanical Devices



Karin Punning  
CEO, Englo LLC

Englo has nearly 30 years of experience in design and manufacturing of intelligent electromechanical measuring devices for construction, road construction, mining, military, environmental and other applications. The company now plans to keep building on its success by engaging and growing customer base with exciting and innovative new products that help its clients perform their tasks efficiently and accurately. "We are actively expanding our sales, support, production and R&D groups to continue meeting the support and product requirements of our customers," said Karin Punning, CEO and Founder, Englo LLC, during an interview with Aeromag.

Englo has around 30 years of experience in design and manufacturing of intelligent electromechanical measuring devices. Could you give us an overview about the company and major achievements?

Englo Ltd. was founded in 1991 by a group of scientists and engineers from



Blasting machine BART-2, firing voltage 1250 V

Special Design Office of the Estonian Academy of Sciences. The company got started by designing and manufacturing metal detectors and has since expanded to include products for military, road construction, mining and environmental applications, including profilometers, light weight deflectometers, blasting machines, radiation detectors etc. During the past 30 years Englo has released over 45 different products and has become an international name associated with high-quality intelligent measuring, inspection and surveillance devices.

What are the company's operations in the military sector? Could you talk about the products and services offered in the sector?

Englo has a number of products that are ideally suited for the military applications, including blasting machines, surveillance systems and radiation detectors.

A key feature of our blasting machines is that they can be either battery powered or hand cranked, the latter being very useful in situations where users need to rely on the device always being operational. Hand cranked Erna 5 is the only blasting machine in the world that also includes a digital line tester.

Our traffic counting and surveillance systems can be buried in the ground at or around the area of interest. The products include a relay that can be programmed to take a specific action upon detection of an intruding vehicle, such as setting off an alarm, opening or closing a gate etc.

Englo's personal and professional



Blasting machine with digital ohmmeter ERNA-5, firing voltage 560 V

dosimeters and radiation detectors offer a wide range of accurate coverage that can detect alpha ( $\alpha$ ) and beta ( $\beta$ ) particles, gamma ( $\gamma$ ) rays and X-rays and radon (Rn).

Englo offers different products for both surface level and underground mining application. What are the highlights?

We offer a wide selection of different blasting machines and line testers that can be used in highly adverse conditions where proper safety features are of utmost

importance. This is especially true in closed or underground mines with combustible gas and dust, but is also important at sites with flammable material, such as coal. Englo's blasting machines Mars 2EX and Bart 2AS have special housing that dissipates any excess static energy left over after the blast. All products also include output pulse tail cutting to limit the output impulse and quench the remaining capacitor charge, which could otherwise lead to an unwanted secondary explosion. Many blasting machines also come with built-in line testers to verify the detonator

Detonator line ohmmeter OOM-4



line resistance and identify short circuits, breaks in the blasting line or circuits with excessive resistance prior to the blast. This technology virtually eliminates misfires caused by detonator wiring problems, which is one of the leading causes of blast related injuries.

Could you talk about your R&D capabilities, quality performance measures, and the production facilities? How did the pandemic affect your business?

Englo has a strong R&D team with deep knowledge in physics, chemistry and mathematics. We apply this scientific background to all our products to solve the challenges with a most optimal and





LWD deflectometers  
INSPECTOR-4 and  
INSPECTOR-5

targeted approach. Our team also includes experts in electronics, mechanics and software, to create a final product that is full-featured and user-friendly.

Englo has always been very committed to quality and is fully ISO 9001:2000 certified. Our products are tested to the specifics of the target application and target geographical area.

**How strong is your customer base? Could you share the details of your export business?**

Englo has a very strong international customer base. Since our inception we have attained a growing, world-wide loyal customer base for our various products. Our products are sold in most areas of the world, including Europe, North and South



Traffic counter KLL-3B



Alpha, beta and gamma radiation  
measuring device RADON-4

America, Asia, and Africa.

**What are the immediate goals of the company in the next five year? What are your vision and priorities for the company's future?**

Englo is known for working closely with customers to provide optimal solutions for military, mining, road construction and environmental applications. Our products are high performance, feature-rich and

lightweight, and can often be used by a single operator. We have a wide product portfolio to address different stages and needs of a project.

Our plan is to keep building on our success by engaging and growing our customer base with exciting and innovative new products that help our clients perform their tasks efficiently and accurately. We are actively expanding our sales, support, production and R&D groups to Clacker PONGO, firing voltage 10 V



Blasting machine LM-2M



continue meeting the support and product requirements of our customers. We are always encouraging new customers and partners to visit us at [www.englo.eu](http://www.englo.eu) and contact us to help us execute on our vision.

## DRDO & Indian Army successfully conduct six flight-tests of QRSAM

Defence Research and Development Organisation (DRDO) and Indian Army have successfully completed six flight-tests of Quick Reaction Surface to Air Missile (QRSAM) system from Integrated Test Range (ITR) Chandipur off the Odisha coast. The flight tests were conducted as part of evaluation trials by the Indian Army.

The flight-tests were carried out against high-speed aerial targets mimicking various types of threats to evaluate the capability of the weapon systems under different scenarios, including long range medium altitude, short range, high altitude manoeuvring target, low radar signature

with receding & crossing target and salvo launch with two missiles fired in quick succession. The system performance was also evaluated under day and night operation scenarios.

During these tests, all the mission objectives were met establishing pin-point accuracy of the weapon system with state-of-the-art guidance and control algorithms including warhead chain.

The performance of the system has been confirmed from the data captured by several Range instruments like Telemetry, Radar, and Electro Optical Tracking Systems (EOTS) deployed by ITR. Senior officials from DRDO and the Indian Army participated in the launches.

These tests were conducted in the final deployment configuration consisting of all indigenously developed sub-systems, including the missile with indigenous Radio Frequency (RF) seeker, mobile launcher, fully automated command and control system, surveillance, and multi-function Radars.

The uniqueness of the QRSAM weapon system is that it can operate on the move with search and track capability & fire on short halt. This has been proven during the mobility trials conducted earlier.

Defence Minister Rajnath Singh has complimented DRDO and Indian Army on the successful flight trials.

# GRSE Aims to Expand its Global Outlook



**Cmde P R Hari IN (Retd),  
CMD, GRSE**

With a very clear project execution strategy, Garden Reach Shipbuilders and Engineers (GRSE) Limited is on an accelerated growth trajectory and the company is confident of meeting its customer expectations. "Our focus, in addition to domestic warship building is on exports, ship repairs, product diversification with thrust on 'green energy platforms', 'R&D' and digitalization in the entire spectrum of operations. With a healthy order book of Rs 24,100 crore as on 31 March 22, GRSE's vision is to become a Navratna Company by 2030 and be globally recognized as the best Indian Shipyard," said Cmde P R Hari, IN (Retd), Chairman and Managing Director (CMD), GRSE Ltd. In an interview with Aeromag, the CMD talks about the company's growth, ongoing projects, and future plans.

Being one of the most advanced shipyards in the country, could you talk about the recent major achievements made by GRSE?

The shipyard has achieved a key milestone in the prestigious Project 17A with the launch of Dunagiri (Yard 3023), the second of GRSE's three Advanced Frigates. The contract for building three Frigates under Project 17A is the largest order ever won by GRSE.

Further, GRSE launched the first Survey Vessel (Large), INS Sandhayak (Yard 3025) in the series of four ships under the Survey Vessel (Large) project for the Indian Navy in 05 Dec 2021. GRSE launched the 2nd SVL (Yard 3026) INS Nirdeshak on 26 May 2022.

In line with the country's Atmanirbhar Bharat Abhiyaan, GRSE collaborated with Border Roads Organization (BRO) for the fabrication, supply, erection and launching of first-of-its-kind 27 nos. of double-lane Class 70 modular steel bridges in the border areas. These bridges have been designed by the in-house design team of GRSE. Recently, GRSE became the only organization in India qualified by

DGQA, for the prestigious Green Channel Certification for the Bailey Type Portable Steel Bridges. So far, GRSE has supplied more than 5,500 portable steel bridges to Indian Army, Border Road Organization, State PWDs, Central Government and friendly neighborhood countries.

GRSE & Syama Prasad Mookerjee Port Kolkata jointly inaugurated the GRSE-KPDD Khidderpore Dry Dock Unit in Kolkata for the development & utilisation of three existing dry docks. The project aims to explore new business opportunities in ship repair & refit of defence & commercial segments leading to revenue generation and contributing to skill development and infrastructure upgrade in West Bengal.

Taking a revolutionary step towards reducing the Carbon emission in the water transport sector, GRSE associated with the Government of West Bengal for design and construction of Next Generation Electric Ferry. The zero-emission electric ferry is powered by 210 Kilowatt per hour (kWh) liquid cooled energy storage solution and ergonomically designed to carry 150 passengers with provision of

air conditioning sitting arrangements. The ferry is designed by the in-house design team of GRSE and is indigenously developed in association with Industry experts in the domain.

How does the company associate with the Indian Navy and Coast Guard? Could you talk about the latest projects in the defence sector?

GRSE has enjoyed a strong collaboration with the Indian Navy and the Indian Coast Guard over the last six decades. GRSE has been a pioneer shipbuilder of India, having built 788 platforms including 107 warships for Indian Navy, Indian Coast Guard and Government of Mauritius & Seychelles Coast Guard.

The ongoing projects include construction of 24 ships & vessels under seven prestigious projects - Frigates (P17A), Survey Vessels (Large), ASW Shallow Water Crafts (ASW-SWC) for Indian Navy, Fast Patrol Vessel (FPV) for Indian Coast Guard, Next Generation Electric Ferry for Govt of West Bengal, Ocean Going Passenger cum Cargo Ferry Vessel for Republic of Guyana and Patrol Boats





Integrated Shipbuilding Technology in line with the best in the world.

**How does the company rely on emerging technologies and the concept of Industry 4.0?**

To maintain its competitive edge, the company is shifting to smart manufacturing (Industry 4.0), through thrust on innovations in automation, robotics and the industrial internet of things. It is also introducing Artificial Intelligence, Machine Learning, Interoperability and secured connectivity enabling real time monitoring.

In our journey towards digitization in strengthening the operation and shipbuilding efficiency, GRSE in collaboration with IIT Kharagpur has developed an AI Enabled Non-Destructive Testing (NDT) mechanism which aims to replace manual inspection by using Industry 4.0 techniques such as Artificial Intelligence, Machine Learning & Deep Learning for carrying out automated inspection.

A first-of-its-kind AI-based HR Chatbot 'Ask ANVESHA' by GRSE was launched to provide employees digital access to their personal documents. The cloud-based Chatbot enables employees to access individual data like Payslip, PF statement, Form-16 etc.

Adopting the latest technology with respect to security of infrastructure and other assets, we have established an Artificial Intelligence (AI) enabled high end CCTV network across its five units in Kolkata. The state-of-the-art technology has enabled surveillance of the shipyard to ensure 24x7 safety and security of all its premises.

**What are GRSE's activities to support Make in India and Atmanirbhar Bharat?**

As part of Make in India initiatives of Ministry of Defence, GRSE has made commendable progress by successfully incorporating a high percentage of indigenous equipment fit into the ships being built for the Indian Navy and Indian Coast Guard.

This is evident on-board Kamorta class ASW Corvettes, the first warship built in the country with indigenous DMR steel and overall 90% indigenous content with a unique feature of superstructure made of carbon fibre composite material. The Landing Craft Utility (LCU) ships, designed in-house by GRSE also achieved similar distinction. The company so far has delivered eight such LCU Mk IV ships to the Indian Navy.

for a government agency of Bangladesh. Concurrently, the shipyard is undertaking measures to strengthen internal processes, systems, and infrastructure and cost effectiveness. Several new initiatives have also been launched under the 'Ease of Doing Business' drive.

GRSE's Portable Steel Bridges primarily used for disaster management, have also been exported to friendly countries like Bhutan, Nepal, Myanmar & Sri Lanka. Concurrently, GRSE has also developed Double Lane Portable Steel Bridge and Portable Assault Bridge for the first time in India. We have supplied more than 5500 Portable Steel Bridges to the Indian Army, Border Road Organization, and State PWDs & Central Governments.

**Despite the impact caused by the pandemic, GRSE performed high in terms of turnover and profit. Could you share more details?**

GRSE became the only shipyard to get the 'Excellent' rating in the MoU performance evaluation for FY 2020-21. The core business of GRSE is warship building & the company reported the highest turnover of Rs. 1758 crore for FY 21-22, registering a growth of 54 percent over FY 20-21. The company has earned an operating profit of Rs 104 crore for FY 2021-22 as against Rs. 42 crore for FY 2020-21, registering a growth of 147%.

With a healthy order book of approx. Rs 24,000 crore and some in the pipeline,

we are looking at a very high growth in turnover in next few years. GRSE's vision is to be globally recognized as the best Indian Shipyard and also become a Navratna Company by 2030.

**Could you talk about GRSE's design and production capabilities? How strong is the R&D division of the shipyard?**

The company's in-house design capability remains its major area of strength with the multi-disciplinary 100 plus design team working towards developing various concept designs for current and future warship projects aided by state-of-the-art Virtual Reality Lab. VR Lab resolves design issues in a very short time with reliability and accuracy. The lab also displays 3D models in virtual environment to assist the production and customers to get faster approval of the ship system. The company's Design and R&D Department has received recognition from the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology.

A state-of-the-art indigenous CNC Underwater Plasma Plate cutting machine and a modern Hull Block Fabrication complex at its Rajabagan Dockyard Unit are targeted at enhancing the production capacity of the shipyard. With modernized infrastructure facilities across three production locations, GRSE is today in a position to construct 20 Warships concurrently using Advanced Modular

# IAI Aims High at DefExpo as India-Israel Ties Turn 30



**Boaz Levy**  
President & CEO  
IAI

IAI India Pvt Ltd, a subsidiary of Israel Aerospace Industries Ltd., will showcase its advanced technologies, industry-leading air-defense systems and ground-combat solutions (in Booths # 7R.11 & 7R.12, Hall 7) at DefExpo 2022, India's largest defense exhibition. IAI India Pvt Ltd is leading a strategic transformation to provide fast direct access to IAI's superior solutions in full support of India's Atmanirbhar Bharat vision of a self-reliant country.

Boaz Levy, IAI President and CEO: "IAI is proud and excited to be exhibiting at this year's DefExpo, emphasizing our commitment to the local Indian defense ecosystem. We have been innovating and



delivering state-of-the-art technologies that have expanded our partnerships and collaboration with India's industry-leading companies in both the public and private sectors. For the last three decades, we have been jointly developing tailor-made, cutting-edge solutions to meet India's unique challenges. As a trusted partner in India, IAI's elite technological solutions are

deployed throughout the Indian defense forces. As we celebrate thirty years of friendship with India, we are re-pledging our commitment to India's self-reliance campaign and seek opportunities to further advance the 'Make in India' vision. We look forward to meeting our friends and partners while exhibiting our cutting-edge technologies to the Indian, Asian, and global markets during this prestigious defense exhibition."

IAI India Pvt Ltd will be showcasing a wide array of aerial systems, including its Medium Altitude Long Endurance (MALE) strategic Unmanned Aerial Systems (UAS) Heron TP, and its most advanced UAS to date, the Heron MK II. In addition, IAI will exhibit its unique Vertical Take-Off and Landing capabilities with the WanderB VTOL, developed by IAI's BlueBird Aero Systems subsidiary, alongside IAI's advanced tactical loitering-munition designed for both ground and naval units, the Mini Harpy. IAI's long-range artillery weapons systems, the LORA precision strike surface-to-surface missile, will also show IAI's strike capabilities. IAI's Zibar family of all-terrain tactical utility vehicles

will be shown alongside IAI's cutting-edge future armored fighting vehicle – the Carmel. IAI will also exhibit its TERRA radar and M19 and MOSP sensor payloads, among other advanced systems. IAI is excited to highlight its technologies and deep-rooted partnerships with India's defense ecosystem.

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# GSL: A Shipbuilder's Sparkling Journey



Over the last six decades, Goa Shipyard Limited (GSL) has transformed from a barge repair yard to a major shipbuilder constructing advanced weapon platforms such as missile frigates. GSL contributes immensely towards meeting the requirements of Indian Navy and Indian Coast Guard for sturdy and dependable vessels, thus supporting the initiative to achieve the goal of 'Atma Nirbhar Bharat'. Exports too have been carried out by the yard, and with a big order book GSL is planning to diversify its product portfolio in future. Brajesh Kumar Upadhyay, Chairman and Managing Director (CMD) of GSL, elaborates.

**Brajesh Kumar Upadhyay**  
CMD

Beginning as a small barge building yard, GSL has garnered a reputation as one of the most sophisticated shipbuilders in the country. Where does the company stand in the global shipbuilding industry and what are the major achievements?

We have been a shipbuilding public sector undertaking (PSU) for the last six decades and from being a small barge builder, Goa Shipyard has gained reputation as one of the fastest growing yards in the country, producing state-of-the-art indigenous vessels for maritime security forces. Goa Shipyard Limited (GSL) was established by the Portuguese, on November 26, 1957 as 'Estaleiros Navais de Goa'. It started functioning with its own board of directors under the Government of India (GoI) from September 26, 1967.

The shipyard has had an illustrious and challenging journey which commenced as a barge repair yard and today is constructing advanced weapon platforms such as missile frigates. In addition to creating quality products, the shipyard has also proved itself as a reliable supplier with the unique distinction of all deliveries prior to contractual schedule. Having built and delivered 227 ships and 157 glass reinforced plastic (GRP)

boats in the last six decades, GSL is a Miniratna, Category-I, ISO 9001:2015 certified company with state-of-the-art infrastructure and this journey of the yard itself speaks about its contribution towards nation-building.

One of the five offshore patrol vessels (OPV) being built by GSL has been commissioned into the Indian Coast Guard in October 2021. Could you elaborate on the ongoing defence projects at GSL?

We completed the delivery of five Coast Guard OPVs in February 2022 which was an order from the Indian Coast Guard in continuation to the previously executed project for six OPVs. I am very proud to be a part of the execution of this project since despite many challenges GSL was able to deliver all the vessels within the contractual dates.

Currently, we are executing the prestigious Advanced Missile Frigate Project or Project 1135.6 which is progressing at a fast pace with the Design Phase at an advanced stage and production activity also proceeding as per plan. The other two major projects being executed are the two Pollution Control Vessels and eight Fast Patrol Vessels for

the Indian Coast Guard, which would be entering into full-scale production stage



soon.

The last couple of years have been very challenging for the shipyard owing to the cascading effects of the pandemic and very recently the changes in the geo-political scenario with respect to the Russia-Ukraine conflict. However, the period has also been very encouraging with the yard transitioning itself to the domain of advanced weapon intensive platforms by commencing the execution of the prestigious contract for construction of two Advanced Missile Frigates for the Indian Navy under design assistance from Russia. This project which has completed the technical design stage

and is in the advanced stages of detailed design with physical construction also commenced, will definitely catapult GSL into a select league of shipyards which can design and construct complex weapon-intensive ships. I am proud of the fact that we have aggressively worked in coordination with Russian design agencies and the Indian Navy to ensure speedy completion of the preparatory activities.

We have also laid additional impetus and thrust on the 'Repair and Refit Sector' wherein we have successfully completed more than 10 refits of vessels from Indian Navy, Coast Guard as well as Merchant Marine in the last one year. Sensing an opportunity in the repair and refit field, we have gone a step ahead by expanding our operations to Karwar and a separate Refit Office has been set up there to independently cater to repair requirements of vessels based there.

**Could you explain how GSL gives a fillip to the modernization of the fleets of Navy and Coast Guard?**

As I mentioned, we are currently executing the prestigious Advanced Missile Frigate Project or Project 1135.6 which was inked in January 2019 which is picking up momentum with the Design Phase at advanced stages and production activity also proceeding at planned pace. The other two major projects being executed are the two Pollution Control Vessels and eight Fast Patrol Vessels for the Indian Coast Guard, which are entering into full-scale production stage soon. GSL has also emerged as the lowest bidder for the project to supply seven New Generation Offshore Patrol Vessels to the Indian Navy. The contract for this project is expected to be inked in the near future. So, presently there are 18 platforms under construction, the major ones being the Frigates, Pollution Control Vessels and Fast Patrol Vessels and construction of seven platforms is in

the pipeline.

We are on the verge of completion of an entire modernization programme spanning over a decade. In fact, GSL is now a fully state-of-the-art and modernized yard designed for construction of 14 vessels at the same time at various stages. GSL is also equipped with the advanced GRP Composite Manufacturing facility which is one-of-its-kind in South East Asia.

**Could you tell us about the export operations of GSL?**

The shipyard has made significant inroads into the global market with export of diverse vessels to Indian Ocean Region (IOR) countries. In recent years it has delivered 15 vessels and a Damage Control Simulator to neighbouring countries. The performance of these ships has been highly appreciated by the respective customers.

GSL is proactively pursuing interactions with various countries for further improving our performance in terms of exports. We are in dialogue with our Defence Attaches in Indian Missions to promote our products. We have also commenced export of soft skills in shipbuilding design to our neighbours. In the last one year, two courses have been recently completed for friendly foreign countries in the field of ship design and construction techniques. The government has been extremely supportive in promotion of exports and helped us in engaging with potential countries/customers. As of now, GSL is executing a prestigious project for a friendly foreign country which is presently in the design stage and will commence physical construction soon.

**Procurement through GeM (Government e-Marketplace) has been implemented in GSL. How does the company associate with private players,**

**especially MSMEs and startups? What are the initiatives to increase the pace of defence indigenisation?**

GeM is a very unique and productive initiative by the Government of India which has brought the entire government's procurement ecosystem under one platform and GSL has been actively involved in GeM procurement for its shipbuilding goods, material and equipment.

As far as association and support to MSMEs is concerned, GSL was the first Defence PSU to introduce 'Procurement Preference Policy' in July 2015 to encourage domestic vendors in order to increase industry awareness and promote indigenous manufacturing. Over the years, the indigenous content of GSL-make platforms has increased substantially. The local content of the recently-completed five Coast Guard OPVs is in excess of 70%, compared to 60% in the earlier Coast Guard project for six OPVs.

It is also a matter of great pride that the two frigates under construction will be installed with a considerable percentage of indigenous equipment fit, contributing to the Government of India's 'Make in India' and 'Atma Nirbhar Bharat' vision. Critical engineering, hull and weapon systems will be of indigenous origin tapping into the growing capabilities of domestic public and private industry. Close to 8,000 items will be of indigenous origin and are presently under various stages of procurement from MSMEs.

In order to bring world-class technology to India and manufacture equipment/systems in India with significant indigenous content, GSL has laid considerable thrust on collaboration with leading Indian OEMs and startups and has entered into MoUs with various Industry and academic institutions such as BEL, L&T and IIT Goa to further boost indigenisation and reduce dependence





on imports. GSL is also participating in the 'iDEX' programme and is associating with startups for development of niche technologies in the Marine and Shipbuilding Domain.

While we are aggressively pursuing the 'Make in India' initiative by introducing more and more import substitute products, we are conscious of the fact that MSMEs form a critical fulcrum behind this initiative. Therefore, we are making all-out efforts in increasing our vendor base. We have a robust vendor development programme in place with regular organisation of vendor meets, active participation in vendor meets at regional and national levels, facilitating yard visits for vendors for interacting with stakeholders at GSL and understanding their requirements, imparting training on TReDS to MSMEs, arranging rebate in class approval fee for MSMEs owned by SC/ST entrepreneurs from Indian Register of Shipping and handholding local suppliers. GSL also actively works towards on-boarding majority of its vendors on the India Defence Mart (IDM), which is again another great initiative by the Government.

**Could you reveal your vision and priorities for GSL over the next decade?**

I consider it a great honour and privilege to be appointed as the CMD of this premier yard. Having risen from the ranks of the company, I have seen this company transforming itself from being a small-scale shipbuilder to a fully-modernised yard capable of executing complex warship construction such as missile frigates, OPVs and various diversified products. As far as the revenues of the company are concerned, I am confident of achieving considerable growth in the next three years since most of our projects which are in the design stages will enter into full-fledged construction phases and shipbuilding being a cyclical process, the company will witness a rise in revenues.



My vision at the same time will also be towards diversifying our product ranges without sticking to only a few customers or product portfolios. We have a very strong in-house design team and with the growing startup culture in the country, I aim to invest my efforts in diversifying our verticals concentrating on domains such as ship repairs, exports and expanding our product range beyond vessels to other areas that are technology driven. We aim to consolidate and expand in the segments of composite-based products, simulators, stern gears, stabilisers and heli grids. I also firmly believe that the shipbuilding industry needs to be self-reliant and focus more on indigenisation. So, I fully appreciate the Government of India's thrust to make our country 'Atma Nirbhar'. GSL is making all efforts to increase the indigenous content of its products.

As far as our capability in new construction is concerned, with the present upgraded capacity, GSL can undertake concurrent construction of 14 steel hulled vessels at a time, eight at hull fabrication stage and six at the outfitting stage. In addition, we can undertake concurrent construction of five FRP hull ships. So now our focus is to expand the product portfolio and cater to the ever-

increasing requirements of the Indian Navy and Coast Guard. A large number of projects are lined up for both Indian Navy and Coast Guard and GSL is confident of bagging some of them. In addition to the mid-sized vessels where we have domain expertise, we are developing expertise in niche segments such as hovercrafts and autonomous platforms. We have ramped up our expertise and capabilities to execute these additional shipbuilding projects concurrent to the ongoing long-term project for missile frigates.

**How do you look at DefExpo 2022 to expand the business opportunities of GSL? Could you share the details of your participation?**

DefExpo 2022 is a very crucial event and a platform for GSL to showcase its capabilities in the shipbuilding domain especially in the Defence Sector. We will get an opportunity to display our full range of products ranging from advanced frigates to OPVs, fast patrol vessels, composite-based crafts and other engineering products. Our in-house design capability, especially in the OPV domain, will be showcased and we are expecting a good footfall from both domestic as well as international customers in our stall.



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# AEPL Focuses on Innovation and Diversification



**R. Sundaram**  
MD & CEO, AEPL

Aerospace Engineers Pvt Ltd (AEPL) is a technology driven company designing, developing and manufacturing components and sub-systems for the aviation, aerospace, defence, and healthcare industry. Established in 2000, it has emerged at the forefront as a quality supplier of high-precision detail parts (rubber, metallic, non-metallic, and composite), electro-mechanical LRU's, and missile sub-assemblies. AEPL now has wider experience in the supply of engine components and it entered the global market through manufacturing and supply of engine components to foreign companies. According to R Sundaram, Founder and Managing Director, AEPL, MRO & Sub-System Developments are the company's focus areas for near future. Innovation and diversification is the key to making India self-reliant. As a significant step towards Atma Nirbhar Bharat, AEPL has started a separate division called the 'Advanced Technology Division' to fulfil the rising needs of the subsea naval warfare.

With over two decades of credible expertise, Aerospace Engineers Private Limited (AEPL) has earned itself a name to be an eminent aerospace parts sub assembly manufacturing industry. Over these years AEPL received wide exposure and expertise in the manufacturing of high precision metallic, rubber and composites. AEPL now has wider experience in the supply of engine components and it entered the global market through manufacturing and supply of engine components to foreign companies.

According to R Sundaram, Founder and Managing Director, AEPL, MRO & Sub-System Developments are the company's focus areas for near future. AEPL has taken up indigenous design, development, manufacture and servicing of a variety of Actuators, Valves, Pumps, High Pressure Hoses, Rubber Fuel Tanks, Gear Box from Various Divisions of HAL



and DRDO against development orders. Some of these products are duly certified by CEMILAC and DGAQA. AEPL has simultaneously engaged in development of airborne sub-systems under the MAKE-II policy, Overhauling of LRU's, Sub-system of Engines, Gear Box, Actuators, Pumps, Blowers, Landing gears etc.

"AEPL has developed the capability to take up indigenous development of Linear and Rotary Electro Mechanical Actuators among other sub-systems for the Missile programs. AEPL strongly believes in diversification and the company is taking dedicated strides into the space of autonomous UAS (Unmanned Aerial Systems) that can be programmed to perform various tasks like surveillance and

inspections. Also, having excellent CNC machining shops, discussions are going on for manufacturing of structural metallic parts of UAV & Composite moulded parts," he said,

Aerospace Engineers Pvt Ltd (AEPL) is a technology driven company designing, developing and manufacturing components and sub-systems for the aviation, aerospace, defense, and healthcare industry. Established in 2000, it has emerged at the forefront as a quality supplier of high-precision detail parts (rubber, metallic, non-metallic, and composite), electro-mechanical LRU's, and missile sub-assemblies.

AEPL is an eminent aerospace parts, sub assembly manufacturing industry certified with the prestigious AS9100D. The company's accurate technical testing has earned numerous certifications from reputed organisations such as NADCAP, CEMILAC, NABL, etc. The commitment to







quality, unparalleled customer service, and on-time delivery makes AEPL the supplier of choice for some highly-sought after clients in the market.

AEPL is a one – stop solution provider with various enhanced capabilities to support the growing needs of the Global market. The company's broad range of capabilities include a world – class NABL certified in – house facility, NADCAP approved chemical processing facility, FOD free area and our highly experienced design and production team.

"AEPL strongly believes in indigenisation and over the last three decades, we have developed more than 15000 parts through indigenisation out of which 12000 are non-metallic. We have developed mission critical products like Canopy Seals, Rotary Mast Seals, Actuators, Fuel / Oil handling Valves, Pumps & High-Pressure Hoses, Mask Hose Assembly, Rubber Fuel Tanks etc for several fighter aircraft and rotary winged aircraft. AEPL is a DRDO Qualified Manufacturing Partner for several critical Missile sub-systems like AKASH (Variants), BRAHMOS, LRSAM and some classified weapon systems including those deployed

Under Water. As a recent development to fight against COVID 19, we have developed about 75 parts and supplied about 30,000 sets for Ventilators and compressors within a span of 45 days," Sundaram said.

AEPL is a ZED gold rated Company and has developed more than 122 types of Rubber Compound which are duly approved by CEMILAC meeting Airworthiness and International Specification. DGCA has certified the company for Aerospace Hose Assemblies and Aircraft Seals for use in Civil Aircraft / Helicopters. Recently, NADCAP accreditation entitled AEPL to appear on the Qualified Manufacturers List (QML) for Fluid Distribution System.

AEPL trusts in building value through continual and long term partnerships which led the company to sign a long-term contract with 'Egyptian Armament Authority' for supply of aerospace components. In continuance to it, AEPL has won a long-term contract from Boeing & Honeywell to manufacture and supply critical aviation components and parts for the global aerospace company's products.

"We strive to work towards improvement and organic expansion which made us take the existing manufacturing facility of Taneja Aerospace & Aviation Limited (TAAL) at Hosur as our Unit - III, which includes machine shop, sheet metal processing, composite shop, heat

treatment, special process & painting process with NADCAP certification and CMM for inspection. This unit majorly focuses on the structural assemblies for aviation and space applications. We also have our separate unit in Hosur (Unit II) which is created to take up Integration of assemblies, sub-assemblies related to aviation. We plan to have an exclusive refined Research and Development Centre with International standard testing facilities," Sundaram said.

Innovation and diversification is the key to making India self-reliant. As a significant step towards Atma Nirbhar Bharat, AEPL has started a separate division called the 'Advanced Technology Division' to fulfil the rising needs of the subsea naval warfare. AEPL has strong global customer base like HAL, BDL, BrahMos, ISROs, DRDOs, BEL, Boeing & Airbus, Honeywell, Eaton, Apollo Aerospace, Pratt & Whitney, Collins Aerospace, Continental Aerospace Technologies US, etc. The company aims to strive towards catering the ever evolving Global Market by Making in India. ■



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# MIL Gives Fresh Impetus on Modernisation



**Ravi Kant**  
CMD  
Munitions India Ltd. (MIL)

MIL is that the India's biggest manufacturer and market leader engaged in Production, Testing Research & Development and Marketing of comprehensive range of ammunition & explosives for Army, Navy, and Air force & Para-Military Forces. The conventional ammunitions has been a forte of MIL but the company is making efforts to co-develop and co-produce smart ammunition in collaboration with academia and industry. The vision is to become a major player in global supply of ammunition and explosive production and to maintain the leadership in Indian ammunition and explosive industry. The focus has been on the modernisation to create state-of-the-art facilities for ammunition production. Co-Development and Co-Production of next generation ammunition through collaboration is also the long-term goal. Ravi Kant, Chairman and Managing Director, Munitions India Ltd. Speaking to Aeromag, he talks about the MIL's latest business operations and future plans.

Manufacturing of ammunition and explosives in India received a big boost with the formation of Munitions India Ltd. (MIL) on October 1, 2021 following the restructuring of the Ordnance Factory Board. Could you describe the benefits of this landmark decision of the Indian Government?

The landmark decision has accrued lot of benefits like - improved efficiency due to better management with greater autonomy in operations, financial independence, export impetus, focussed approach, better quality and delivery of products, flexibility to co-produce and co-sale products having niche technologies. The results are evident as MIL has secured export orders worth Rs. 1500 Crores since its inception.

The Indian Army has recently started RFID tagging of its inventory in conjunction with MIL. Could you provide more details?

Indian army has a typical, large, complex, and extended supply chain to satisfy the need of troops spread over geographically diverse operational commands. Real

time visibility of assets not only improves management of colossal war reserves in peace, but shall also radically improve availability and pace of movement of assets through the logistic pipeline in war.

Automatic Identification and Data capture (AIDC) technologies have the potential of ushering real-time asset visibility across the length and breadth of any supply chain. Keeping in view of the above, the necessity was expressed to introduce Radio Frequency Identification (RFID) in ammunition packing boxes for traceability of Ammunition Lots. This will contain important viz. lot no, size of the component for traceability of ammunition by both user and Factory.

Post Corporatisation, it was decided in consultation with DGOS that implementation of RFID tagging in Small Arms ammunition will be undertaken as a pilot initiative for this purpose. Currently, all the Small arms ammunition of 5.56 mm calibre issued to Army are being RFID tagged thus paving way for implementation of new state-of-the-art advanced Ammunition Management System by Indian Army. Consequently, it

is being planned to expand this to other products too.

The Central Government has cleared a proposal to manufacture the AK-203 assault rifle in India to replace the in-service INSAS rifle under a Russian partnership which also involves MIL. What are the latest developments in this regard?

MIL is having 8 % share in Indo-Russian Rifle Pvt Limited. Production of these rifles is about to begin soon at Korwa. MIL has already been producing 7.62X39 ammunition. MIL facilities are fully geared up to meet the requirements of ammunitions for these rifles.

The Pinaka rocket is among the major products of MIL and its advanced versions are under development. Could you update us on the matter?

PINAKA DPICM Rockets with 340 bomblets and PINAKA Extended Range up to 45 kilometres have been successfully developed post corporatisation. The variant of PINAKA extended range up to 60 kilometres and Pinaka Guided ammunition with range up to 75 kilometres



are under trial and development stage.

**MIL exports several of its products. What are the main export items and which are the markets?**

MIL has a strong focus on exports and business development. MIL is exporting various variants of Small Arms Ammunition, Grenades, Artillery ammunition, rockets, explosives and propellant. MIL has bagged export orders of 8 new products which were never exported before from India. Geographically, MIL has customer base in North America, South America, Europe, Africa and Asia. Since its inception last year, MIL has bagged export orders from 5 new countries.

**MIL presently has 12 manufacturing units around the country. Tell us about the expansion plans?**

MIL is planning to augment its capacities of factories producing single base propellant, BMCS and other explosive and propellant manufacturing facilities. Contract worth more than Rs. 2200 Crores have been signed for modernisation and augmentation of capacities by MIL since its inception. We are aggressive about the modernisation of the existing facilities and creation of new facilities to maintain our market leadership. This is a continuous process and we are now getting full support and encouragement from government in this regard.

**Could you reveal the major upcoming projects of MIL in 2022 as well as in the**

**coming years?**

The conventional ammunitions has been a forte of MIL. MIL is making efforts to co-develop and co-produce smart ammunition in collaboration with academia and industry. Development of 40 mm precision guided munitions system and Ship borne loitering Munitions System have been taken through i-DEX platform. 42 items have been identified under three Positive Indigenisation lists for fast track indigenisation through in-house R&D and collaboration with Indian Industry.

**As Chairman and Managing Director, what is your vision and long-term goals for MIL in future?**

The vision is to become a major player in global supply of ammunition and explosive production and to maintain the leadership in Indian ammunition and explosive industry. The focus has been on the modernisation to create state of the art facilities for ammunition production. Co-Development and Co-Production of next generation ammunition through collaboration is also the long-term goal. ■



**CARTG 20MM AMR HE/I**

## Rosoboronexport to Discuss Production & Sale of AK-203 Assault Rifles at Defexpo

A delegation from Rosoboronexport, a subsidiary of the Rostec State Corporation, is taking part in Defexpo India 2022, as a co-founder of Indo-Russian Rifles Private



Limited, a Russian-Indian joint venture established to produce Kalashnikov assault

rifles in India.

"Rosoboronexport has the world's largest portfolio of completed, on-going and future defense production projects in India. The joint venture Indo-Russian Rifles Private Limited, in which Rosoboronexport and the Kalashnikov Concern participate from the Russian side, is fully in line with the Government's Make in India initiative and Defense Acquisition Procedure (DAP) 2020 rules," said Rosoboronexport Director General Alexander Mikheev. "The Korwa Ordnance Factory is ready to start manufacturing Kalashnikov AK-203 assault rifles by the end of 2022. Our plans include 100% localization of the

production of legendary Russian assault rifles in India. In addition, in the future, the joint venture may increase production and modernize production facilities to manufacture advanced rifles based on the Kalashnikov assault rifle platform."

Kalashnikov AK-200 series assault rifles have successfully passed the test program, are supplied to government customers in Russia, and are also exported to partners who impose higher requirements on small arms.

These assault rifles have retained all the advantages of the traditional AK pattern: reliability, durability and ease of maintenance.

# 'BEML will be a cornerstone for Make-in-India'



**BEML Limited, a Schedule 'A' company under the Ministry of Defence, Government of India, deals with crucial sectors such as Defence & Aerospace, Mining & Construction and Rail & Metro. Amit Banerjee, Chairman and Managing Director of the company, explains the major ongoing projects, modernization, indigenization, export initiatives and future plans.**

**Amit Banerjee**  
CMD, BEML

**How does BEML contribute to the modernization of India's armed forces? What are the ongoing projects in the defence sector?**

BEML is in intense competitive environment across all its business verticals and more than 85% of its business is coming thru open competition. Modernization of facilities and upgradation of products is essential to be on par with global players.

BEML is steadily upgrading its manufacturing facilities, IT infrastructure and R&D facilities and CAPEX is about Rs. 50 Crs. to Rs. 70 Crs. per year. BEML is going for outsourcing wherever capability / capacity is available in the private sector and generally restricts capital expenditure only to add machines for carrying out very critical operations. The Company's CAPEX is funded thru internal accruals and borrowed funds.

BEML has taken up many projects to support the modernisation of Indian Armed forces, which includes development of improved cabins for High Mobility Vehicles& introducing AI based systems in existing vehicles. Following AI based projects have been taken to serve the Armed Forces.

- i) Medical Health Diagnostic System.
- ii) Autonomous Dozer for snow clearing

application.

- iii) Intelligent machine controlled Robotic Arm for weapon loading.
- iv) Lighting Control system on HEMM.
- v) Autonomous All Terrain Surface vehicle.

**How strong is BEML's international business and how do you intend to expand it? What are the major products on export and who are the clients?**

BEML has an exclusive International Business Division (IBD), working in tandem with Marketing divisions for the execution of export orders.

BEML has exported its products to around 68 countries across the globe. The products planned for exports are

Armour Personnel Carrier, Wheeled Armoured Vehicles, Armoured Recovery vehicles, HMMV 6X6, HMMV 8X8, Engineering Plant equipment (Dozers, Excavators, Motor Graders), Prime mover with trailer 20&50 Ton, Heavy Recovery Vehicle and Aircraft Towing Tractors, Medium Bullet Proof Vehicle, Crash Fire Tenders.

**Could you shed some light onto the indigenization efforts of BEML? What are the indigenization levels in various divisions?**

BEML has made considerable efforts during the last few years to indigenize large number of imported parts across all the three business verticals under Atmanirbharatha. Around 1400 parts have been identified for indigenisation over a period of five years and same have been uploaded in SRIJAN Portal for indigenisation.

•BEML has indigenized the products manufactured under license and technology transfer agreements thru extensive R&D efforts and achieved over 90% indigenisation level on most of Mining and Construction products, over 80% on Defence & Aerospace products and over 60% on Metro & Rail products.

•BEML recognizes outsourcing as one of the strategic tools to achieve cost benefits and also complement the strengths of private sector to build a strong industrial base. BEML has established itself as a system integrator by outsourcing substantial part of manufacturing activities to domestic suppliers.

•Further, BEML has indigenously developed and manufactured various equipment by involving Indian private industries;

1. Arjun Armoured Recovery & Repair Vehicle (Arjun ARRV)
2. Medium Bullet Proof Vehicle (MBPV)





3. Vehicles for Mounted Gun System (MGS) Dhanush
4. Vehicles for Mounted Gun System (MGS) with AK630.
5. AI based Medical Health Care Diagnostics System (MHDS)
6. Mobile Stand by command post vehicle (MSCPV) on 4x2 chassis.
7. Sarvatra Bridge System
8. 10 Mtr. & 5 Mtr. Short Span Bridge System
9. Mine Field Marking Equipment (MFME)
10. Mechanical Munition Self Propelled (MMLSP)
11. India's Biggest High-end Dump Trucks of 150 Ton & 190 Ton



**AK Srivastava**  
Director Defence Business, BEML

12. India's Biggest High-end Excavator of 180T
13. Unmanned Train Operation (Driverless) Metro Rolling Stock.

**How well does the rail & metro division of BEML perform? How do you intend to tap business opportunities in expanding metro rails in the country?**

BEML at present hold market share of about 44% in terms of metro car supplies in the country. We note that the Government of India is putting great thrust on infrastructure spending including development of many Metros rail projects in future. As premier supplier of rolling stock to metro corporations in

the country, BEML is at the forefront of adapting to the latest technologies and expanding its expertise & capacities as well as strengthening its supply chains to cater to the substantial emerging market requirement. BEML is also looking for partnerships to address new product categories in Indian Urban rail transport such as LRTs/Trams/High Speed trains etc. We hope BEML will continue its dominant position in Indian metro rolling stock market in the future.

**BEML organised a seven-day exhibition 'Journey of BEML Since 1964, showcasing its capabilities in both defence and non-defence segments. How successful has been the expo and what were the highlights?**

During the week between 13th December 2021 to 19th December 2021, BEML Limited had celebrated Azadi Ka Amrit Mahotsav across all its manufacturing Units i.e. Bengaluru, Mysuru, Kolar Gold Fields and Palakkad. An exhibition was organized to showcase the BEML's Journey since 1964. The exhibition was inaugurated by Hon'ble RM thru V.C. We have showcased our major equipment and aggregates during the exhibition. Also, equipment demonstration was organized. Details of all Atmanirbhar products were explained to visitors.

Arrangements were made for pickup and drop of school students. Wide media coverage was also imparted for citizens to witness the prowess of BEML equipment. Necessary arrangements were made for all visitors. All senior officials also visited and encouraged the visitors. We are happy to share that during the period the footfall was around 22000 visitors.

**How will BEML mark its presence at the DefExpo 2022? What prospects do you**

**see at the expo which is held amid the challenges posed by the pandemic?**

BEML is participating in Def Expo 2022 which will be held at Gujarat from 18th to 22nd Oct 2022. BEML has booked space for the Stall and the range of products being showcased are BEML Sarvatra, PMS, TWMP, BD-50 HST, BA-10 4x4 & other Defence & Aerospace related aggregates / parts acrylic models & cut sections. Also, we are planning to sign MoUs with OEMs and Academia for joint cooperation & Technology transfer for manufacturing various products. BEML is eagerly anticipating lot of interactions with Indian & Foreign OEMs for new business opportunities & expansions.

It has been less than a year since you assumed charge as the CMD.

**How do you assess the operations of BEML and what are the objectives ahead?**

My vision for the Company is to become a cornerstone for India's Make-in-India aspirations, a manufacturing hub for the highly competitive core businesses. Immediate priorities will be to leverage the strengths in our core business for significant growth in the next 4-5 years. This would involve diversifying in the Aerospace & Defence business, accelerate the growth in Rail & Metro business and sustain the Mining & Construction business. We need to develop new products adopting the latest technologies through strategic tie-ups with global players and premium academic institutions. Increasing the indigenisation levels in all the products will be a key thrust area. Exploring the international market opportunities in all the business areas to increase the exports will be a major priority. The goal in the next few years would be to increase the revenues substantially with reasonable margins and contribute significantly towards exports.



# India's Reliable Partner in Advanced ODM-plus Solutions



SFO started its aerospace business in 2007 by forming a dedicated A&D Division to focus on developing and manufacturing products for aerospace application starting with PCBAs and Cable Assemblies for aircraft lighting applications. Over the last 15 years, SFO has grown to become a significant global player in A&D business, developing mission critical products for Indian and global OEMs. Our determined efforts have enabled SFO to develop into a leading provider of LRUs for the world's top passenger jets, fighter jets, submarines, missiles, and ground vehicles, said N Jehangir, Vice-Chairman and Managing Director, NeST Group. In an interview with Aeromag, he talks about the company's business operations and projects.

**N Jehangir**  
Vice-Chairman and Managing Director  
NeST Group

NeST Group has been catering to the aerospace & defence industry for over two decades. Could you share with us an overview of your business operations in aerospace defence sector?

NeST Groups expansion into the Aerospace and Defense domain follows our emergence as a leading player in the Healthcare and Communications sectors. SFO Technologies, the flagship company of NeST Group started its aerospace business in 2007 by forming a dedicated A&D Division to focus on developing and manufacturing products for aerospace application starting with PCBAs and Cable Assemblies for aircraft lighting applications. From this humble beginning, SFO has now grown to become a significant global player in A&D business, developing mission critical products for Indian and global OEMs. Our determined efforts have enabled SFO to develop into a leading provider of LRUs for the world's top passenger jets, fighter jets, submarines, missiles, and ground vehicles, thanks to dedicated team effort.

Can you give more details about these

aircraft programmes?

In a short span, SFO established themselves as a niche technology player with our equipment donning Lighting systems for Aircrafts, Missile Electronics, LRUs for Military Vehicles and Underwater Systems, Battery Chargers, Military Radios, Night Vision Equipment, Radar Systems, Transformer Rectifier Units, AC and DC Power Management System for Fighter Aircrafts, Cabinet Assemblies for Ground Equipment, Power Conversion Panels, Underwater Sensors, Power Supplies for Sonar, High Power Laser Systems and more. This strategic move positioned our company to support the Govt. with the Make in India and Digital India programs as well as the Defense Offset Programs, augmenting a quick growth for the A & D Division. Further, NeST moved on to engage with global players for the design and manufacture of high-tech sub-assemblies for Defense applications from France, Israel, and the United States. As a result of this diverse approach, the A&D Division became Preferred Supplier to many OEMs and the Indian Defence Labs.

You are accredited as design and development partner for a major commercial aerospace company. Could you talk more about it?

Yes, we are qualified for the role of a design and development partner to a leading civil aircraft OEM. This relationship is progressing well. A major development proposal for this Customer is near completion.

Could you shed some light onto the company's operations in underwater sensing and fibre optics?

Indian Defense Labs now count SFO as a development partner for their underwater fibre optics and photonics technologies. SFO is countries first company to work on fiber optic technologies since 1991. We have also set up a world class design and manufacturing infrastructure for fiber optics and optronics products.

Since most of the products we are developing for underwater application is covered under strict confidentiality agreements, I am unable to disclose details of the same. However, I can only mention some generic information about two key projects that the R&D team is



working on.

- First one is the development of under-water sensors using fiber optics. For this project, SFO provides detailed technology development and product engineering, as well as many prototypes for field trials, all of which have yielded very positive results. This is a cutting-edge technology that is only available to the world's most advanced nations.

- The second one is the development of the guidance system for under water vehicles using fiber optics. SFO developed the technology that allows us to create very compact spools of high-strength fibre optic cable that can be deployed trailing behind the vehicle, while the mother vessel communicates with it via the fibre optics high-bandwidth channel. The winding machine, winding process, spool hardware, modems and power injectors at both ends of the cable are all developed by SFO. The product has successfully undergone functional trials, and is being used by our customer

**What are the highlights of your association with defence PSUs? How do you support the defence indigenization?**

SFO has become a renowned supplier to the defense PSUs for ground based and naval systems. We support defense indigenization on two fronts viz.

- Firstly, projects where we produce the designs for Defense Labs, and subsequently, upon completion of volume production at SFO's state-of-the-art production units, these are transferred to the PSUs for integrating with other Sub systems. As an example of a build-to-spec project, I would like to mention that SFO designed and developed a high-power amplifier system using switching mode technology to reduce system size and weight by one-fourth. This is done as part of an upgrade program on an existing platform. Several platforms have already been upgraded with our units. Moreover, the same technology is now applied to newly designed systems as well, which have recently entered volume production

- Secondly, there are several built to print projects currently under way at SFO, where we are doing volume production with the PSU's documentation

**How does the company perform in defence exports? What are the plans to expand the reach?**

70% of our exports business comes from Defence & Aerospace Customers

in Europe and Israel. We plan to expand further through account mining as well as new demand generation in niche technology areas where we can provide high-tech solutions through our bouquet of competencies. We are also planning an acquisition of one renowned design facility catering to European customers which will enable us to increase business from Europe, especially for A&D.

**How strong is your R&D capabilities and production facilities?**

NeST believes in providing best in class infrastructure and a safe working environment in all our Plants. We must always be on top of quality and infrastructure because exports account for 80% of our revenue. Our philosophy is to create a 5-year upgrade plan based on which we are not afraid to invest more and modernise our infrastructure with the latest technologies and processes; in fact, ensuring that this upgrade plan is completely implemented is one of the key KRAs at SFO.



- I want to mention that our R&D is both a strength and a differentiator for us. Customers can bring in an idea, we can finish all development inhouse and turn it into a completely sellable product that meets all standards requirement as well as offer them volume production advantage. This means that our customers can secure complete built to spec. capability from a single source, which is major disadvantage for all the major designs houses throughout the globe. With this unique differentiation in mind, we have created a wide spectrum of Hardware competencies in R&D such as in Electronics, Embedded Systems, Power Electronics, Fiber Optics, Mechanical and Industrial Design. We also bring an 800-person software operation to the kitty to assist our customers.

- Our Electronic Manufacturing Operations are best in class in the world, moving towards an Industry 4.0. We have 15 SMT lines in India, three SMT lines in California, and eleven SMT lines that are qualified for defence and aerospace manufacture. All our facilities are NADCAP and AS9100 Rev D certified, and our US facility is ITAR compliant. We

have IPC Certified Operators and Class 3 processes with bar code tracking at each stage and real-time reporting on yield and quality data. Our Aerospace dedicated line is equipped with SPI, AOI, Selective Solder & AXI along with Automatic Conformal Coating, Potting and Bonding facilities. We have Water Wash & Vapour Degreaser Process compliant to J-STD-001 and our inspection is compliant to IPC-A-610 Class 3.

- We have two Cable and Wireharness Plants one at Kochi and the second one at Pune. Our Plants are AS 9100 Rev D certified with IPC 620 certified Operators & Trainers, complete with fully computerised testing capability. Through these Plants, we have supplied over 1 million products in last 8 years and we hold the Supplier Gold status for one of the major A&D Customers.

- Rarely you would find Electronics Manufacturing plants having AS 9001 integrated Sheet Metal and Plastics plant. Our plant in Bangalore has capabilities to handle Precision Machining using 5 and 3 Axis Machines, Metal Stamping, Fabrication, Surface Treatment & High-level Assemblies. Our value chain includes world class Aerospace grade raw material/hardware suppliers and NADCAP sources to meet special process requirements such as MIL-PRF-23377 and MIL-PRF-85285, Anodization as per SPEC MIL-A-8625 and Chemical Film Treatment as per SPEC MIL C 5541 CLASS 1A.

- Our Operator to Component Poke-Yoke at every stage of the production process is often praised by our customers. In addition, we provide our customers with VA/VE and Obsolescence Management, which are distinctive advantages of SFO.

**What all can we expect from NeST at the DefExpo 2022? How do you look at the platform to get new business opportunities?**

Participating in DefExpo 2022 is another opportunity for us to showcase our credentials to some key decision makers. We have plans to meet a few of our important Customers both from India and abroad and expect to establish a few new connects. We will follow up with each of these leads to the logical conclusion.

Expos such as these are growing more common, and everyone is looking for more networking opportunities. Wishing DefExpo & Aeromag continued success in bringing the defense community together on a single platform in the future too.

# VERICUT and AML join forces to simplify complex machining demands



After a decade of using VERICUT machine simulation, verification and optimisation software, Advanced Manufacturing (Sheffield) Ltd (AML) is extolling the virtues of providing industry-leading protection for its high-value capital assets and expensive parts. VERICUT from CGTech is a key component of business success at this rapidly expanding precision machining company, which serves a plethora of customers in sectors such as aerospace, energy and defence. More recently, AML has embraced the efficiency and productivity gains offered by VERICUT's Force™ module, which is driving tool life

Certificate of Approval. In addition, AML is part of the SC21 framework for '21st Century supply chains' to accelerate the competitiveness of aerospace and defence companies.

To manufacture the market's highest quality precision parts, the company utilises the very latest technologies, including VERICUT simulation, verification and optimisation software from CGTech.

castle precision engineering 03 "We've had VERICUT from day one of manufacturing at AML, which dates back around a decade," explains Engineering Manager Jason Mills. "VERICUT is our safety net; it looks after our complex components, some of which are machined from expensive forgings that cost in excess of £50,000 before we've even drilled a hole. There is no margin for error. We use all of the features in VERICUT, including gouge detection, collision detection and, more recently, the FORCE module. The software also looks after our machine tools through virtual simulations, which are critical because a replacement spindle could cost around £40,000 for the hardware alone."

From receipt or generation of customer CAD, forging and stage models, AML engineers start building up what it calls the 'Tech Pack' from its Siemens NX CAM system, including documentation and any relevant paperwork. The company will then start importing the component, fixture and tool models into VERICUT. Here, AML can take advantage of its VERICUT NX Interface, a function that

provides an easy and convenient way to verify, optimise and analyse individual NC programs, a series of selected tool paths or a complete sequence of operations, directly from within Siemens NX.

"We then start simulating the tool paths, checking for everything that could possibly go wrong, from collisions and near misses, to spindles running in the wrong direction," explains Jason Mills.

AML has seven seats of VERICUT base and essential modules that include Verification (detects program mistakes and verifies part accuracy), CNC Machine Simulation (detects collisions and near misses between all components in the machining zone) and Multi-Axis (simulates multi-axis milling, turning and mill-turn



operations).

The latter is vital as AML has 15 DMG Mori CNC machine tools on site, almost all of which are high-specification, multi-axis NT series mill-turn models. These include a large NT6600 with 6-metre bed and the latest arrival, an NT4250 DCG, which is capable of simultaneous five-axis mill-turn operations with a direct-drive motor installed in the B axis.

castle precision engineering 04 "Business is extremely busy, so we also have a DMG Mori DMU 125 FD five-axis machining centre on order, and are looking at two more assets in the near future," says Jason Mills. "We are not shy of investment if it makes sound business sense."

The company also takes advantage of several further VERICUT modules, including AUTO-DIFF™, which compares a CAD design model with a VERICUT



gains and cycle time reductions in the order of 30-40%.

Originally a spin-out from the award-winning Advanced Manufacturing Research Centre (AMRC) at the University of Sheffield, AML is today a recognised market leader in delivering flexible manufacturing capability at the leading edge of machining technologies and efficiencies. The company is AS9100-certified and carries a Rolls-Royce





simulation to automatically detect differences, weaknesses or mistakes in the design. "We use AUTO-DIFF on every component as part of our standard operating procedure [SOP]," states Jason Mills. "With AUTO-DIFF, anyone involved in the manufacturing process can identify an incorrectly processed job. We find that it often flags up errors, especially as we have numerous mill-turn machines. The tools on mill-turn machines can be flipped round either way, so if they are not set-up correctly, VERICUT will capture it."

Additional VERICUT modules on site include CNC Machine Probing, which checks for probe collisions (all of the CNC machine tools at AML feature Renishaw probes), and TDM Systems, which provides a live, on-the-fly connection to TDM. The company is now building tools in TDM for direct import into VERICUT.

Most recently, AML has added Force - Milling to its list of modules. VERICUT Force makes optimising an NC program fast and easy by calculating the contact between the tool and material, cut-by-cut. Force also takes the cutting-tool edge and material into account, adjusting the feed rates accordingly so they are optimal and constant.

"We've seen up to 40% more tool life and 30-40% savings in machining cycle

time when using VERICUT Force," says Jason Mills. "The module is invaluable for our production work as it provides us with a competitive edge. It's quite easy to use and understand. We simply pick the material from the database and input the cutter geometry, which we get from the tooling manufacturer. Force then does its calculations in the background."

AML has come a long way since spinning out of the AMRC (the company remains a tier-two AMRC member to this day).

"We have 30,000 ft2 here now, which is a tenfold increase in 10 years," explains Operations Director Mark Hands. "We've gone from 8 staff to 66; from two CNC machines to 15, and imminently about to sanction another two." It is all about continuous improvement at AML, a strategy that is spurring ambitious goals for the years ahead.

"For the 2021-2024 period we set targets to grow turnover from £4.9 million to £12 million; headcount from 55 to 110; and assets [CNC machine tools] from 10 to 22," says Mark Hands.

castle precision engineering 05AML is also working with a team of consultants from Sharing in Growth, business experts in the world of advanced manufacturing. The dedicated three-year transformation improvement programme is witnessing the entire AML team commit to an intense and comprehensive scheme of training, mentoring, coaching and development.

"We are big believers in reinvesting in our future, as well as our people," says Mark Hands, who joined as a project engineer in 2011 and is now a company director and major shareholder. Similarly, engineering manager Jason Mills began his career at AML as a CNC machinist,

while the company's quality manager was originally a press brake operator.

The coming years are clearly bright for this progressive manufacturing business, where production follows a simple mantra: apply the best manufacturing technology available to provide low-cost parts to customers. This is more than just a tagline; AML was born out of advanced research activities and the company still believes that technology is a key differentiator in providing value for customers. AML aims to apply the best knowledge in tooling, CAM strategies, dynamic analysis and CNC machine platforms to deliver precision quality at high production rates. Key to this goal is VERICUT.

"VERICUT brings security to our business," says Mark Hands. "Not just because our parts are expensive, but because some are 1-offs with no margin for error. We also rely on VERICUT to protect our CNC machines; large, expensive assets that are costly to repair. If we're not protecting our machines or our parts, then we're not protecting the customer programme, nor the relationship we have with them. Right first time within the business is a must and VERICUT is a vital part of that."

Jason Mills concludes: "I can't ever see us changing from VERICUT. We're comfortable and happy with the software, as well as the level of support we receive from CGTech. Today we apply VERICUT to all of our parts. No matter what we change in NX, even if we just add a command to turn on the coolant, it goes through VERICUT as it provides confidence for everyone in the business, from directors to machine operators. You can't put a value on that."



# KINFRA Park Ushers a New Chapter in Defence Ecosystem



**Pinarayi Vijayan**  
Chief Minister of Kerala

Defence has been identified as one of the sectors under 'Make in India' initiative of Government of India for providing a major thrust to the in-house manufacturing of equipment's to meet most of the varied requirements of defence. Kerala now makes its presence felt in the rapidly growing defence industry in the country with the completion of the KINFRA Defence Park, providing plug-and-play facilities. The park is first of its kind developed by any state exclusively for defence sector, spreads across 60 acres of land in verdant surroundings with excellent connectivity. The project is implemented by the state government with assistance from the Government of India under the Modified Industrial Infrastructure Upgradation (MIIU) scheme. Kerala government is determined to position the park as a significant centre of competence for world-class defence manufacturing aligned with Atmanirbhar Bharat. The park, which is envisioned as a hub for multi-prong activities, including manufacturing, R&D testing & certifying etc., offers the best-suited ecosystems for defence companies and startups to thrive. KINFRA Defence Park aims big by marking its presence at DefExpo 2022.

Being a frontrunner for attracting industrial investments, Kerala had progressed by leaps and bounds in the past few years under the LDF government led by Chief Minister Pinarayi Vijayan and support of Industries Minister P Rajeev. Attributes of the state such as a responsive government, developed infrastructure, connectivity, skilled workforce etc. has catapulted Kerala to a high-growth path, making it one of the best states in India for ease and quality of doing business. Today, Kerala has emerged as one of the potential destinations for industrial ventures, especially defence and allied sectors. The growth in the sector in the state is majorly driven by the Defence Park in Ottapalam set up by the Kerala Infrastructure Development Corporation (KINFRA).

Kerala now makes its presence felt in the rapidly-growing defence industry in

the country with the completion of the KINFRA Defence Park, providing plug-and-play facilities. The park, which is first of its kind developed by any state exclusively for defence sector, spreads across 60 acres of land in verdant surroundings with excellent connectivity is ideal for setting up units in the areas of manufacturing, Research and Development, Testing and Certification. The total project cost is 130.94 Cr.

The grant from Government of India is Rs.50 Cr under the Modified Industrial Infrastructure Upgradation scheme. The Defence Park is ideally suited for setting up units catering to the emerging supply chain ecosystem in the defence industries within and outside India.

The Defence Park was set up by KINFRA, a statutory body of the Government of Kerala formed in 1993, with the

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aim of catalysing defence industrial growth in Kerala by providing the robust industry-specific infrastructure. The state government is determined to position the park as a significant centre of competence for world-class defence manufacturing aligned with the Make in India and Atmanirbhar Bharat initiatives. The park is envisioned as a hub for multi-prong activities, including manufacturing, R&D testing & certifying etc. It is part of India's effort to become self-reliant in the defence sector and is expected to give a fresh impetus to the development of defence production in the country both for its domestic needs and also for export.

The park is supported by talent, technology, innovation, infrastructure and most importantly favourable government policies. The park is situated right along the Palakkad – Ponnani state highway. It offers industrial land and brick-and-mortar space to set up industrial units.

The thrust sectors are defence manufacturing, defence navigation products, naval systems, IT hardcore and electronics, tactical communication system, protective clothing & personal equipment, research & design, and naval, land and air electronic sub-systems and accessories. The thrust can be employed in sub-systems/auxiliaries in the manufacturing of the rotary & fixed wing aircrafts, defence navigation technology, tactical vehicles, submarine building, warship/ naval, defence IT systems

and solutions, avionics, space - robotics maintenance, microsatellites, unmanned systems etc.

KINFRA has developed basic infrastructure like Power, Water, Internal roads, Rain water harvesting etc and makes sure that companies are provided with the best service. Other facilities include Service yard, Road and Compound Wall Conference rooms, Paint booth, Tool rooms etc. KINFRA also proposes to set up a testing lab in the park under Testing Infrastructure Scheme of Ministry of Defence, Government of India.

Out of the total 60 acres of land, 33.5 acres of land is allotable. The park has an SDF building area of 2 lakh sq.ft and CFC building area of 1 lakh sq.ft. The warehouse has an area of 24,000 sq.ft KINFRA provides Industrial Land on lease, initially for a period of 30 years and is extendable upto 90 years. The total allotted area is 2.8 acres and 24,934 sq ft in Standard Design Factory with an investment of 147.31 crores and employment potential of 418. Ready to occupy Standard Design Factory

building at lease rent is provided initially for a period of 10 years and is extendable upto 30 years.

KINFRA has allotted land and SDF to 8 potential entrepreneurs in the field of Defence and related areas and all units are in various stages of development. KINFRA already allotted land to companies focusing on the sectors like electro- optic products, metal stamping tools, CNC controls, micro components suiting the medical industry and biological reactors etc.

The park is ideally suited for setting up units catering to the emerging supply



**Santhosh Koshy Thomas**  
Managing Director  
Kerala Industrial Infrastructure  
Development Corporation (KINFRA)

chain ecosystem in the defence industries with the Indian public and private sector companies collaborating with global companies in the sector.

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