# Growing Indian Defence Production Capabilities: From the biggest Importer of Defence Equipment to an Exporter

Dr SD Pradhan<sup>®</sup>

## Abstract

India's progress in increasing its indigenous defence production capabilities, (in recent years), is indeed remarkable. The country has achieved significant milestones by manufacturing key defence items such as nuclear-powered submarines, an aircraft carrier, cruise missiles, fast speed patrol boats, and light combat helicopters. This shift has transformed India from being the largest defence importer to a more self-reliant nation, capable of exporting defence equipment to a growing number of countries. The transformation in India's defence sector is reflected in the significant growth of its indigenous defence equipment and weapons exports. Over the past eight years, India's exports in this sector have grown tenfold, with more than 85 countries now importing Indian defence products. This growth demonstrates the increasing recognition and acceptance of India's capabilities in the global defence market. However, there are several key challenges that India needs to address for further advancing its indigenous defence production capabilities. Two significant challenges are, ensuring availability of sufficient investments and the induction of advanced technology, on a continuing basis (in the defence manufacturing sector) for maintaining a competitive edge in the global defence market.

## The Golden Era of the Indian Defence Sector

The growth of India's indigenous defence production capabilities has been exceptional in the last few years. India organised the Def Expo (18-22 October 2022) in Gandhinagar, displaying

<sup>&</sup>lt;sup>®</sup>Dr S D Pradhan is a Former Deputy National Security Advisor. Journal of the United Service Institution of India, Vol. CLIII, No. 633, July-September 2023.

defence weapons and systems produced in India. More than 1300 exhibitors, including India's defence industry, joint ventures associated with Indian defence industry, Micro, Small and Medium Enterprises (MSMEs), about 100 start-ups, and many foreign representatives, including 53 from African countries, attended the exhibition. India's Defence Minister Shri Rajnath Singh, on this occasion, stated that this is a 'golden era' of the Indian Defence Sector.<sup>1</sup>

India's transition from being the largest defence importer to a modest exporter is a significant shift. The fact that India now exports defence equipment and weapons to more than 85 countries, highlights the growing acceptance and demand for Indian defence products worldwide.<sup>2</sup> India has a list of 7031 defence items that have been indigenised. In 2020-2021, 74 per cent of contracts awarded by the Indian Army went to the Indian vendors. While defence imports have been reduced between 2018-19 and 2021-22 from 46 per cent to 36.7 per cent, defence exports touched Rs 16,000 crore in FY 2022-2023.<sup>3</sup> India plans to achieve a turnover of USD 25 billion, including export of USD 5 billion in Aerospace and Defence goods and services, by 2025.<sup>4</sup>

India is producing certain items in collaboration with foreign entities under the Transfer of Technology (ToT) scheme and steadily moving to totally indigenise strategic items. While earlier three Positive Indigenisation Lists (PILs) covered 3060 items for which there was an embargo on the import beyond the timelines, in May 2023, the Ministry of Defence (MoD) approved the 4<sup>th</sup> PIL of 928 strategically-important Line Replacement Units/Sub-systems/ Spares and Components. Under *Atmanirbharata* in defence, 164 PIL items, with an import substitution value of Rs 814 crore, that were to be indigenised by December 2022, have met the target within the timelines.<sup>5</sup>

Gradually, India is trying to reduce its dependence for spare parts on foreign countries. India's defence production infrastructure is supported by the requisite research and development ecosystem and a reasonable budget. Notwithstanding that modernisation of the Indian Armed Forces demands further increase in defence budget, currently it accounts for 2.15 per cent of the country's total GDP.<sup>6</sup> The objective is not only to indigenise defence production but also to modernise the Indian Armed Forces, to

raise their efficiency in the current scenario by equipping them with modern weapons and weapon systems, supported by advanced technology, to meet the upcoming challenges.

India has established two Defence Industrial Corridors in Uttar Pradesh and Tamil Nadu to boost defence production capabilities. The purpose is to facilitate defence production by having special zones with a faster decision-making system and tax benefits. 'The nodal agency for the Uttar Pradesh Defence Industrial Corridor (UPDIC) has signed 69 MoUs with the industry, with potential investment of Rs 10,545 crore. An Investment of Rs 1,767 crore has been made by the industries in UPDIC. It has six nodes -Aligarh, Agra, Kanpur, Chitrakoot, Jhansi, and Lucknow. The nodal agency for the Tamil Nadu Defence Industrial Corridor (TNDIC) has arranged investment worth Rs 11,359 crore through MoUs etc. with 42 industries. An investment worth Rs 3,176 crore has been made by the industries in the TNDIC, which comprises Chennai, Tiruchirappalli, Coimbatore, Salem, and Hosur. These corridors are expected to create new defence production facilities and promote clusters with necessary testing and certification facilities, export facilitation centres, technology transfer facilitation, etc.'7

# Foreign Direct Investment (FDI) in the Defence Sector

Alongside, India has also liberlised FDI in the defence sector. It now allows FDI under the automatic route up to 74 per cent (up from 49 per cent) and up to 100 per cent through the government route, wherever it is likely to result in access to modern technology. The total FDI inflow in the defence sector between April 2000 and December 2022 was USD 15.78 million. The Department of Defence Production (DDP) has brought in the following policy reforms for attracting foreign investment<sup>8</sup>:

- Higher multipliers are assigned in the Offset Policy to attract investment and ToT for defence manufacturing.
- Specific consultations are done regularly with Foreign Original Equipment Manufacturers.

• Under the Aerospace and Defence Policy notified by the two state governments- UP and Tamil Nadu, customised incentive packages are provided to investors based on investment, employment, and project location, which may include GST based

refunds on sales, stamp duty concessions on land allotment, electricity tax exemption, and capital and training subsidies for training workers.

• The Defence Investor Cell has been created to provide all necessary information including addressing queries related to investment opportunities, procedures, and regulatory requirements for investment in the sector.

# **Emphasis on Critical Military Technologies**

The MoD, under the 'Make in India' and Atmnirbharata initiatives, has identified three critical technologies including a production line for semiconductors, aero-engines and important advanced materials used in military technology. These technologies are important for the different platforms and weapons used by the Indian Armed Forces. The aim is to cut down dependency on imports in these niche areas and achieve self- dependence. The MoD and the Ministry of Electronics and Information Technology are working together to manufacture 'chips'. Defence Research and Development Organisation (DRDO) identified nine thrust areas for focused research, namely, platforms, weapon system, strategic systems, sensors and communication systems, space, cyber security, Artificial Intelligence (AI) and robotics, material and devices and soldier support. To enable the adoption of AI in defence, the Defence Artificial Intelligence Council (DAIC) and the Defence Artificial Intelligence Project Agency (DAIPA) have been created. The Unmanned Aerial Vehicle (UAV) designed and developed by DRDO, has been successfully tested in fully autonomous mode.<sup>9</sup> The DRDO has indigenously developed an engine with 180 HP capacity for the UAV Tapas, which can go up to 17000 ft altitude.<sup>10</sup> It marks a significant development towards self-reliance in manufacturing UAVs, which are going to play a vital role in future wars.

According to DRDO Chairman, Dr Samir Kamat, his organisation is now focussing on cutting edge technology to face the challenges in future wars. Three aspects are especially given importance: space situational awareness, underwater domain awareness, and defensive system to protect military and strategic assets from hypersonic weapons. Alongside, research in Direct Energy Weapons like laser and high-power microwaves, and cyberrelated weaponry continue to receive due attention.<sup>11</sup>

India is also collaborating with foreign countries for research and development in critical and advanced technology. The India-US initiative on Critical and Emerging Technology was launched to elevate and expand Strategic Technology Partnership and Defence Industrial Cooperation between the two countries. India and US launched a new bilateral 'Defence Industrial Cooperation Roadmap' to accelerate technological cooperation in critical technologies like AI, Quantum Mechanism, and Advanced Wireless. In addition, both countries are jointly enhancing research focus on identifying challenging dimensions of maritime security and Intelligence Surveillance Reconnaissance operations.<sup>12</sup> India and France are also collaborating in the production of six Scorpene submarines through the ToT. The first Scorpene submarine, INS Kalvari, was commissioned in 2017.<sup>13</sup>

#### Important Defence Items Manufactured in India

In recent years, India has pushed the policy of 'Make in India' in the defence sector, which is implemented through various policy initiatives that promotes indigenous design, development, and manufacture of defence items. The initiatives for encouraging indigenous production of defence items, inter-alia, include priority for procurement of capital items from domestic sources under the Defence Acquisition Procedure 2020, simplification of the industrial licencing process with longer validity, liberalisation of FDI, and sourcing of items from the Positive lists. Many significant projects, including the 155 mm Artillery Gun system 'Dhanush', Bridge Laying Tank, Thermal Imaging Sight Mark-II for T-72 Tank, Light Combat Aircraft 'Tejas', 'Akash' Surface to Air Missile System, Submarine 'INS Kalvari', 'INS Chennai', Anti-Submarine Warfare Corvette. Arjun Armoured Repair and Recovery Vehicle, Landing Craft Utility, etc., have been produced in the country under 'Make in India' initiative of the government in the last few years.14

Some of the major items exported in the past few years, are, Fast Speed Patrol Boats, Coastal Surveillance System, Light Weight Torpedoes, Light Weight Torpedo Launcher and parts, Dornier-228 Aircraft, Wheeled Infantry Carrier, Light Specialist Vehicle, Mine Protected Vehicle, Passive Night Sights, Battle Field Surveillance Radar Extended Range, Integrated Anti-Submarine Warfare, Advanced Weapons Simulator, Personal Protective Items, 155 mm Artillery Gun Ammunition, Small Arms and Ammunitions,

Weapon locating Radars, Identification of Friend or Foe -Interrogator, etc.<sup>15</sup> India is also exporting BrahMos missiles that are manufactured in India in collaboration with Russia.<sup>16</sup>

# **Big-ticket Items**

Among the big-ticket items produced in India are the nuclearpowered submarine INS Arihant, BrahMos Cruise Missile, the INS Vikrant aircraft carrier and Light Combat Helicopter (LCH) Prachand.

## **INS Arihant**

Launched in 2009 and commissioned in 2016, INS Arihant is India's first indigenous nuclear powered ballistic missile capable submarine, built under the Advanced Technology Vessel (ATV) project. INS Arihant and its class of submarines are classified as nuclear-powered ballistic missile submarine (SSBN). They can remain under water for longer durations and do not create noise like diesel submarines. The commissioning of the Arihant submarine was important for the nuclear triad. Prime Minister Modi remarked that the commissioning of INS Arihant completes India's nuclear triad, though India remains committed to 'No First Use' of nuclear weapons.<sup>17</sup>

Crucially, the Submarine Launched Ballistic Missiles (SLBMs) for these submarines are also being indigenously developed by DRDO. These are lighter, more compact, and stealthier than their land-based counterparts, the Agni series of missiles which are medium and intercontinental range nuclear capable ballistic assets. INS Arihant carried out a successful launch of a SLBM on 14 October 2022. The successful user training launch of the SLBM by INS Arihant is significant to prove crew competency and validate the SSBN programme, a key element of India's nuclear deterrence capability.<sup>18</sup>

INS Arihant is a 6,000-tonne nuclear propelled submarine with a length of 104 metres and a beam of 15 metres. It has a range of over 700 km. Its surface speed is between 12 and 15 knots and submerged speed is between 30 and 34 knots. It can carry 12x K-15 ballistic missiles and 6x 533 tube torpedoes.<sup>19</sup> It can stay deep inside the ocean making it virtually undetectable for months. There are plans to build more nuclear-powered submarines. Another nuclear-powered submarine the INS Arighat

is slated to be commissioned soon. Two more SSBNs are under construction.

# **BrahMos Missile**

The BrahMos missile of the Indian Armed Forces is a supersonic cruise missile developed by the DRDO and Russia's Mashinostroyeniya. It is named after two major rivers in India and Russia: the Brahmaputra and the Moskva. The missile is capable of being launched from land, sea, sub-sea, and air against surface and sea-based targets and has been long inducted by the Indian Armed Forces.

In the joint venture, the Indian side holds a share of 50.5 per cent and the Russian side holds 49.5 per cent. The technology used in this joint venture is based on the Russian P-800 Oniks cruise missile and similar sea-skimming cruise missiles from Russia.

The BrahMos supersonic cruise missile was first tested on 12 Jun 2001. Since then, it has been upgraded many times across various platforms, that is, the sea, land, and air. When compared to subsonic cruise missiles, BrahMos has three times the speed, and 2.5 times the flight range. BrahMos is supersonic cruise missile that can attain a speed of up to Mach 3, with a maximum flight range of 290 km. It is a two-stage missile with a solid propellant booster as its first stage, which brings it to supersonic speed and then separates. The second stage then takes the missile closer to Mach 3 speed. Stealth technology and guidance system with advanced embedded software provide the missile with exceptional capabilities.<sup>20</sup> Its special features include<sup>21</sup>:

• Operations on the principle of 'fire and forget', adopting varieties of flight on its way to the target.

• Enhanced estructive power due to the large kinetic energy on impact.

- High supersonic speed all through the flight.
- Long flight range with a variety of flight trajectories.
- Low radar signature.

- Shorter flight times leading to lower target dispersion and quicker engagement.
- Pin-point accuracy with high lethal power.

It can carry a conventional warhead weighing 200 to 300 kg. The missile has identical configurations for land, sea, and sub-sea platforms and uses a Transport Launch Canister (TLC) for transportation, storage, and launch.<sup>22</sup>

India is exporting BrahMos missiles to the Philippines. In January 2022, the Philippines signed a \$374.96-million deal with BrahMos Aerospace Private Ltd. for the supply of a shore-based, anti-ship variant of the BrahMos supersonic cruise missile. The contract includes delivery of three missile batteries, training for operators and maintainers, as well as the necessary Integrated Logistics Support (ILS) package. The coastal defence regiment of the Philippine Marines will be the primary employer of the missile systems. The Indian Navy trained 21 Filipino marines on the operating and maintenance procedures of BrahMos missiles.<sup>23</sup> Other countries, like Indonesia and Vietnam, are also showing interest in this missile.

## **INS Vikrant**

The commissioning of the aircraft carrier INS Vikrant, with its new abilities and the fact that it was not only designed and built indigenously but also used 76 per cent Indian material, was an important landmark in the growth of indigenous aircraft carrier production capabilities. It was built in India at a cost of about Rs 20,000 crore. With INS Vikrant, India joined the list of countries which manufacture huge aircraft carriers with indigenous technology. It is an important reflection of India becoming self-reliant in this crucial field. An aircraft carrier is considered the most valuable sea-based asset that allows todominate the maritime domain. It can be quickly deployed in different areas and, thus, helps the navy establish command and control at decisive points.

"The 262-metre-long INS Vikrant aircraft carrier has a full displacement of close to 45,000 tonnes, which is much larger and more advanced than its predecessor. The ship is powered by four gas turbines totalling 88 MW and has a maximum speed of 28 knots. It has been built with a high degree of automation for machinery operation, ship navigation and survivability, and designed

to accommodate an assortment of fixed and rotating aircraft. The ship would be capable of operating an air wing consisting of 30 aircraft comprising MiG-29K fighter jets and Kamov-31 multi-role helicopters, in addition to indigenously manufactured Advanced Light Helicopters (ALH) and Light Combat Aircraft (LCA) (Navy). Using a novel aircraft-operation mode known as Short Take-Off but Arrested Landing (STOBAR), the IAC is equipped with a skijump for launching aircraft, and a set of arrester wires for their recovery onboard".<sup>24</sup> INS Vikrant used indigenous equipment and machinery supplied by India's major industrial houses as well as over 100 MSMEs. It is the largest ship ever built-in maritime history of India and houses state of the art automation features.

The commissioning of INS Vikrant makes India's maritime domain more secure. Given our dependence on the blue economy and having three sides to the sea, maritime security for India is of paramount importance, particularly in the present context when China is increasing its footprint in the Indian Ocean. Control over the seas and safeguarding the sea lanes of trade and communications are essential. With its escort ships and fighter jets, it is a Carrier Battle Group, which means it can bring to bear that kind of force which is mobile, potent, and self-sustaining.

## LCH Prachand

The induction of the indigenously built LCH named Prachand into the Indian Air Force at Jodhpur on 3 October 2022, by Shri Rajnath Singh, India's Defence Minister, was another landmark in the development of India's defence production capabilities. This helicopter fills an important need for the protection of our assets and territory at high altitudes, like in Siachen, Daulat Beg Oldie etc.

The special characteristics of this air vehicle make it different from other helicopters. Air Chief Marshal Chaudhari, Chief of the Indian Air Force, stated that this LCH is either at par with or better than similar attack helicopters available globally.<sup>25</sup> The LCH is designed and developed indigenously by Hindustan Aeronautics Limited (HAL). It is primarily designed for operations at high-altitude in all-weather combat conditions. It is a multirole combat helicopter, designed to perform various attack profiles.

'It can fly at an altitude of 5000 metres. Its empty weight is 2250 kg and maximum take-off weight is 5800 kg. It can carry a weapon payload of up to 1750 kg. It can take off at high altitude with all its payloads. Its length is 15.8 m, wingspan is 4.60 m, and height is 4.70 m. It can carry two pilots. It has a top speed of 268 kmph and a maximum range of 550 km. It is powered by two Shakti engines. Its endurance is 3 hours and 10 minutes. Its weapons capabilities are significant. It carries 1 x 20 mm M621 cannon on Nexter THL-20 turret,  $4 \times 12$  FZ275 LG Rockets,  $4 \times 2$  Mistral air to ait missiles, 4x4 'Dhruvastra' anti-tank guided missiles, cluster bombs, and grenade launchers. It can evade detection by enemy radar and dodge incoming missiles. It is armed with a missile approach warning system, a Saab radar laser warning system, and chaff and flare dispensers.<sup>26</sup>

In Indian context, given the distinct advantages of greater fire power, excellent manoeuvrability, and a higher range of operations than other helicopters, along with stealth features, the role of this helicopter would be critical at higher altitudes. It upgrades India's capability to check air and land intrusions by our enemies. While it can be effectively deployed to deny the use of our airspace by hostile air or land forces, it is also capable of conducting lightning air strikes to complement the army's offensive and defensive operations. Besides, it can also be deployed to destroy the terrorist infrastructure behind enemy-lines. In any conflict, the role of this helicopter will prove invaluable.

# Conclusion

The Indian defence manufacturing industry is vital not only for security of India but also for its economy. The demand for better equipment, based on advanced technology, is increasing as India moves towards modernising its forces. Such demands are also increasing in other countries, which are facing threats from bullying countries that still believe in achieving their objectives using force. India's threat perception of a two-front-war has risen many times in recent years. The security of the land border and the Indian Ocean demands more submarines, aircraft carriers, fifth-generation fighter aircraft, combat helicopters, and super-sonic missiles.

The fundamental shifts in strategic equations globally demand a robust defence capability to maintain India's strategic autonomy. The risks involved in importing defence equipment are well known.

Usually, the best technology-based weapon systems are not transferred and if they are, the importing country remains dependent for maintenance on the country manufacturing the system. Defence equipment imported from abroad is susceptible to espionage and sensitive information can be leaked/stolen through such imported systems. Domestically manufactured equipment reduces this vulnerability. In addition, the purchase from foreign countries usually takes a lot of time, and by the time the equipment comes, it has outdated technology.

India has done well recently to push its defence manufacturing capabilities. The creation of two defence corridors will evolve as hubs for the defence manufacturing industry along with private industries linked to the defence industries, skilled manpower, startups, and R&D institutions providing useful assistance. Defence indigenisation has been extended to areas such as Innovations for Defence Excellence, which seeks to generate innovation in aerospace and defence. Significantly, necessary provisions to boost indigenous defence industry (68 per cent) have been made and a Special Purpose Vehicle has been arranged in the budget. Indian Defence Minister, Shri Rajnath Singh, has recently stated that it will establish the role of the private industry as a partner beyond just a vendor or supplier. The positive list is yet another excellent decision that will go a long way towards ensuring a market for the indigenous defence industry. The fifth-generation fighter plane is likely to be manufactured in about three-and-a-half years while transport aircraft would start production by 2026. The exports have substantially increased, indicating bright prospects for the Indian defence industry. To attract investments, incentives are being given.

However, there would be key challenges to achieving the goals. First, investors' interests will have to be protected to ensure their continued support to the defence industry. The long-term challenge for India is to ensure deep and sustained investments in defence R&D. Increase in exports of indigenous weapons constitute an essential aspect for attracting investments. The government's decision to deploy defence attachés in the target counties is an excellent proposal, but they will require the whole of government support, including diplomatic missions and intelligence agencies to achieve the objective. Second, the start-ups and private players will need to be given sufficient assistance and assurance.

Third, it is important to ensure the quality of the products and induction of the latest technology to produce world-class equipment. The lessons from the Ukraine-Russia conflict need to be internalised. The drones are playing an important role, hence, greater emphasis is needed on this dimension. While research in Al is in focus, it must be pursued with greater vigour. India has an agreement with the US on critical and emerging technologies. It is essential to ensure that India gets the advanced technology it needs. The India-US Defence Policy Group keeps meeting and efforts are being made to enhance defence industrial cooperation and operationalise the India-US Major Defence Partnership. These must be actualised soon to achieve the desired results.

Fourth, the production will have to be accelerated to ensure timely delivery. Fifth, at present, some parts are imported for our products. India needs to have a defence industrial ecosystem that can meet the requirements of the Indian Armed Forces. These demand a greater push in the direction of *Atmanirbharta*, particularly when the security environment is deteriorating, causing not only security challenges but also economic problems.

### Endnotes

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<sup>23</sup> https://www.marineinsight.com/shipping-news/21-philippine-marinescomplete-brahmos-training-in-india-amidst-filipino-chinese-tensions/.

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