

Enhancing Indian Defence Exports



SIDM
SOCIETY OF INDIAN DEFENCE MANUFACTURERS

EY

Building a better
working world

Foreword

India, the world's largest democracy, has exhibited maturity, progress and stability, both politically and economically. In the recent past, it has assumed a global leadership role. Countries across the world are looking up to India, and the nation is engaging attention of leadership in different-conflict zones. Indian industry, specifically the defence industry, has grown leaps and bounds over the past decade, demonstrating its capability to support the Indian armed forces. If there is one factor that is precluding the Indian industry to assume a global leadership role is its defence exports:-

Strategic sector dominance will be key for the Indian industry to reach higher thresholds of production and exports. Technology infusion, adapting to technological challenges, and organic technological advancement will be an essential pre-requisite of high quality defence production. The industry has to support start-ups, engage with small and medium enterprises, and develop

inclusive academia interconnects with DRDO and other national research organizations. It has direct implications on synergistic strategic sectors like nuclear, space and electronics.

Strategic independence may be construed as achieving-self-reliance in identified core disciplines such as missiles, strategic electronics, unmanned systems, CBRN and inter dependence with other disciplines. Focus may be directed towards contemporary technologies such as Artificial Intelligence/Augmented Reality/Virtual Reality and effectively integrate them into system

level and platform level production.

*The theme for the decade, therefore, could be **"Make in India; sell to the world"**.*



Kuber

Col K V Kuber
Director, Aerospace and
Defence, EY

Since the launch of the Make in India program in 2014 by the Hon'ble Prime Minister Shri Narendra Modi, a renewed zeal and optimism has emerged amongst the private industry leaders to be vectors in achieving self-reliance in Defence manufacturing. The development of the Defence and Aerospace sector is pivotal for India's strategic independence and to establish herself as a global, economic and military powerhouse. Make-in-India is a decisive and bold step towards attaining strategic Autonomy by India.

With announcement of the Draft Defence Production Policy 2018, in an unprecedented way, articulated the target of achieving USD 5 billion in exports by 2025 as part of an endeavor towards building a USD 26 billion Defence Industry. Enabled by the Government's promulgation of export friendly measures, India has gathered steady momentum and witnessed considerable success as Defence exports grew to reach approximately USD 1.54 Bn in 2019 from USD 0.28 Bn in 2014. This multi-fold increase has been possible due to unstinted efforts by the Government in Defence Diplomacy, framing encouraging policies, easing

and digitalizing clearances, mandate our overseas missions to support export initiatives, combined with tapping the agility and aggressive marketing of Indian Private Industry to global markets that included setting up India pavilions at prominent Global Defence exhibitions. In addition, the Government's readiness to offer Line of Credit to targeted friendly foreign countries, offers unprecedented opportunity for the Industry to build exports.

Today, the Indian Industry has matured to not only supply sub-systems but also complete platforms, at very competitive prices leveraging India's ability to pursue frugal innovation.

Since the sector opened in 2001, the Defence Industry has steadily evolved itself to be at par with global competition and is uniquely positioned in the global market.



A handwritten signature in black ink, appearing to read 'Jayant Patil', written in a cursive style.

Jayant Patil
President, SIDM
Whole Time Director &
Senior Executive Vice
President (Defence &
Smart Technologies),
Larsen & Toubro Limited

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1



Introduction

Defence industry is an indispensable component of every country aspiring to gain global recognition. A thriving domestic defence industry supports the armed forces in its national interests and fights against external and internal threats of armed aggression. Defence is one of the major spending sectors in the Indian economy. India has 15,000 km long border (across mountains, plains and sea) with seven neighboring countries. The country's geographical and topographical diversity poses unique challenges to the Indian defence forces.

India has fought several wars in the initial decades of its independence. The country then relied on its imports to meet its defence needs and immediate requirements of defence systems. During the larger part of the 20th century, India received support from other nations that contributed significantly to our defence capabilities. However, over the years, we have had limited success in building a robust domestic defence manufacturing base, one going beyond license manufacturing.

While state-owned enterprises are leading defence manufacturing in India, there have been attempts to set up defence industrial parks, Micro, Small and Medium Enterprise (MSME) defence clusters and concerted technology creation hubs. However, it has resulted in scattered capabilities.

The improvement of GDP has helped India, over the years, to transition from being a dependent nation to the one that relies on its internal capabilities to drive the country ahead. With the economic boom, India is assuming a critical role in global affairs. In this context, it is imperative to have a strong defence industrial base. A strong defence industry has been the backbone of the developed countries that has enabled them to exercise their military diplomacy across the world.

India has achieved major milestones while developing its industries. The economic crisis of 1990-91 prompted the acceleration of the liberalization process. Regulatory controls in many sectors were removed, and operation of the market forces were largely restored. The private sector demonstrated its prowess, especially in the information technology and pharmaceuticals, followed by automotive and infrastructure sectors. In 2001-02, the country removed the policy of reserving all defence equipment manufacture for the public sector, which opened the

doors for private sectors to operate, albeit under license. Military agreements also expanded to countries across the globe.

For the first time in 2002, India put a completely new acquisition architecture with the promulgation of a detailed procedural guideline called Defence Procurement Procedure (DPP). The scope of these procedures was enlarged in 2003 to include procurements flowing out of *Buy and Make* through imported transfer of technology (ToT).

The DPP, has since, been revised in 2005, 2006, 2008, 2009, 2011, 2013 and 2016 and has enhanced the scope to include *Make* procedure and *Buy and Make (Indian)* categories and upgrades. Since 2005, offsets were made mandatory for specified high value projects. Periodic revisions of the DPP has also taken place. There was renewed emphasis on indigenization and more importantly on indigenous products. The Buy (Global) decision can now be taken only after the other options for procurement, namely, Buy and Make (IDDM), Make, Buy and Make with TOT are ruled out.

In 2014, the government's call of "Make in India" built a clear vision for the defence sector to develop self-reliance and for the local industry to support the country's domestic needs.

This led to an ease of defence industrial licensing, relaxation in export controls and grant of No Objection Certificates (NOCs); India also became part of three of the four international export control groups, viz. the Missile Technology Control Regime (MTCR), Australia Group and Wassenaar Arrangement.

As India is on its journey to become a developed country, it is essential for our defence industries to have a strong footing. Now at the start of a new decade, towards the middle of the 21st century, it is time to rethink our global positioning. We have achieved great milestones in the field of space exploration. India is amongst a few countries to develop our own Inter Continental Ballistic Missile (ICBM). We are also progressing well on our civil nuclear program and it's time for us to think about our strategic independence in the defence sector.

In a rapidly changing world, being dependent on defence imports is not an option, considering our geo-political scenario. We must move out of the

constant threat of sanctions or our dependency on individual nations for our basic war reserves, such as ammunition, tactical systems and other equipment. Thus, the need to become strategically independent cannot be emphasized enough.

To achieve this goal, efforts are being made to increase indigenization if they are technologically feasible and economically viable. **The *Make in India* theme may be re-looked at with a broader objective as *Make in India* for import substitution, *Make in India* for sustained domestic demand and *Make in India* for global exports.**

$$\text{Strategic independence (SI)} = \frac{\text{defence exports} + \text{domestic absorption of indigenous products}}{\text{defence imports}}$$

Considering the above equation, strategic independence quotient can be improved directly by lowering our defence imports and simultaneously, increasing our defence exports in the global market. Global examples suggest that nations have gained influence globally on the back of their defence exports.

Exports is an important market influence. Most industries take advantage of them. Major Indian industrialists are said to have grown substantially over

the last two decades because they have expanded in the global markets. Increasing their defence exports may help India become strategically independent and achieve its ambition of becoming a US\$5 trillion economy by 2024.

Keeping the vision of gaining strategic independence in mind, this paper aims at understanding how the government and the industry can enhance defence exports.



A photograph of a modern military tank, likely an Arjun, painted in yellow and green camouflage. The tank is positioned in a desert environment. A soldier in camouflage uniform stands to the right of the tank, looking towards it. A large yellow vertical bar is overlaid on the right side of the image, containing the number '2' in black.

2

Insights on global defence trade

To understand defence exports and how India can meet and subsequently exceed its targets in this sector, it is imperative to study the current global defence trade. This section highlights the trends in the global defence markets and identifies key exporters and importers in these geographies. It also maps the trends in global defence trade from a weapon systems approach, thereby examining the markets, product/weapon system segments that may be targeted.

Methodology for data recording and analysis¹

The data used in this section is sourced from the SIPRI Arms Transfer Database and relates to actual deliveries of major conventional weapons.

The Trend Indicator Value (TIV) is based on the known unit production costs of a core set of weapons and is intended to represent the transfer of military resources rather than the financial value of the transfer. Weapons whose production cost is not known are compared to core weapons based on their size and performance characteristics, such as their weight, speed, range and payload; the type of electronics, loading or unloading arrangements, engine, tracks or wheels, armament and materials and the year in which these weapons were produced. A weapon that has been in service in another armed force is given a value 40% of that of a new weapon. A used weapon that has been significantly refurbished or modified by the supplier before delivery is given a value of 66% of that of a new weapon.

SIPRI calculates the volume of transfers to, from and between all parties using the TIV and the number of weapon systems or subsystems delivered in a given year. The data is intended to provide a common unit to measure the trends in the arms flow between various countries and regions over a specific period of time. Therefore, the main priority is to ensure that the TIV system remains consistent over time and any changes introduced are ignored.

SIPRI TIV figures do not represent sales prices for arms transfers. They should, therefore, not be directly compared with Gross Domestic Product (GDP), military expenditure, sales values or the financial value of export licenses while measuring the economic burden of arms imports or the economic benefits of exports. These figures should be used as raw data for calculating trends in international arms' transfers over a period of time, global percentages for suppliers and recipients aiming to measure the market share in defence trade, and percentages (of arms) for the volume of transfers to or from a particular state.

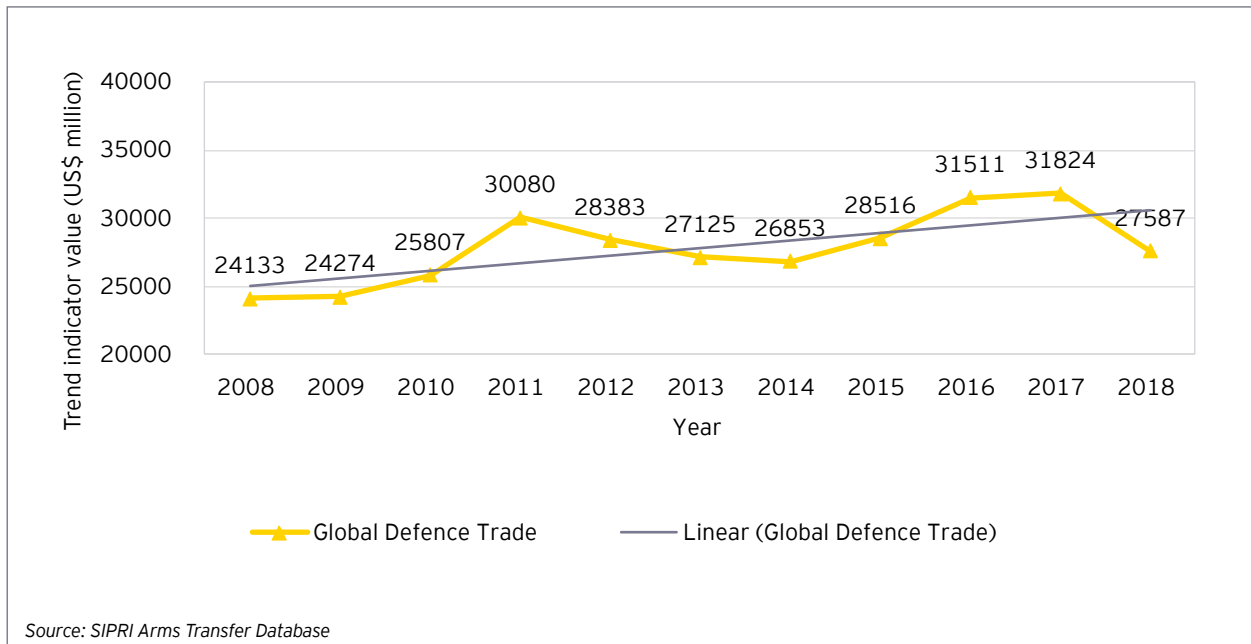
Examples of TIV in use

1. **The transfer of newly-produced complete weapons systems:** in 2017, France delivered eight Rafale combat aircrafts to Egypt. One Rafale was valued at 55 million SIPRI TIV. Therefore, the delivery is valued at 440 million SIPRI TIV.
2. **Transfer of significant components for major conventional weapons systems:** in 2017, France delivered three Folding Light Acoustic System for Helicopters (FLASH) anti-submarine warfare (ASW) sonars to Denmark for its use on US-made helicopters. One FLASH ASW sonar is valued at 1.9 million SIPRI TIV. Therefore, the delivery is valued at 5.7 million SIPRI TIV.

1 <https://www.sipri.org/databases/armstransfers/sources-and-methods>

The following graph represents the global defence trade over the last 10 years (2008-2018):

Graph 1 Global defence trade



The global defence trade has steadily risen over the last 10 years at a Compounded Annual Growth Rate (CAGR) of approximately 1.35%, with the SIPRI trend indicator value equating to 24.13 billion in 2008 and growing to 27.58 billion in 2018. Over the last 10 years (2008-2018), the aggregate amount of the global defence trade equates to approximately 306.1 billion SIPRI TIV. While looking at these figures from an export standpoint, the top 10 exporters of defence products over the past one decade is relatively unchanged with countries like the US and Russia being the market leaders in defence exports.

Global defence exports²

The growth (decline) trends can be witnessed from different geographies as shown in Table 1. The US has grown in defence exports at 4.45% which has led to an increase of market share from 28.2% to 38.1%. Russia's growth has been relatively flat at 0.28% which has ultimately led to a fall in the market share from 25.8% in 2008 to 23.2% in 2018. There has been a significant

decline in Germany's defence exports to 6.04% which has led to a fall in the market share of defence exports from 9.9% in 2008 to 4.6% in 2018. France's defence exports decreased by 1.06% over the study period and dropped the market share from 8.1% in 2008 to 6.4% in 2018. China, on the other hand, showcased a healthy growth of 4.91% in defence exports resulting in a 3.8% market share of global defence exports in 2018. The UK defence exports declined at 2.83% with the market share in defence exports falling from 4.1% in 2008 to 2.7% in 2018. Both Spain and Israel experienced a significant growth in their defence exports growing at 7.03% and 6.32%, respectively, with Spain's 2018 market share of defence exports being 4.3% and Israel's being 2.6%. Italy's defence exports grew at 3.77% resulting in a subsequent increase in market share from 1.7% in 2008 to 2.2% in 2018. Lastly, the Netherlands experienced a decline in defence exports of 1.88% and a subsequent market share drop from 1.8% to 1.3% within the period of consideration.

² SIPRI Arms Transfer Database

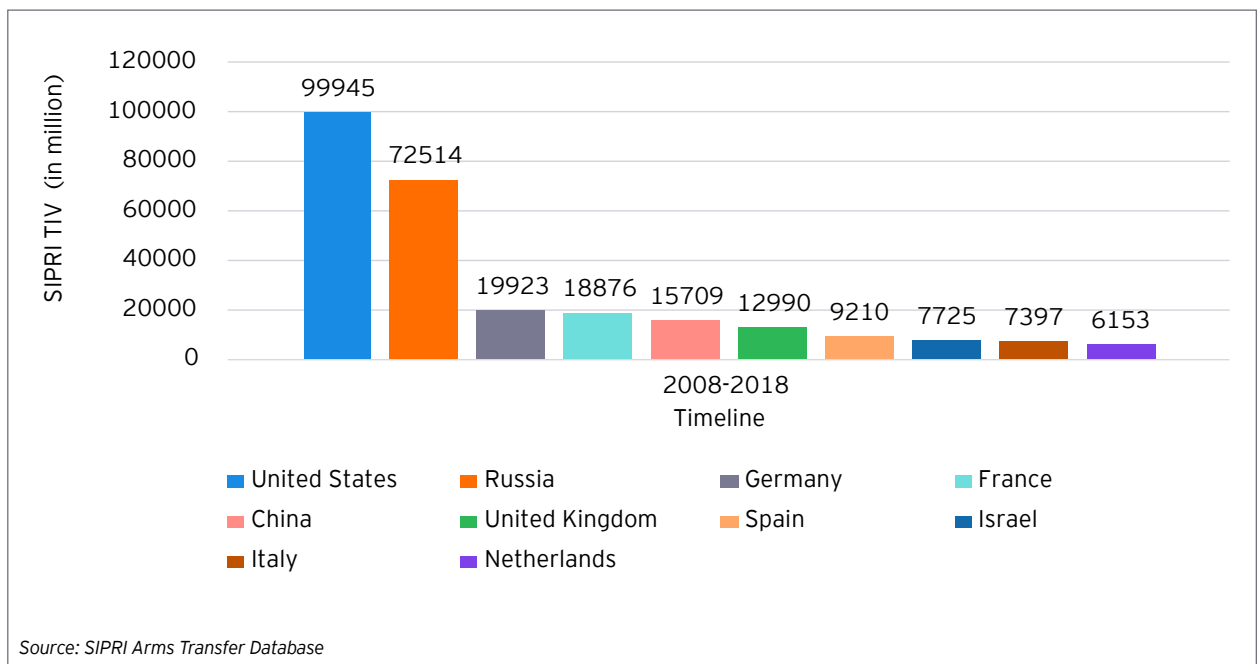
Table 1 Top 10 Defence Exporting Geographies

Geography	Export trend indicator value (in millions)		CAGR (%) (2008-2018)	Market share	
	2008	2018		2008	2018
United States	6800	10508	4.45%	28.2%	38.1%
Russia	6235	6409	0.28%	25.8%	23.2%
Germany	2380	1277	-6.04%	9.9%	4.6%
France	1966	1768	-1.06%	8.1%	6.4%
China	644	1040	4.91%	2.7%	3.8%
United Kingdom	987	741	-2.83%	4.1%	2.7%
Spain	602	1188	7.03%	2.5%	4.3%
Israel	383	707	6.32%	1.6%	2.6%
Italy	422	611	3.77%	1.7%	2.2%
Netherlands	446	369	-1.88%	1.8%	1.3%

Source: SIPRI Arms Transfer Database

*Note: Table 1 is ranked by aggregate exports based on volume (SIPRI TIV) over the period under consideration (2008-2018)

Graph 2 Top 10 defence exporting geographies



Source: SIPRI Arms Transfer Database

In terms of aggregate defence exports over the last 10 years, the US accounts for a little over 30% (32.65% is the exact number) of all global defence exports by volume. To put this into perspective, the top 10 defence product exporting geographies (shown in Graph 2) have accounted for approximately 88% of global defence exports over the study period (2008-2018)³.

Global defence imports (2008-2018)⁴

India tops the list of countries that import defence equipment over the study period (2008-2018). However, there has been a trend reversal in defence imports into the Indian subcontinent decreasing to 1.8% leading to a contraction in market share of global defence imports from 7.6% in 2008 to 5.6% in 2018. Saudi Arabia's defence imports have increased significantly at 25.57% over the study period leading to a huge increase in Saudi Arabia's market share in defence imports from 1.6% in 2008 to 13.8% in 2018. China has experienced a decline in its defence imports

of 1.68% that resulted the country to capture 5.7% of defence imports. Australia, on the other hand, has seen tremendous increase in its defence imports with 13.45%, resulting its market share to increase from 1.8% in 2008 to 5.7% in 2018. Algeria has decreased its defence imports by 1.47% over the study period. This led to a fall in the country's market share from 6.3% (2008) to 4.8% (2018). The UAE has seen an increase in defence imports, with the country's imports increasing by 3.87% driving its market share up from 3.1% in 2008 to 4% in 2018. Pakistan has seen a decline of 3.16% in defence imports, thereby leading to a fall in their market share from 4.4% in 2008 to 2.8% in 2018. South Korea also experienced a decrease in defence imports at a rate of -2.42%. This resulted in the reduction of its market share in defence imports from 7% (2008) to 4.8% (2018). Egypt experienced significant growth in terms of defence imports, growing at 16.12% and increasing its market share of global defence imports from 1.4% to 5.4%. Finally, the US defence imports have decreased at 4.30% resulting in a reduction in their market share in defence imports from 3.9% in 2008 to 2.2% in 2018. Here's a detailed clarity on defence imports of different countries.

Table 2 Top 10 defence importing geographies

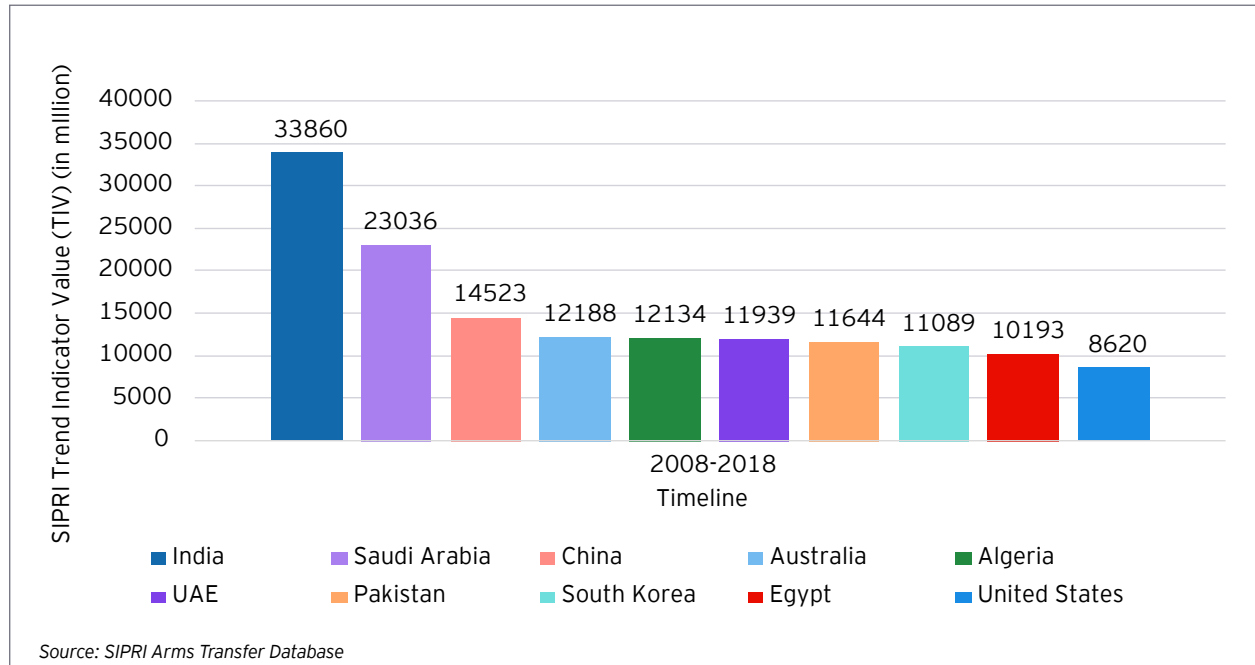
Geography	Import trend indicator values (in million)		CAGR (%) (2008-2018)	Market share	
	2008	2018		2008	2018
India	1845	1539	-1.80%	7.6%	5.6%
Saudi Arabia	391	3810	25.57%	1.6%	13.8%
China	1856	1566	-1.68%	7.7%	5.7%
Australia	445	1572	13.45%	1.8%	5.7%
Algeria	1529	1318	-1.47%	6.3%	4.8%
UAE	753	1101	3.87%	3.1%	4.0%
Pakistan	1071	777	-3.16%	4.4%	2.8%
South Korea	1683	1317	-2.42%	7.0%	4.8%
Egypt	333	1484	16.12%	1.4%	5.4%
United States	951	613	-4.30%	3.9%	2.2%

Source: SIPRI Arms Transfer Database

*Note: Table 2 is ranked by aggregate imports based on volume (SIPRI TIV) over the period under consideration (2008-2018)

3 SIPRI Arms Transfer Database

4 SIPRI Arms Transfer Database

Graph 3 Top 10 defence importing geographies

Key trends in defence trade

While looking at defence trade from a major weapon systems or platform approach, in 2018, the aircraft market segment accounted for around 45%, up from 40.5% in 2008, growing at around 2.4%. The air defence systems market segment has reduced its market share over the period under consideration from 5.4% to 4.5% declining at a rate of 0.6%. The armored vehicles market segment has experienced a reduction in market share from 13.5% (2008) to 12.0% (2018) with a CAGR of 0.1%. Artillery equipment showcased a significant decline of 6.7% resulting in its market share decreasing 1.5% from 13.5% to 12% of defence trade during the same period under consideration.

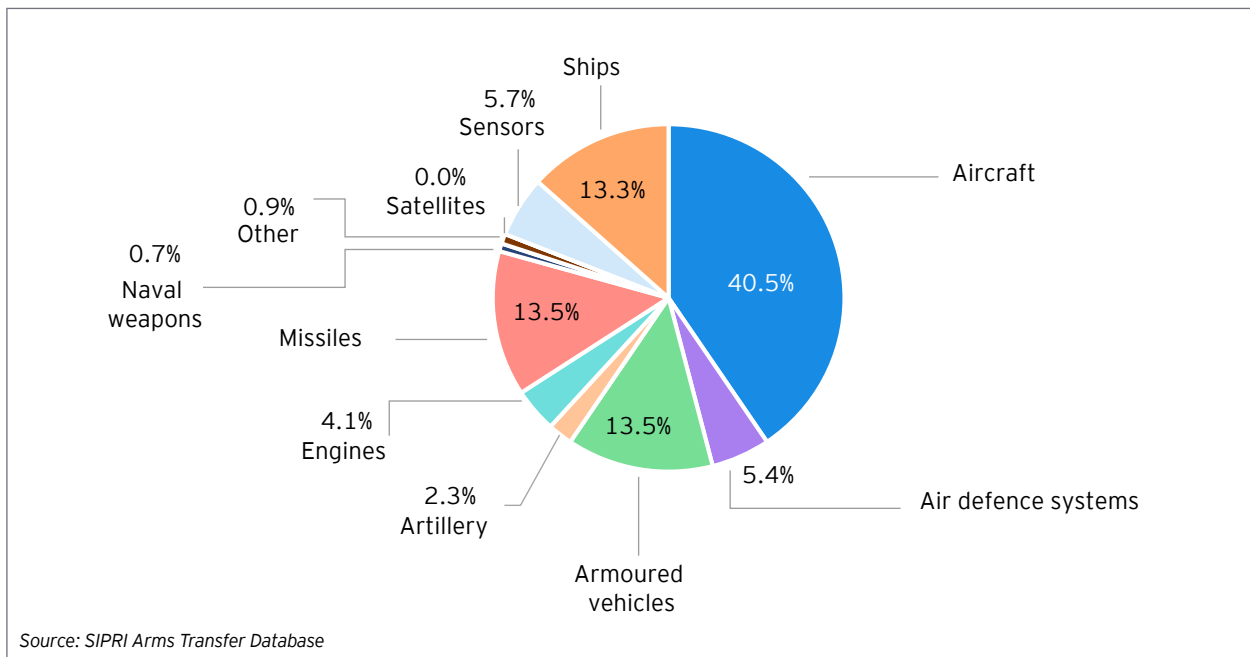
The engines market segment showcased a growth of 1.8% (2008) in global defence trade which resulted in a fractionally higher market share of 4.3% in 2018. The missiles market segment grew at 2.6% and in 2018 accounted for 15.3% of defence exports globally. The naval weapons segment experienced a decline of 2.1% and saw a contraction in the market share to 0.5% of defence exports. The sensors market segment declined at 3.3% over the period under consideration resulting in a 3.6% market share of defence trade. The ships market accounted for 13.2% in 2018 (of defence trade) which is a small contraction despite growing at 1.2% within the period under consideration. This can be better understood by referring to Table 3.

Table 3 Weapons system market share of the global defence trade

Platform/weapon system	Trend indicator value (in million) (2008)	Trend indicator value (in million) (2018)	Market share (2008)	Market share (2018)	CAGR (2008-2018)	TIV of global defence exports (in million) (2008-2018)
Aircraft	9784	12403	40.5%	45.0%	2.4%	131,947
Air defence systems	1309	1235	5.4%	4.5%	-0.6%	16,440
Armored vehicles	3254	3302	13.5%	12.0%	0.1%	36,521
Artillery	550	276	2.3%	1.0%	-6.7%	5,051
Engines	986	1184	4.1%	4.3%	1.8%	13,941
Missiles	3265	4226	13.5%	15.3%	2.6%	39,723
Naval weapons	176	142	0.7%	0.5%	-2.1%	1,666
Other	223	146	0.9%	0.5%	-4.1%	2,297
Satellites		50	0.0%	0.2%	N/A	350
Sensors	1367	980	5.7%	3.6%	-3.3%	15,799
Ships	3219	3643	13.3%	13.2%	1.2%	42,357

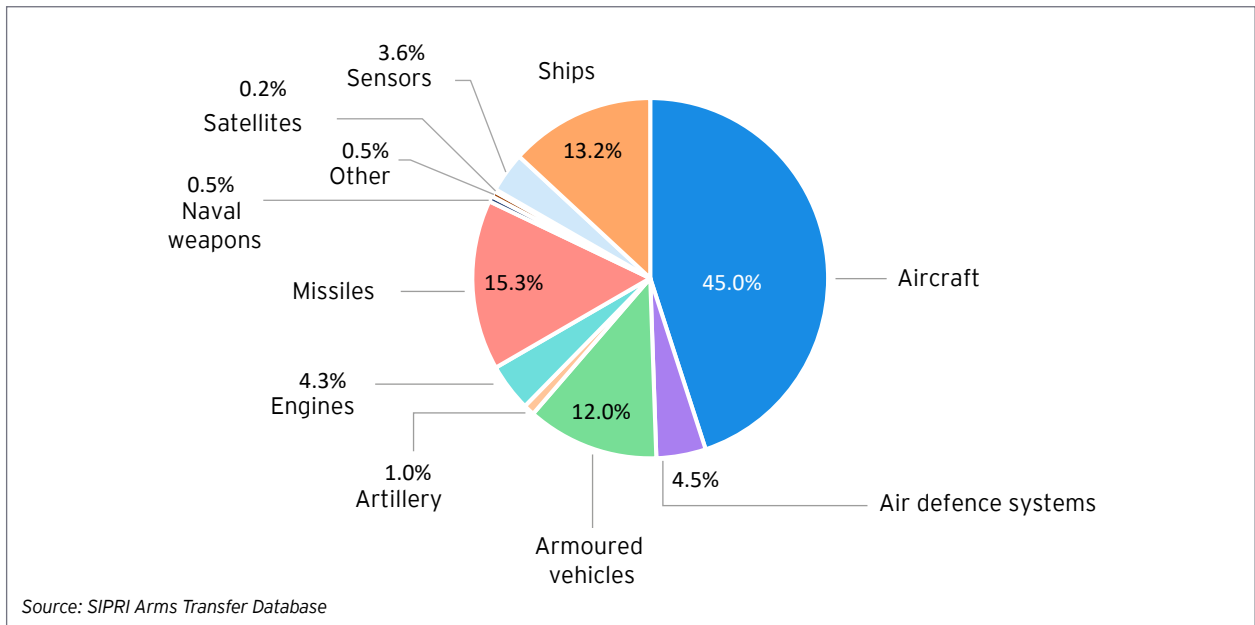
Source: SIPRI Arms Transfer Database

Graph 4 Weapon systems market share of global defence trade (2008)



Source: SIPRI Arms Transfer Database

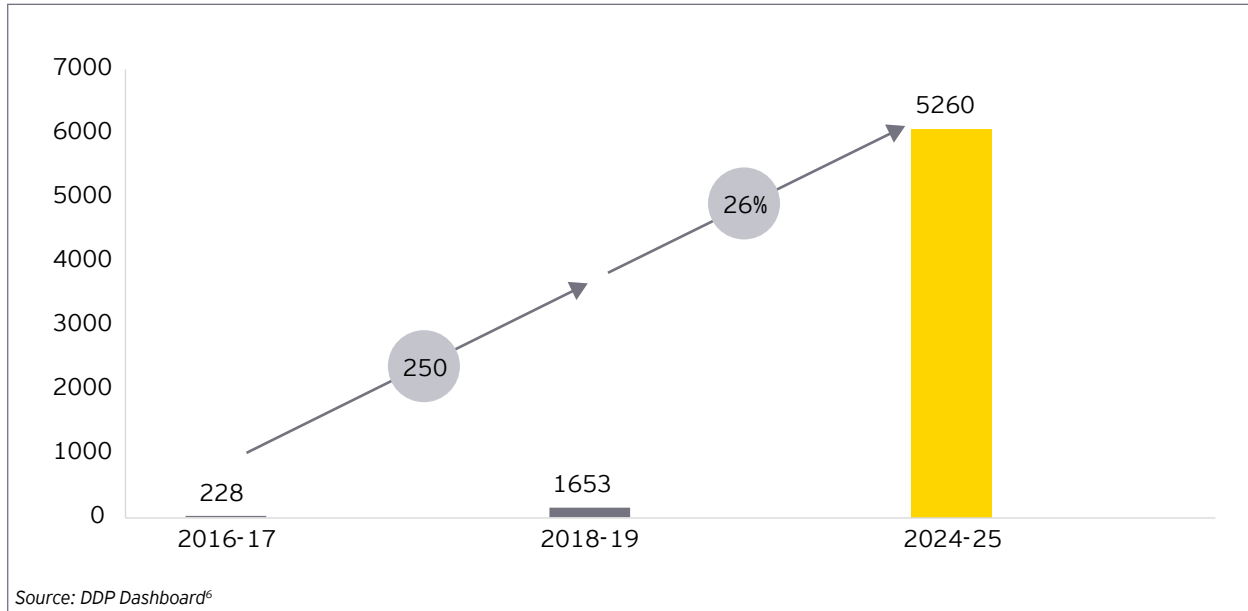
Graph 5 Weapon systems market share of global defence trade (2018)



3



India's current defence exports

Graph 1 Indian defence export (in US\$m)

Currently, India's defence exports are around INR11,000 crores (2018-19), and the vision set by the government is to achieve INR35,000 crores by 2025.⁵ There is a need of an optimistic jump in the CAGR of 26% to meet the desired target.

India's defence exports have increased from 2016-17 till today, but the size of the current volume (base effect) may pose a challenge to increase our defence exports from here on.

The Government of India continues to take initiatives to enhance defence exports. On 25 October 2019, Defence Minister Rajnath Singh approved the issuance of two open general export licenses (OGELs) for export of certain defence parts and components intra-company transfer of technology to select countries so as to give a boost to India's defence exports. The countries allowed under the OGELs are Belgium, France, Germany, Japan, South Africa, Spain, Sweden, UK, USA, Canada, Italy, Poland and Mexico. Export of items to a Special Economic Zone is not permitted. The items permitted under OGEL include components of ammunition and fuse setting device without energetic and explosive material, firing control and related

alerting and warning equipment and related system. Besides this, body protective items, complete aircraft or complete unmanned aerial vehicles (UAVs) and any components specially designed or modified for UAVs are excluded under this license. The Department of Defence Production (DPP), on a case-to-case basis, may consider the application for grant of OGEL. The transfer of technology to the countries is subject to the condition that the export is an intra-company transfer from an Indian subsidiary (applicant exporter) to its foreign parent company and/or to subsidiaries of the foreign parent company. The OGEL is a one-time export license to be granted to a company for a specific period (two years initially). In order to acquire the licenses, the applicant is mandatory to have an import-export certificate. The quarterly and end of the year reports on all the transactions done under OGELs should be submitted to DPP for examination and post-export verification.

Defence Research and Development Organisation (DRDO) has developed products/systems, like radars, electronic warfare systems, missiles, naval systems, etc. that can be exported to the friendly foreign countries⁷.

5 SIPRI Arms Transfer Database

6 SIPRI Arms Transfer Database

7 <https://pib.gov.in/newsite/PrintRelease.aspx?relid=112871>

Therefore, to enhance India's defence exports, DRDO has released a list of products developed with an export variant.

DRDO's list of exportable products ⁸					
S No.	Product	Description	Lab involved	Technology cluster	Update on export
1	Face mask	A universal type face mask is developed to give protection against the accidental mine blasts which may cause soldiers loss of their vision and face injuries.	Defence Materials and Stores Research and Development Establishment (DMSRDE)	Naval Systems and Materials (NS&M)	
2	Crevasse crossing bridge (CCB)	The crevasse crossing bridge is fabricated using light-weight high strength weldable and self-ageing aluminum alloy for crossing crevasses in snow bound areas. It enhances the mobility of troops, arms ammunition and supplies in these regions. Detachable railing is provided for the safety. The bridge is designed to bear a load up to 550 kg, i.e., snow scooter and pay load, besides the load of the limited uncleared fresh snow. The bridge is launched across the crevasse manually, with the help of a nose launching assembly.	Research and Development Establishment (Engrs.)	Armament and Combat Engineering Systems (ACE)	
3	Controlled Aerial Delivery System (CADS)	CADS delivers the attached payload within a CEP of 100 m utilizing gliding and manoeuvring capability of a high-performance RAM Air Parachute. The system operates under complete autonomous mode with manual override capability during its entire flight regime. The system could be dropped from an altitude of 7600 m (max) (AMSL) and can travel up to 30 km. CADS technology for 500 kg payload has already developed and demonstrated successfully for induction.	Aerial Delivery Research and Development Establishment (ADRDE)	Aeronautical Systems (Aero)	
4	Combat Free Fall System (CFF)	A CFF parachute system provides solution to paratroopers for jumping from height as high as 30,000 ft. It can glide up to a range of 30 kms and can land at the desired target. The system can be used in High Altitude High Opening (HAHO) as well as in High Altitude Low Opening (HALO) modes. A CFF parachute system has been inducted into services.	Aerial Delivery Research and Development Establishment (ADRDE), and Defence Bio-Engineering and Electro Medical Laboratory (DEBEL)	Aeronautical Systems (Aero) and Life Sciences (LS)	

⁸ https://www.drdo.gov.in/export-products?title=&sort_by=title&page=1

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
5	CBRN Mini UGV	<p>A CBRN (Chemical, Biological, Radiological and Nuclear) Mini unmanned ground vehicle (UGV) is used for detection and sample collection as well as marking of CBRN contaminated zones without the risk of exposing the personnel. UGV, being unmanned/tele-operated vehicles, have an edge over conventional manned nuclear, biological, chemical (NBC) recce vehicles, specifically, in the safety of armed forces personnel.</p> <p>Export potential: the UGV platform can be configured for a variety of roles, CBRN being one of them. They are, thus, expected to have a wide demand worldwide. Export potential to be explored.</p>	Vehicle Research Development Establishment (VRDE)	Armament and Combat Engineering Systems (ACE)	
6	CAP Glacier	CAP Glacier is developed to protect head, ears, cheeks and neck from cold in glacier region.	Defence Materials and Stores Research and Development Establishment (DMSRDE)	Naval Systems and Materials (NS&M)	
7	Bridge Layer Tank (BLT) Arjun	<p>BLT Arjun is a fast and reliable bridge laying system built on the Main Battle Tank Arjun. It is capable of launching a 24 m bridge within 10 minutes on any wet and dry obstacle, facilitating speedy induction of vehicles.</p> <p>The launching mechanism is supported by state-of-the-art hydraulic system for launching and retrieving the operations. It has a separate auxiliary engine provided for contingencies.</p>	-	-	
8	Bridge Layer Tank (BLT - T-72)	BLT-72 is a variant of T-72 M1 tank integrated with long Military Load Classification 70 bridge, that tracked and wheeled vehicles in Indian Army can use to cross any canal/stream/river. Heavy Vehicles Factory in Avadi is the production agency.	Combat Vehicles Research and Development Establishment (CVRDE)	Armament and Combat Engineering Systems (ACE)	

DRDO's list of exportable products⁹

S No.	Product	Description	Lab involved	Technology cluster	Update on export
9	Brake parachute	Brake parachutes have been designed to provide adequate deceleration to fighter aircrafts of different weight classes and to stop them within a specified landing speed in both normal and emergency conditions. Well-proven and inducted single canopy brake parachute can stop the aircraft, having landing weight varying from 9 ton to 20 ton for normal and emergency landing speeds. Very stable twin canopies brake parachutes had also been designed and inducted for fighter aircraft landing weight varying from 20 ton to 40 ton for normal and emergency landing speeds. All the fighter aircrafts of the Indian Air Force operating within the country are equipped with the indigenously designed and developed brake parachute.	Aerial Delivery Research and Development Establishment (ADRDE)	Aeronautical Systems (Aero)	
10	BrahMos	BrahMos is a universal long range supersonic cruise missile system that can be launched from land, sea and air. It has been jointly developed by DRDO, India, and NPOM, Russia. The system has been designed with two variants for anti-ship and land-attack roles. As weapon systems, BrahMos has been inducted and is operational with the Indian Navy (IN) as well as the Indian Army (IA).	-	-	Philippines is currently in talks with India to order the BrahMos missile system from India in 2020 as part of the military's modernization program ⁹ .
11	Battle Field Surveillance Radar (BFSR-SR)	BFSR-SR is a lightweight, man-portable battery-powered electronic short range battlefield surveillance radar to provide all-weather surveillance against intrusion. The radar is capable of searching a specified sector and it tracks by scanning for multiple targets. The radar detects, tracks and aids in classifying the moving targets. The entire radar system is carried by two soldiers and is operated on a tripod. The radar is compact and weighs about 27 kg (packed in two modules, each weighing not more than 15 kg) and can be set up within six minutes to match the speed and requirements of the users.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	

⁹ <https://sputniknews.com/military/201912231077746844-exporting-brahmos-to-any-countries-including-philippines-has-in-principal-approval-from-russia/>

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
12	3D Tactical Control Radar (3D TCR)	3D TCR is a stand-alone medium range all-weather surveillance radar for detection and identification of aerial targets, transmission of pertinent data to target data receiver (TDR). The radar is capable of Track While Scan (TWS) of airborne targets, with advanced technologies like digital receiver, programmable signal processor providing high resolution, accuracy, response and information availability.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	
13	Revathi, a 3D Surveillance Radar for Indian Navy	3D Surveillance Radar for Indian Navy is a ship-borne radar having digital receiver, programmable signal processor providing high resolution, accuracy, response and information availability. The radar can auto track up to 150 targets including tracking with identification friend or foe (IFF) (Mk XI) association. There are three antenna rotation rates (ARR) of 6, 12 and 24 RPMs. The radar has electronic counter-countermeasure (ECCM) features.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	
14	Aslesha Mk I, a 3D Low Level Light Weight Radar	3D Low Level Light Weight Radar (LLLWR) is a multi-beam ground based three-dimensional (3D) surveillance radar for its deployment in diverse terrains like plains, deserts, mountain tops and high altitude regions. This radar detects and tracks heterogeneous air targets, including helicopters, fighters and UAVs, at low and medium altitudes. The quadripod-mounted radar is built to operate in networked or stand-alone mode to support joint or independent operations.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	
15	Rohini, a 3 D Medium Range Surveillance Radar for air force	3D Medium Range Surveillance Radar is a ground-based mechanically scanning pulse doppler radar for air space surveillance to detect and track air targets under hostile electronic warfare operational environment, early warning for air defence weapon system, air defence sensor at airbases.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	
16	2D Low Level Light Weight Radar (LLLWR): BHARANI MK I	2D Low Level Light Weight Radar (LLLWR) is a light-weight battery powered compact sensor which provides 2D surveillance in mountainous terrain against hostile aerial targets like UAVs, RPVs, helicopters and fixed wing aircraft flying at low and medium altitudes. It acts as an early warning system o air defence weapon systems employed to provide protection to vulnerable areas or vulnerable points.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
17	Pilotless Target Aircraft, Lakshya	Lakshya is a cost-effective re-usable high subsonic aerial target system powered by a gas turbine engine and is launched either from land or ship. It carries two targets having tow lengths of 1.5 km each having radar, IR or visual signature augmentation and miss distance indication scoring system. These tow targets are used in training land or ship-based gun and missile crews and combat aircraft pilots in weapon engagement. Lakshya was inducted into the Indian Air Force, Indian Navy and Indian Army in 2000, 2001 and 2003, respectively.	Aeronautical Development Establishment (ADE)	Aeronautical Systems (Aero)	
18	P7 Heavy Drop System	P-7 Heavy Drop System (P-7 HDS) is used for para drop of military stores (vehicles/ammunitions/equipment) of weights in 7-ton class. For IL-76 aircrafts, the system consists of a platform and specialized parachute system. A parachute system comprises of a multi-stage system that includes five main canopies, five brake chutes, two auxiliary chutes and one extractor parachute. The platform is a metallic structure made up of aluminum/steel alloys. P-7 HDS has been developed successfully with 100% indigenous resources and has been inducted in the Army.	Aeronautical Development Establishment (ADE)	Aeronautical Systems (Aero)	
19	On-Board Oxygen Generating System (OBOGS)	An On-Board Oxygen Generating System (OBOGS) centric life support system provides an enhanced physiology protection to aircrew of fighter aircrafts. OBOGS replaces liquid oxygen system (LOX) by utilizing bleed air from the aircraft engine and separating its components using a molecular sieve (Zeolite) pressure swing adsorption (PSA) technology. The system consists of two molecular sieve beds with oxygen plenum to provide breathing gas to aircrew continuously.	-	Aeronautical Systems (Aero)	
20	Nishant	Nishant is a multi-mission Unmanned Aerial Vehicle (UAV) launched using a mobile hydro pneumatic launcher with day/night capability used for battlefield surveillance and reconnaissance, target tracking and localization, and artillery fire correction. A sophisticated image processing system is used for analyzing the images transmitted from the UAV.	Aeronautical Development Establishment (ADE)	Aeronautical Systems (Aero)	

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
21	NBC Suit Permeable Mk IV	A new generation suit is based on the state-of-the-art technology that has three times more adsorption capacity than the Mk I version.	-	-	
22	Multispan Mobile Bridging System (Sarvatra)	Sarvatra, offers versatile bridging solutions for all types of military traffic for negotiating wet and dry obstacles of up to 75m span in steps of 15m within 100 minutes. It can be used as an emergency bridge during natural calamities like floods and earthquakes.	Research and Development Establishment (Engrs.)	Armament and Combat Engineering Systems (ACE)	
23	Multi-Purpose Reflex Weapon Sight (MRWS)		Instruments Research and Development Establishment (IRDE)	Electronics and Communication Systems (ECS)	
24	Multi-Purpose Decontamination System	Equipment developed by VRDE for decontamination of vehicles, equipment, personnel and terrain against B and C warfare agents.	Vehicle Research Development Establishment (VRDE)	Armament and Combat Engineering Systems (ACE)	
25	Local Selection System - Computerized Pilot Selection System (CPSS)	A state-of-the-art embedded micro controller based CPSS with built-in security features has been indigenously designed and developed by ADE against the sanctioned project of the IAF. The system is used to evaluate the candidates' psychomotor skills information processing skills (speed and accuracy), coordination, visualization and time-sharing skills along with cognitive information processing skills by subjecting large number of candidates simultaneously to perform concurrent multiple tasks. The system consists of 20 psychomotor systems and 100 cognitive systems, each of them have been delivered and inducted to the three air force selection boards at Mysore, Varanasi and Dehradun.	Defence Institute of Psychological Research (DIPR)/ Aeronautical Development Establishment (ADE)	Aeronautical Systems (Aero) and Life Sciences (LS)	
26	Radome, an inflatable structure ()	Inflatable structure has been designed and developed indigenously by ADRDE with an objective of serving it as a shelter to provide controlled environment for effective and continuous functioning of expensive electronic and strategic systems. The inflatable structure consists of hemispherical envelope of 80 feet base diameter, airlock tunnel, air blowers, air conditioners, electrical control system and emergency power backup system.	Aerial Delivery Research and Development Establishment (ADRDE)	Aeronautical Systems (Aero)	

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
27	Impressed Current Cathodic Protection (ICCP) System	An ICCP system is used for the protection of ship's hull from corrosion in seawater. NMRL has developed a specialty advanced ICCP system to effectively monitor and suppress the corrosion attack on steel hull.	-	-	
28	Holographic sights		Instruments Research and Development Establishment (IRDE)	Electronics and Communication Systems (ECS)	
29	HMS-X2: Compact Hull Mounted Sonar for Small Surface Vessels	Compact Hull Mounted Sonar System for Ships (HMS-X2) is a compact integrated active-cum-passive sonar system, specifically targeted for installation on small platforms such as anti-submarine warfare (AWS) corvettes, shallow water crafts and patrol vessels. It employs advanced adaptive signal and information processing techniques for detection, tracking and classification of targets.	Naval Systems and Materials (NS&M)		
30	Heavy Drop System 16T	Heavy Drop System (HDS-16T) has a capacity of 16 tons. It consists of a platform and highly-advanced system of parachutes. A parachute system is used to drop loads consisting of military stores, such as vehicles (including BMP class) and ammunition supplies from IL-76 aircraft.	Aerial Delivery Research and Development Establishment (ADRDE)	Aeronautical Systems (Aero)	
31	High Altitude Pulmonary Oedema (HAPO) chamber	One man HAPO chamber is a life-saving device that provides emergency treatment to HAPO victims by enhancing the partial pressure of the breathing air inside the chamber. Three-hundred chambers have been inducted into the army and induction of 642 is under process.	Defence Bio-Engineering and Electro Medical Laboratory (DEBEL)	Life Sciences (LS)	
32	Flight simulators	Avionics Part Task Trainer (APTT) for upgraded MIG-27, Computerized Pilot Selection System (CPSS), Pilot mental workload assessment Simulator	-	-	

DRDO's list of exportable products⁸

S No.	Product	Description	Lab involved	Technology cluster	Update on export
33	Weapon Locating Radar (WLR)	The radar uses advanced signal processing techniques for detection and tracking projectiles in the presence of ground, weather clutter and other forms of interference in electronic warfare (EW) scenario. Algorithms for trajectory computation take environmental parameters into consideration while estimating both launch and impact points for desired accuracy. WLR is designed for high mobility, quick deployment and decamp.	Electronics and Radar Development Establishment (LRDE)	Electronics and Communication Systems (ECS)	
34	Torpedo Advanced Light (TAL)	Torpedo Advanced Light (TAL) is an electrically propelled self-homing torpedo and can be launched from ship and rotary wing aircraft. It has both active and passive modes of operations, and all digital control and guidance systems. TAL is an anti-submarine weapon, which can attack submarines in shallow as well as deep waters.	Naval Science and Technological Laboratory (NSTL)	Naval Systems and Materials (NS&M)	An export deal worth US\$37.9 million which was signed in 2017 between India and Myanmar ¹⁰ .
35	Submarine Escape Set	Submarine Escape Set protects the wearer from hypothermia and reptile bites. The suit is made out of Neoprene coated nylon fabric. The breathing apparatus prevents decompression sickness, nitrogen narcosis and oxygen toxicity related to underwater breathing up to 100m.	-	Life Sciences (LS)	
36	Short Span Bridge 10m	It is a mechanically launched short span bridging system of MLC-70 load class to meet the smaller gaps and canals up to 10m length.	Research and Development Establishment (Engrs.)	Armament and Combat Engineering Systems (ACE)	
37	Pinaka Ammunition Support Vehicles	Loader-cum-Replenishment Vehicles (LCRs) and replenishment vehicles (RVs) are designed as Logistics Support Vehicles for Pinaka Multi Barrel Rocket System (MBRS). Currently in service with Indian Army.	Vehicle Research Development Establishment (VRDE)	Armament and Combat Engineering Systems (ACE)	

10 <https://swarajyamag.com/insta/defence-make-in-india-first-batch-of-lightweight-anti-submarine-shyena-torpedoes-sent-to-myanmar>

Amongst the nine defence Public Sector Undertakings (DPSUs), four export their products. These are Bharat Earth Movers Limited (BEML), Hindustan Aeronautics Limited (HAL), Bharat Electronics Limited (BEL) and Mishra Dhatu Nigam Limited (MIDHANI). Their value of exports for the year 2018-2019 are as under:

1. **BEML Limited (BEML):** INR19.2 crore¹¹
2. **Hindustan Aeronautics Limited (HAL):** INR405 crore¹²
3. **Bharat Electronics Limited (BEL):** INR138.19 crore¹³
4. **Mishra Dhatu Nigam Limited (MIDHANI):** INR8.05 crore¹⁴

India has begun exporting bulletproof jackets as per its own standards, which conform to international norms to over 100 countries, including European nations, according to the Bureau of Indian Standards (BIS). India

is the fourth country after the US, the UK and Germany to have its own national standard on bulletproof jackets to provide a 360-degree protection. Two PSUs, namely, Midhani and Ordnance Factory at Avadi, Chennai, and private firms from Palwal and Faridabad in Haryana and another from Kanpur in Uttar Pradesh are manufacturing bulletproof jackets as per the BIS norms. They have already supplied about 1.86 lakh jackets to defence forces and the tendering process for further supply is underway¹⁵.

Ordnance Factory Board (OFB) and the UAE signed a contract worth INR315 crore (US\$45.75 million) in 2019, adding to an earlier order for 40,000 shells that were finalized in 2017¹⁶. In particular, the OFB will supply 50,000 155 mm HE ERFB BT shell and Primer M19I-A2 to the UAE¹⁷.

11 https://www.bemlindia.in/writereaddata/Downloads/201909161805Annual_Report_2018-19.pdf

12 <https://hal-india.co.in/Common/Uploads/Finance/Annual%20Report%202018-19.pdf>

13 <http://www.bel-india.in/Documentviews.aspx?fileName=Annual-Report-2018-19.pdf>

14 <http://midhani-india.in/WordPress-content/uploads/2018/11/Annual%20Report%202018-19.pdf>

15 <http://www.indiandefensenews.in/2019/09/india-exporting-bulletproof-jackets-of.html>

16 <http://www.indiandefensenews.in/2019/08/in-its-largest-ever-export-order-ofb-to.html>

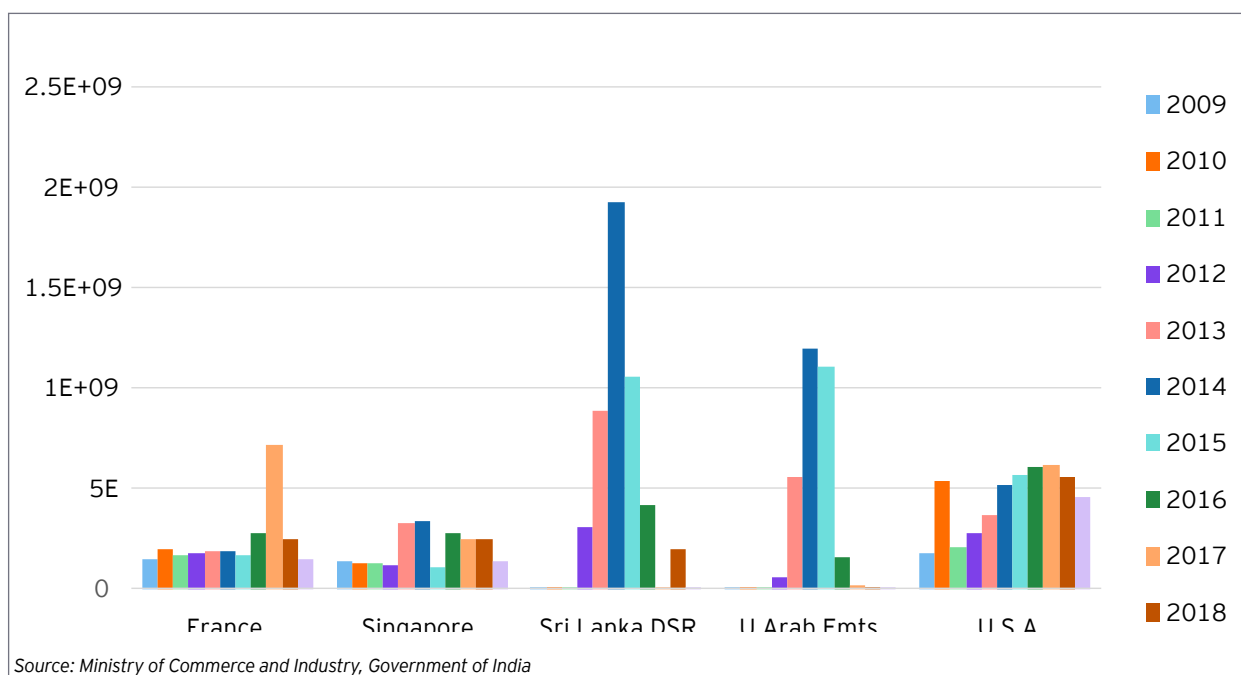
17 <http://www.indiandefensenews.in/2019/08/in-its-largest-ever-export-order-ofb-to.html>



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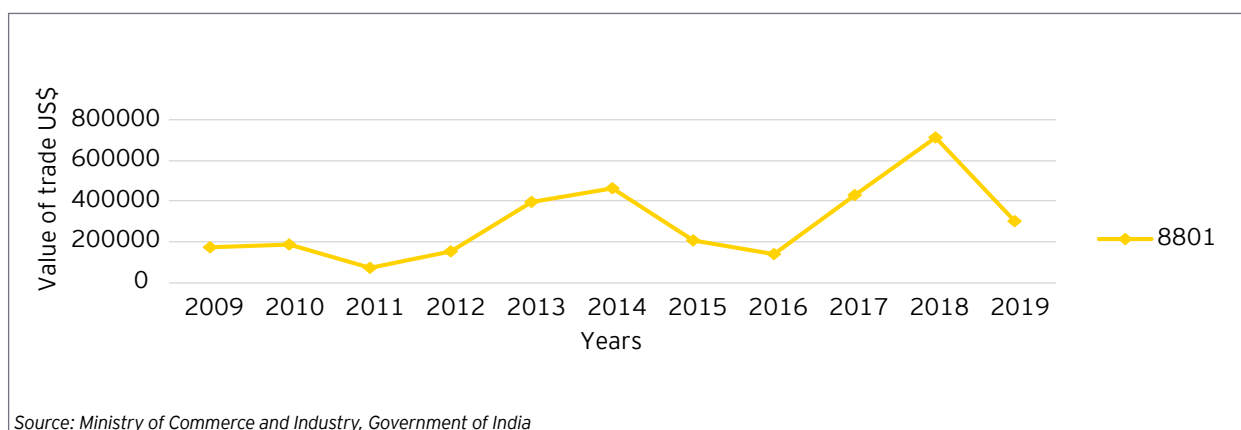
Analysis of exports

Graph 1 Top 5 geographies where India exported in 2009 - 2018 under Chapter 88 (including 8801, 8802, 8803, 8804 and 8805) of ITC HS codes



Four-digit harmonized system code wise 10-year analysis of growth of exports is depicted in graphs 2-9 as under:

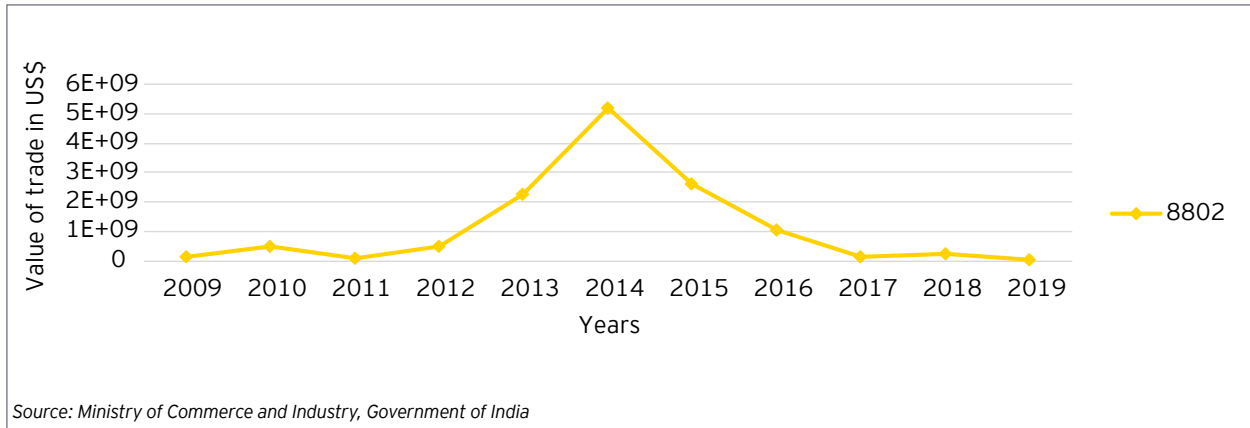
Graph 2 8801: Export data for balloons and dirigibles, gliders, hand gliders and other non-powered aircraft



Balloons and dirigibles, gliders, hand gliders and other non-powered aircrafts have seen regular ups and downs in the last decade. There has been a greater number of climbs than slips in the period of study. The trend looks encouraging for a robust growth in the future. The year 2018 showed exponential growth.

The 2019 figures are till September only.

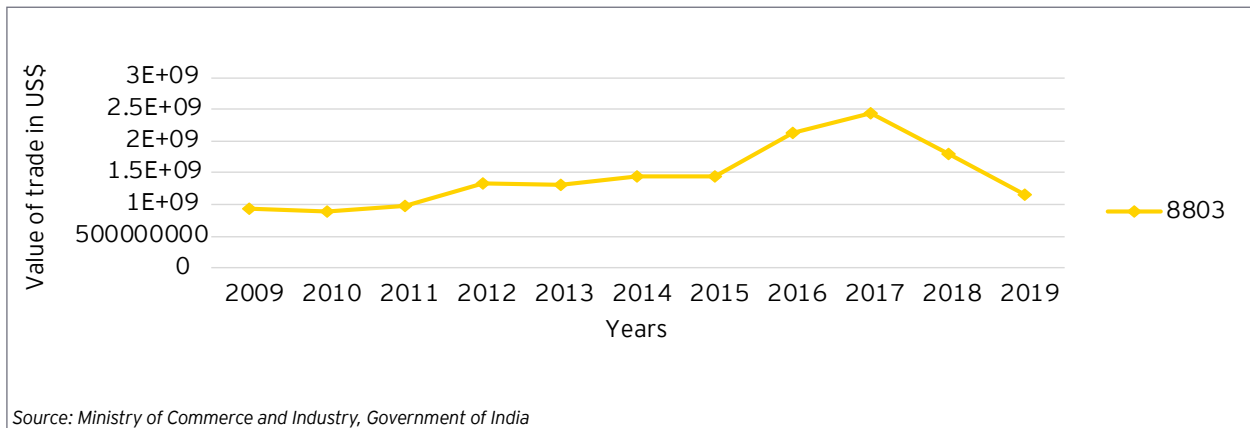
Graph3 8802: Export data for helicopters, aero planes, spacecrafts, satellites and spacecraft launch vehicles.



With regular ascend seen from 2011 and trade values reaching their peak in 2014, there has been a regular descend in the year-on-year exports of helicopters, aero planes, spacecrafts, satellites and spacecraft launch vehicles under this HS code.

The 2019 figures are till September only.

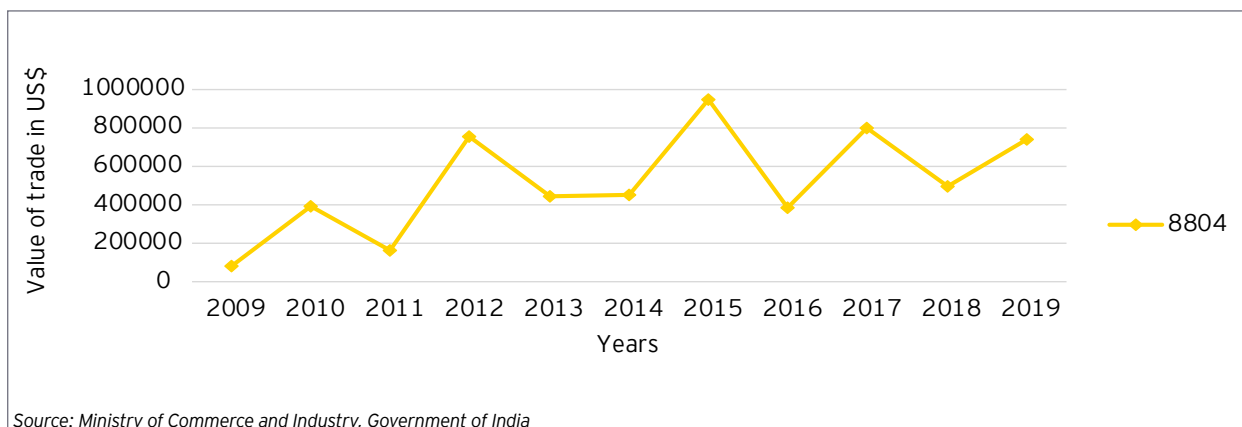
Graph 4 8803: Export data for parts of goods of codes 8801 or 8802



8803: Parts and spares of goods of heading of codes 8801 or 8802

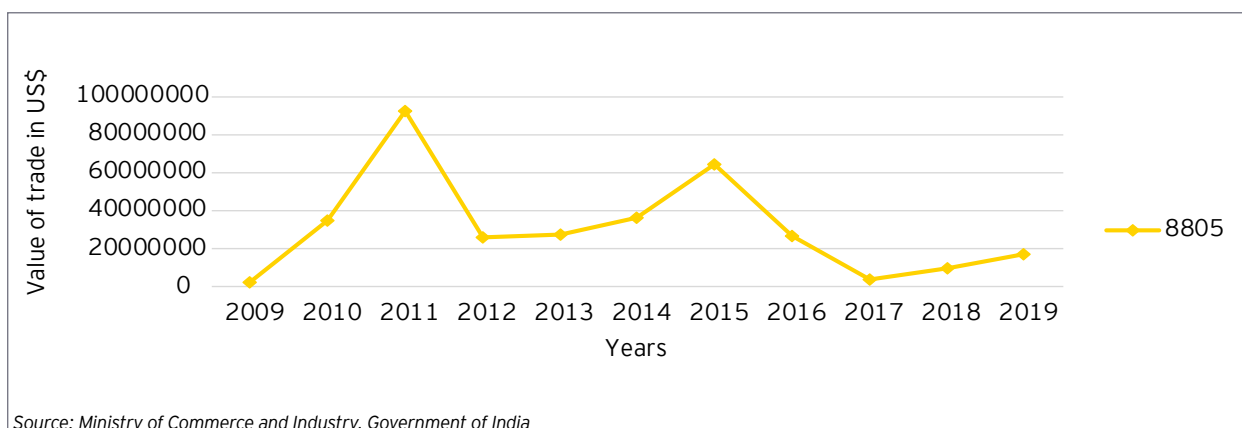
During 2009 to 2019, the values of trade have seen a slow growth. However, since 2017, there has been a decline in the overall trade.

The 2019 figures are till September.

Graph 5 8804: Export data for parachutes, paragliders, roto chutes, parts and accessories

Parachutes (including dirigible parachutes and paragliders) and roto chutes and parts, thereof, and accessories have a very inconsistent year-on-year trade but the overall value has grown during the analysis period.

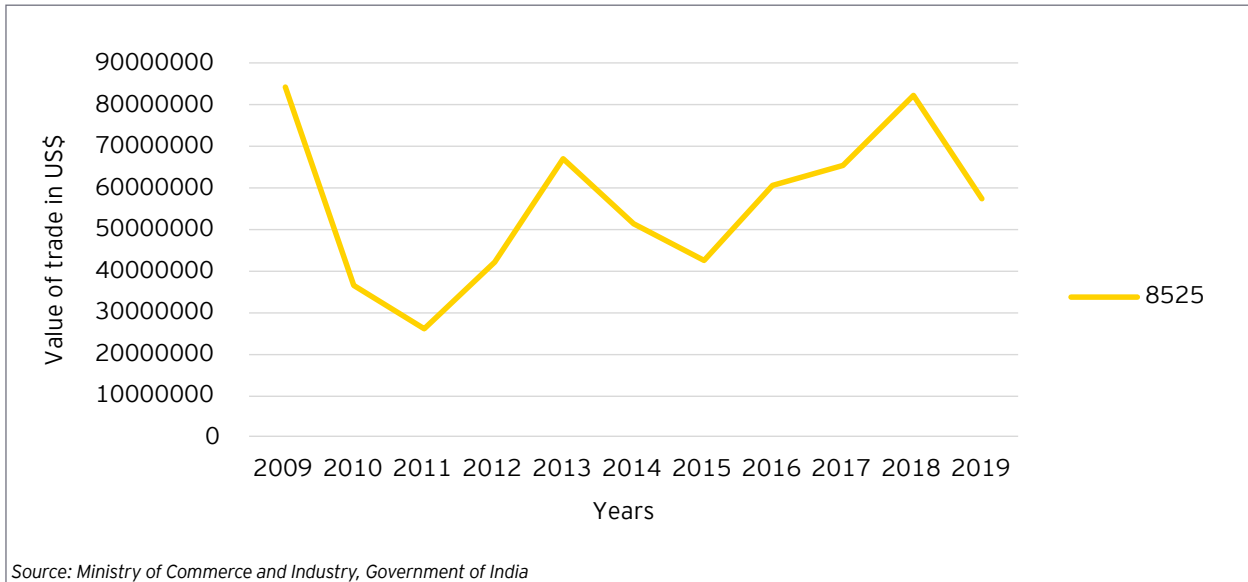
The 2019 figures are till September.

Graph 6 8805: Export data for aircraft launching gear, deck-arrestor or similar gear and parts of the foregoing articles

Aircraft launching gear, deck-arrestor or similar gear and parts of the foregoing articles have seen a decade of business instability but from 2017, their trade values have risen.

The 2019 figures are till the month of September.

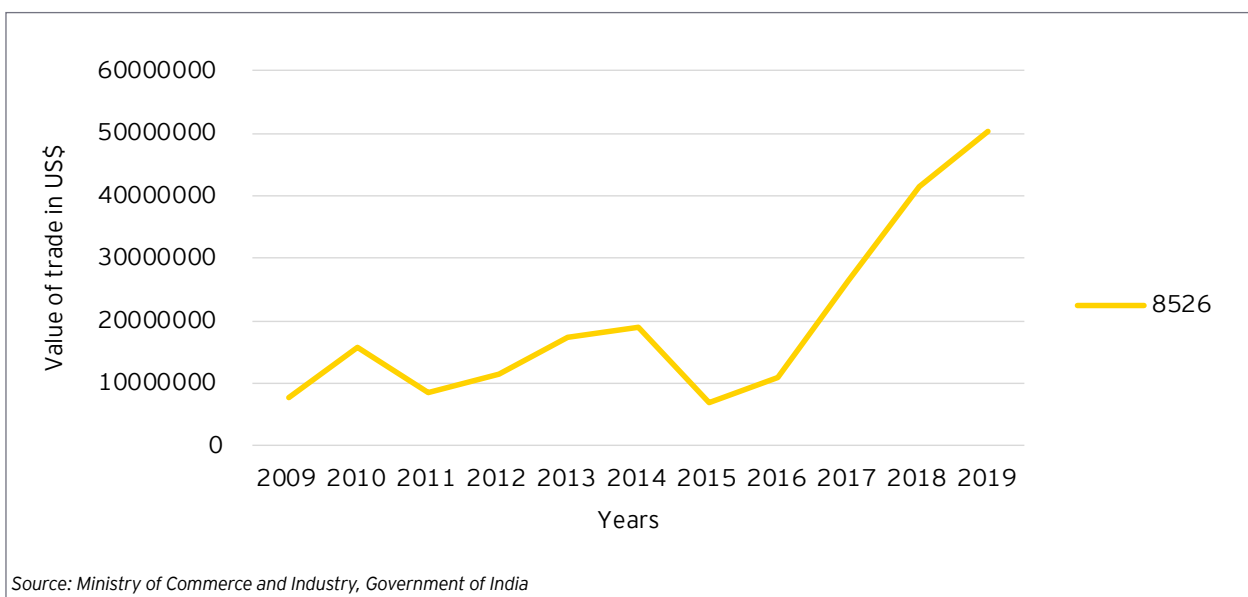
Graph 7 8525: Export data for transmission apparatus for radiotelephony, radiotelegraph, radiobroadcasting or television, whether or not incorporating reception apparatus or sound recording or reproducing apparatus, television cameras, cameras and other video cameras



Transmission apparatus for radiotelephony, radiotelegraph, radiobroadcasting or television, whether or not incorporating reception apparatus or sound recording or reproducing apparatus, television cameras, still image video cameras and other video cameras during the 2015-2018 have been the promising years for this sector.

The 2019 figures are till September only.

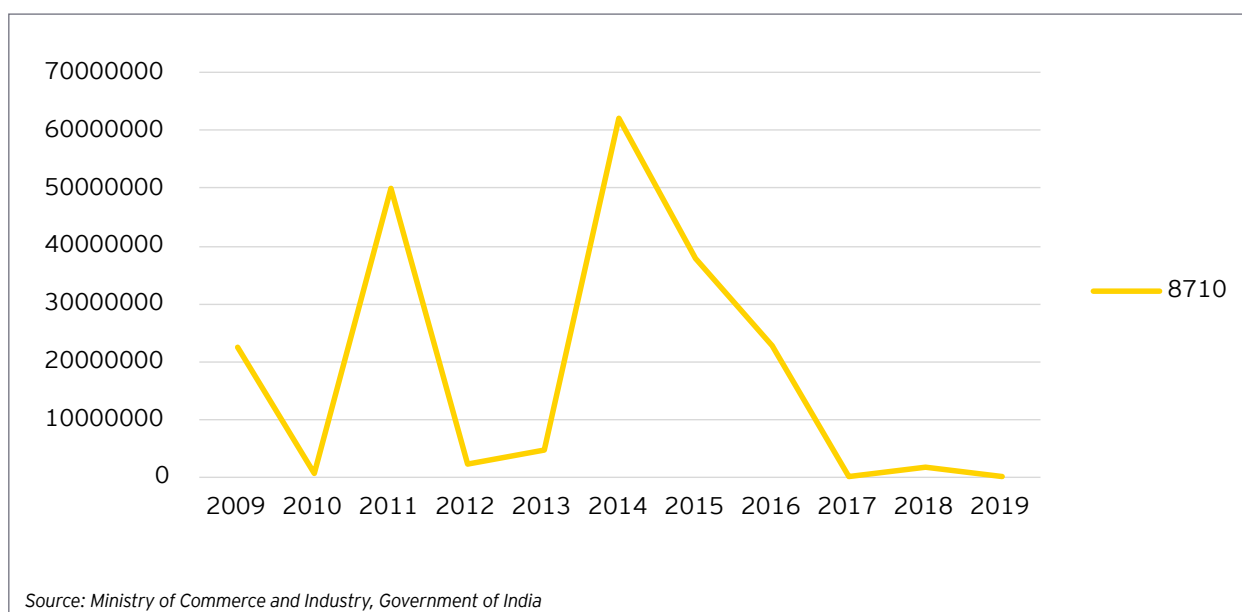
Graph 8 8526: Export data for radar apparatus, radio navigational aid apparatus and radio remote control apparatus



Radar apparatus, radio navigational aid apparatus and radio remote control apparatus sector have been among the lowest trade values in the analyzed HS codes. Since 2015, there has been a rapid increase in the value of exports.

The 2019 figures are till the month of September only.

Graph 9 8710: Export data for tanks and other armored fighting vehicles



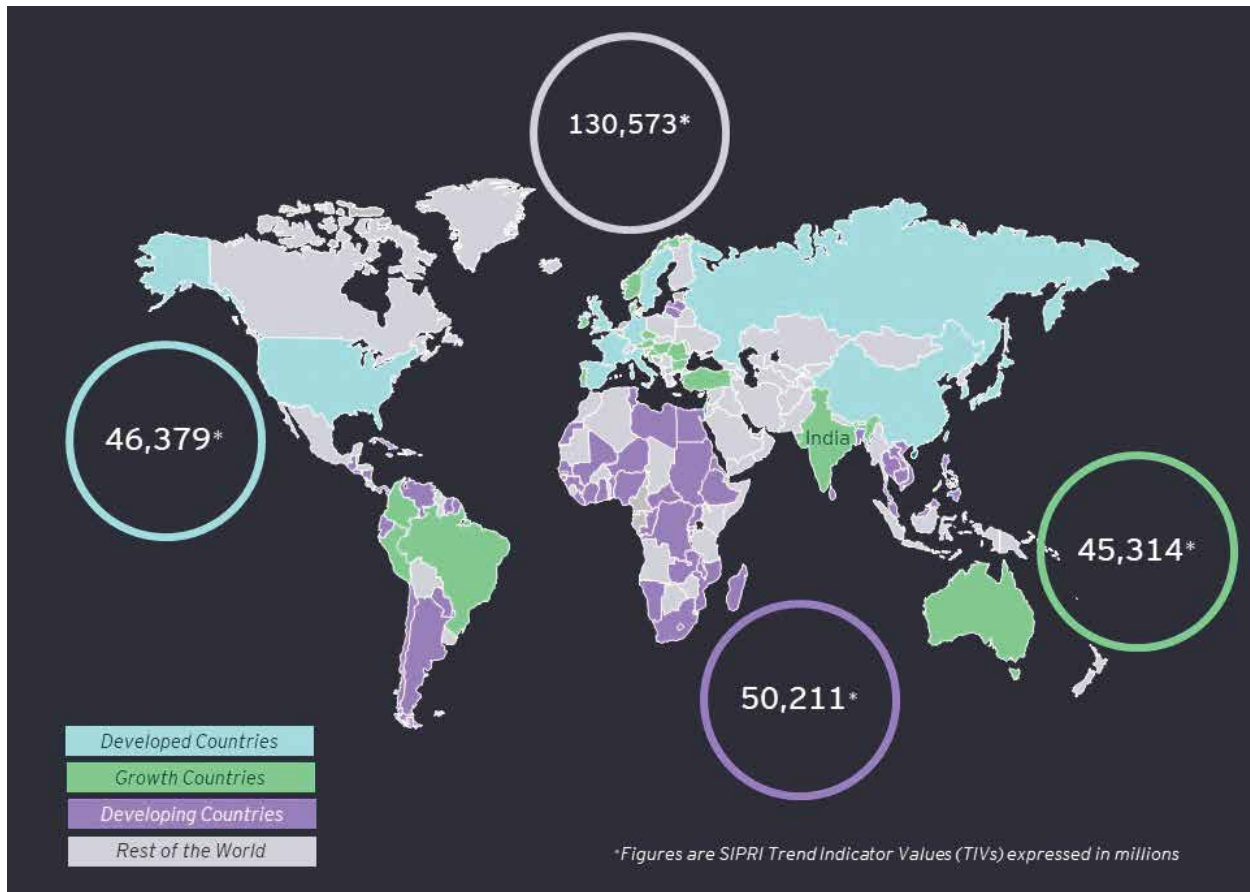
Tanks and other armored fighting vehicles have seen regular ups and downs from 2009, with 2014 witnessing a peak in the exports. Since 2014, there has been a regular decline in the value of trade under this HS code.

The 2019 figures are till September.

5



Target market for India



Source: SIPRI Arms Transfer Database

India has a potential to export defence products to 192 countries. There is a need to segment this market on the basis of capabilities and requirements of these nations. One way to segment the market is on the basis of defence industry's maturity in each of these countries. This will enable us to strategize the kind of market that can be targeted in each segment.

The market segments are:

1. Developed countries (Market Type A)
2. Growth countries (Market Type B)
3. Developing countries (Market Type C)
4. Rest of the world (Market Type D)

If we take a closer look at the defence import trends of these four groups, we gather that while the largest market share is from the rest of the world group, the highest market potential lies in the developing countries, followed by developed and growth countries. This is explained in the subsequent sections

Defence imports in global market

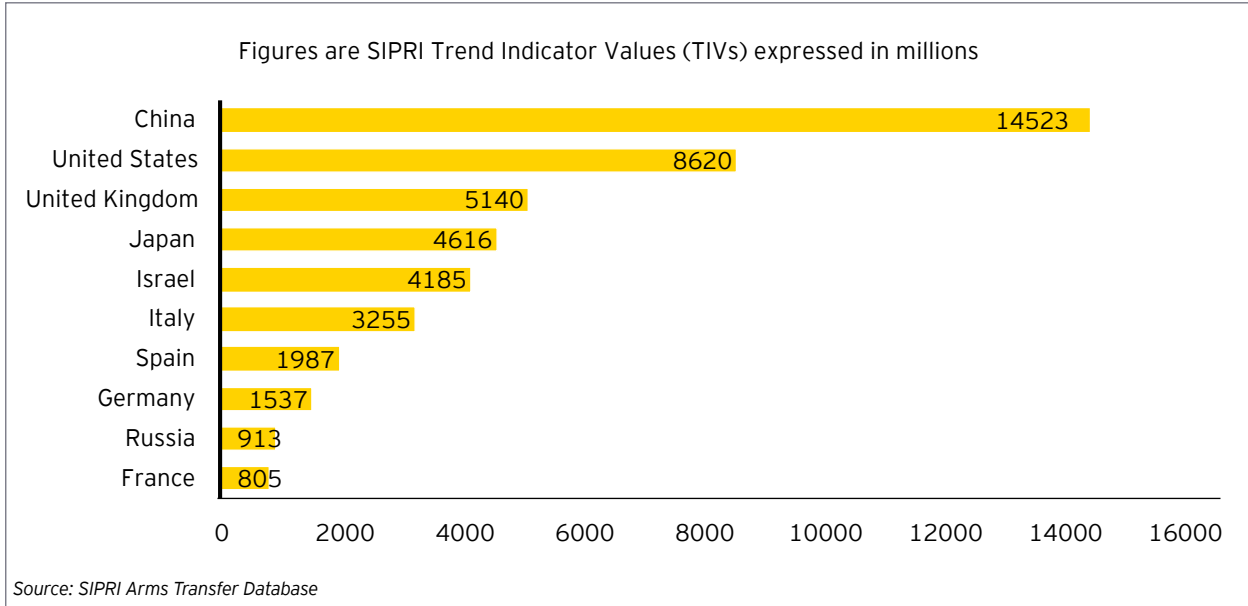
Market Type A: developed countries

These countries are traditionally the most advanced defence equipment manufacturing nations. This group comprises of countries viz. the US, the UK, Russia, Israel, Italy, Spain, Germany, France, Japan and China

These countries do not require technological or major systems' manufacturing support, rather to reduce their burden of rudimentary manufacturing processes, they outsource the Tier2/3/4 workshare to other geographies.

These countries are also major defence exporters and, therefore, have their global supply chain to address basic manufacturing process and take advantage of low-cost solutions.

Graph 1 Defence imports of top 10 developed countries (2008-2018)



How can India capture the target markets?

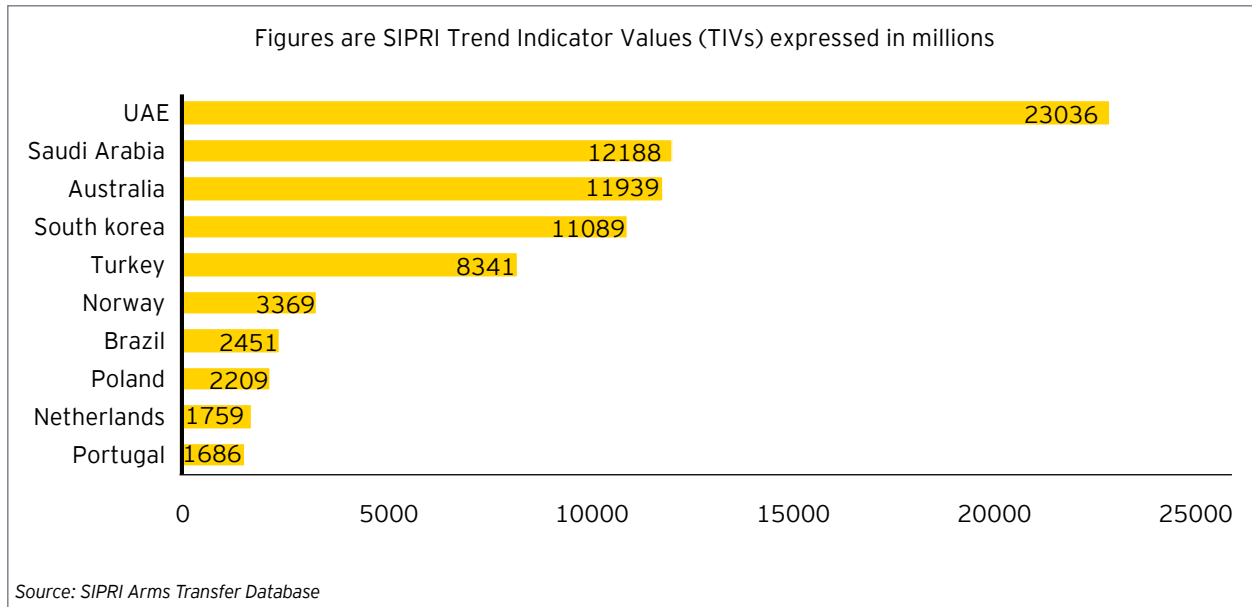
By working with major Original Equipment Manufacturers (OEMs) present in these countries such as the US, Israel and France, India has exported products and services through the defence offsets option. Although, defence offsets is a push mechanism, creating regulatory conditions for these countries/OEMs to source from India, our progressive improvement on cost, time and quality has led to Indian suppliers getting absorbed into the global supply chains of major OEMs belonging to these geographies. Increased efforts on this front may lead to further penetration of the Indian supply into the major systems of these OEMs. It has been observed that most of the top 100 aerospace and defence (A&D) companies belong to this group, highlighting the potential of supplying to them at a product/sub-system level.

Market type B: growth countries

The countries grouped under this segment are those which have shown a strong growth in their defence industry over the past two decades. This group includes UAE, Saudi Arabia, Australia, South Korea, Turkey, Norway, Brazil, Poland, Netherlands and Portugal.

These countries are on a similar trajectory as India, wherein they have relied on foreign equipment during the major part of the 20th century. Lately, they have relooked at their defence sector and made self-reliance and indigenous manufacturing a key part of their growth strategy.

In over the last 30 years, this group continues to take support from the 'developed countries' for specific technology/ equipment/ systems while endeavoring to carve out their own niche products for their domestic use as well as global consumption.

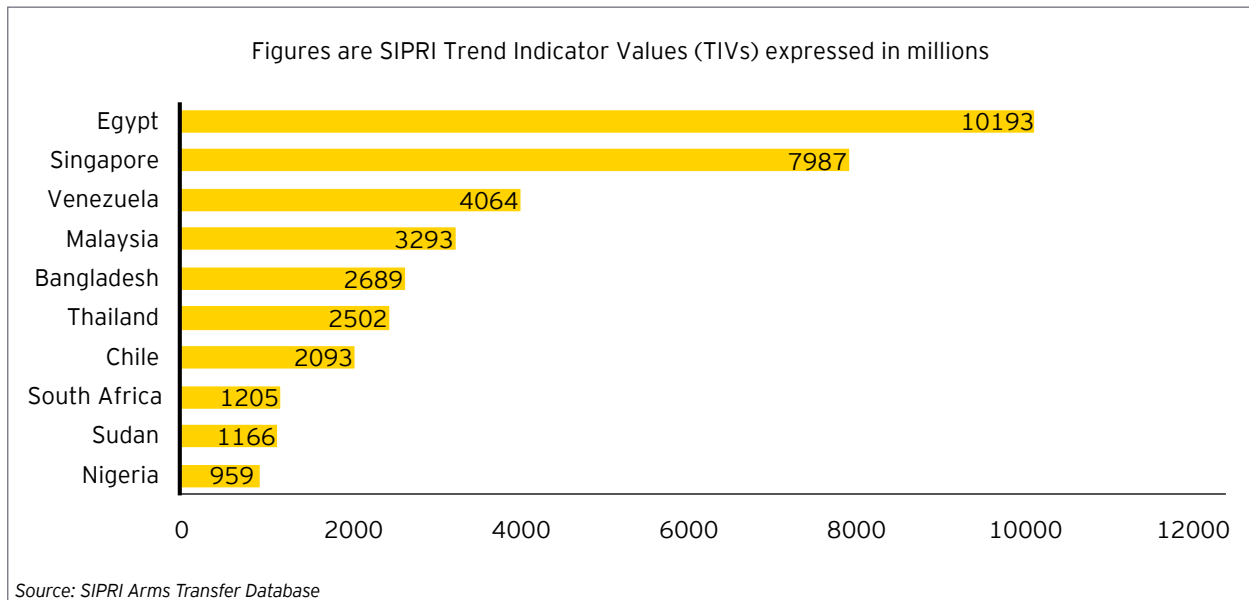
Graph 2 Defence imports of top 10 growth countries (2008-2018)**How can India capture the target market?**

This group has employed foreign equipment for a major period of 20th century. This is why they have in active use equipment that is beyond 25 years of service life. Such equipment requires constant support from their spare parts and their timely upgradation to bridge the gap between the technology. For platforms that are beyond 25-30 years into service, it has been observed that their Tier2/3/4 supply chain starts drying up and the support gets restricted to the OEM level in form of maintenance repair and overhaul (MRO) activities.

India has been challenging similar issues for our vintage platforms/systems for quite some time. Gradually, through our indigenization cells and support from DRDO, India has found ways to extend the life of these platforms/systems

Market Type C: developing countries

These are economically-struggling countries that focus on providing basic social amenities for their citizens. They utilize internal resources on education, health, social systems and development of infrastructure. They do not intend to focus on the development of defence equipment and technology and most of their defence demand is met through imports. This group comprises of countries from Africa, South East Asia and Latin America. This group has also a unique terrain and climactic conditions which defines their requirement in defence equipment.

Graph 3 Defence imports of top 10 developing countries (2008-2018)**How can India capture the target market?**

These countries are not in the need of the high technology or game-changing defence equipment; rather they look for systems/equipment that are classified as medium-to-high technology and more importantly, are fairly priced. Such countries are potential market for the indigenous systems that India has developed through its defence public sectors units. India's diverse geographical conditions in deserts, coastal line, mountain ranges and semi-arid regions, have allowed us to be mindful of specific equipment that cater to these unique conditions. Our existing indigenous platforms/systems may find great potential for such regions as they have been developed keeping such environmental conditions in mind.

Some of the indigenous equipment that is likely to have significant export are:

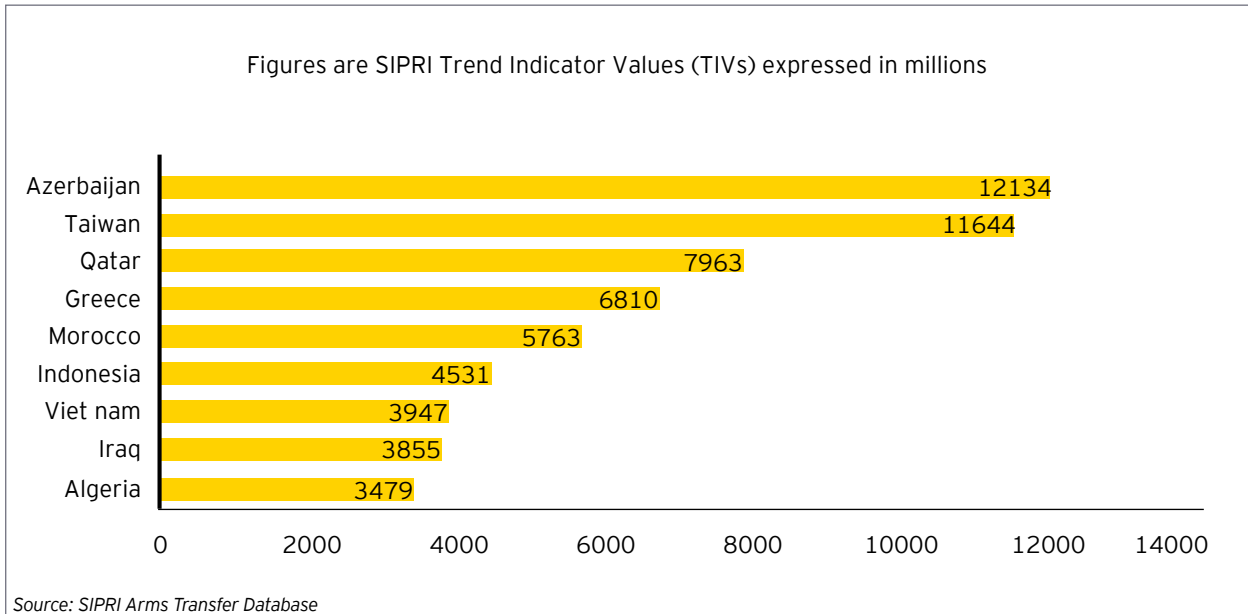
- ▶ BrahMos Missile System
- ▶ Pinaka Multi-Barrel Rocket Launch Systems
- ▶ Akash Air Defence Systems
- ▶ Tejas Fighter Aircraft
- ▶ Helicopters (Dhruv and Rudra)
- ▶ ASW corvettes
- ▶ Advanced OPVs

- ▶ Patrol boats, Interceptor boats
- ▶ Torpedoes, Sonars, Buoys
- ▶ Radars
- ▶ Artillery guns
- ▶ Anti-tank missiles
- ▶ Mine Protected Vehicles

Market Type D: Rest of the world

There is no definite classification of this group apart from it being the collection of the left-over countries from the other three groups. This group comprises of Azerbaijan, Taiwan, Qatar, Greece, Morocco, Indonesia, Vietnam, Iraq and Algeria.

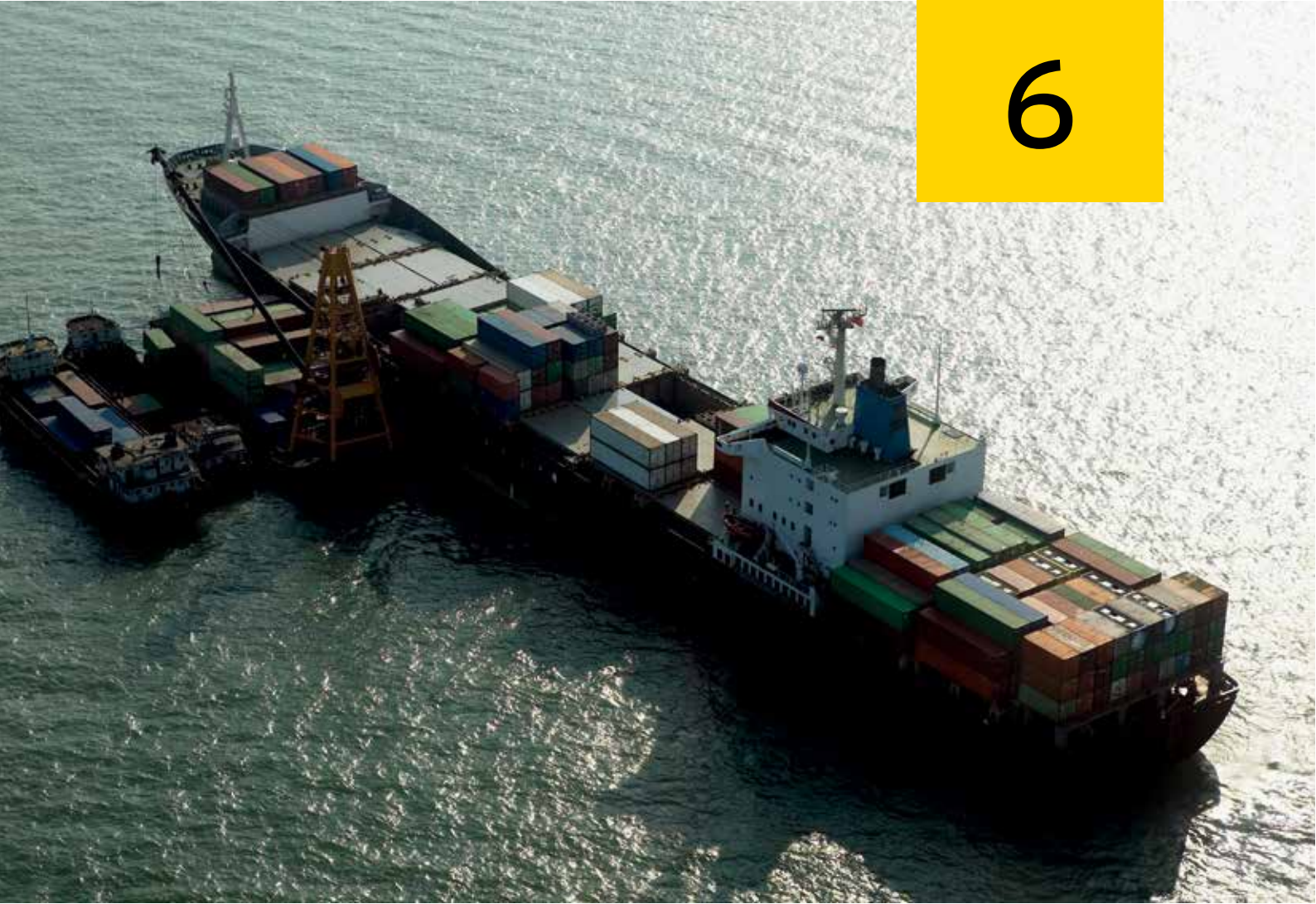
The defence needs of this group are erratic, limited in quantity and extremely diverse. The type of equipment desired is not around major platforms but smaller tactical systems to ensure stronger surveillance and need-based protection systems. Another key observation is that the homeland security market in such countries is more potent than their defence market.

Graph 4 Defence imports of top 10 countries from rest of the world (2008-2018)**How can India capture the target market?**

By supplying smaller equipment or dual-use items, India has the potential to capture the defence market share of this group. Supplies can consist of small-arms, bullet-proof jackets, surveillance equipment, special paints/lubricants and technical textiles/composites/fiber-related equipment.

Accessing this market is a struggle compared to other groups not in terms of meeting the demand, but due to the high effort-to-result ratio. Being a diverse group with unique requirements, there is a need to put dedicated efforts on each country to understand their market projections. Only after such efforts, there is a likeliness for large number of countries to produce desired results.

6



Identification of enablers

This section discusses possible enablers for the Indian industry to enhance its exports.

6.1 Society of Indian Defence Manufacturers (SIDM)

SIDM, a not-for-profit association formed to be the exclusive apex body of the Indian defence industry, plays a proactive role as an advocate, catalyst, and facilitator for the growth and capability building of the defence industry in India. Formed in Aug 2017, the society has not only been involved in the Pre-Induction training sessions of our Defence Attaches (DAs) which include seminars with Indian Defence industry, but also receive and disseminate export opportunities in foreign countries in the defence sector. SIDM members encompass the entire spectrum of the Indian defence Industry.

6.2 Indigenous Defence Equipment Exporters Association (IDEEA)

Indigenous Defence Equipment Exporters Association (IDEEA) was launched at the fourth edition of Defence Attaches' Conclave in October 2019. The aim of this association is to make India one of the top three exporters of defence equipment. IDEEA shall act as the interface between global defence markets and Indian defence industry with specific focus on Micro Small and Medium Enterprises (MSMEs). Founding members of IDEEA are L&T Defence, Zen Technologies, SMPP, MKU, Defence Applied Services, Delta Wallace, Defence Protection System and BharatForge¹⁸.

6.3 Line of credit

Line of credit (LOC) is a loan on concessional interest rates provided to developing countries which is repaid by the borrowing government. LOC helps promote a nation's export of goods and services. India has granted LOC to several nations as across varied sectors, such as, agriculture, infrastructure, telecom,

railway, transmission/power, renewable energy, etc. Under India's LOC, 75% of the value of the contract has to be sourced from India¹⁹.

In December 2015, the Government of India approved the new Indian Development Assistance Scheme (IDEAS) to provide better terms of credit to developing countries since they sought alternative ways to finance themselves. The operational guidelines of this scheme include carrying out a feasibility study, creating a detailed project report (DPR), strengthening of monitoring system, pre-qualification of competent companies and requirement of regular reports by the borrowing governments. To ensure timely and proper implementation of these projects, borrowing governments, project management consultants (PMCs), implementing agency and Indian missions abroad conduct regular monitoring.

In the past, private companies and public sector organizations such as RITES, IRCON, WAPCOS²⁰, etc. have been awarded projects under LOC. As part of the process, borrowing government select PMCs/contractors through an open competitive bidding process, as per the procurement laws of the borrowing country and prescribed LOC guidelines of Government of India. Only Indian companies/firms can bid for executing the LOC projects.

As per the latest data provided by the Export Import (EXIM) Bank of India, for 2019, India has extended LOCs to Burundi, D.R. Congo, Eswatini (Swaziland), Ethiopia, Malawi, Mauritius, Sierra Leone, Uganda, Zimbabwe, Maldives, Uzbekistan, Cuba and Suriname. The amount for the signed contracts totals to US\$2216.31 million. Vietnam, Uzbekistan, Seychelles and Mauritius have been extended an LOC worth up to US\$740m in total for defence purposes and defence-related projects in the pipeline²¹. Bangladesh also has an operative LOC worth US\$500m from India for a defence project²².

Along the same lines, India may allocate a percentage of budget dedicated only for aerospace and defence and may targeted LOC for the same. This is likely to give a boost to Indian defence exports.

18 <https://www.indiastrategic.in/2019/10/18/launch-of-ideea-indigenous-defence-equipment-exporters-association/>

19 <https://pib.gov.in/newsite/PrintRelease.aspx?relid=133835>

20 <https://pib.gov.in/newsite/PrintRelease.aspx?relid=133835>

21 Exim Bank of India

22 <https://economictimes.indiatimes.com/news/defence/india-to-sign-two-major-defence-deals-with-bangladesh/articleshow/58068508.cms?from=mdr>

In addition to this, like the Export Advisory Services Group (EAS) under the EXIM Bank of India, an experts' group is likely to be constituted to provide defence export advisory. This group may enable exporters to evaluate international risks, exploit export opportunities and improve competitiveness. The group may also conduct market analysis of the specific geography and may propose plans to exploit targeted LOC in the most optimum way possible.

6.4 Defence attaches

The government believes the defence production and defence export numbers are achievable and steps are being taken in that direction. The Department of Defence Production has approved one such key scheme where defence attaches may provide financial support of up to US\$50,000 annually for undertaking initiatives/activities to promote Indian defence products to their respective countries. A list of 85 countries has been compiled under Categories A, B and C with approval for funds up to US\$50,000, US\$30,000 and US\$20,000 annually for such activities.

The list of countries being focused upon to generate exports include (a) 23 countries under Category A where exports have already taken place and further significant export potential exists, (b) 17 countries under Category B where there are sufficient leads for possible export opportunities (for example, Myanmar), and (c) 45 countries where limited possibilities exist for exports (for example, Australia). It is, therefore, reliant on these countries to keep their focus on promoting exports.

To meet the target of INR35,000 crore exports, a better coordination between the Ministry of External Affairs (MEA) and MoD may be essential. Defence Attachés' in various countries might give a holistic agenda through better coordination with Defence Intelligence Agency (DIA).

6.5 Industry associations

Industry associations by the nature of their role are in constant touch with different member companies and are aware of their operational/strategic plans. These associations can target to explore suitable geographies relevant to their members' strategic interests. Such associations can carry out roadshows to different markets in order to assess the demand and can plan focused sessions while visiting the key government

officials/industrialists from export focused regions. The associations can also take learning from the existing defence exports trends from the various defence SEZ parks viz. Nagpur Mihan SEZ, Belgaum and Goa.

6.6 Defence industrial corridors

Defence industrial corridor is a collection of nodes with one or more discipline-focused interventions that may become an impetus with a focus of defence related activities surrounding that discipline. The Government of India, in its last year's budget proposed two defence industrial corridors in the country to promote domestic production and boost investment in the defence sector. Once implemented, the defence corridors may become the backbone of the defence ecosystem in the country wherein discipline-focused clusters would be formed. The entire effort would be on attaining self-reliance or strategic autonomy in identified critical disciplines and promoting proliferation of technologies into allied sectors with a view of enhancing exports.

6.7 Offsets

Under the para 3.1(a) of Appendix D to Chapter II, DPP 2016, the offsets discharge avenue is defined as a direct purchase of, or executing export orders for, eligible products manufactured by, or services provided by Indian enterprises. While the foreign OEMs have utilized the direct purchase option to a great extent, the execution of export orders remains unexplored. The idea of introduction of execution of export order is to take advantage of OEMs global presence, to take exports to geographies not known to Indian players. Many foreign OEMs with offsets obligation have a global defence presence with their own group companies diversified into other segments of defence. Such extensive supply chain will have a requirement of many such products that can be exported from the Indian geography. It has been observed that offsets has been a successful impetus to increase exports

6.8 Joint ventures

In December 2018, a major Indian entity in defence inaugurated a US\$15 million unmanned aerial vehicles (UAV) complex in Hyderabad in association with a major Israeli OEM as a partner. The 50,000 sq. ft. UAV complex is the first such manufacturing facility in India and the first outside Israel to manufacture the medium

altitude long endurance (MALE) UAVs. The facility has begun operations by manufacturing complete carbon composite aero-structures for MALE category of UAVs used by customers in several countries. While the initial focus is on exports, the objective of the 51:49 joint venture (JV) between the two companies is to become UAV supplier to the Indian armed forces. Thus, the JV intends to ramp up for the assembly and integrate to UAVs completely at the complex. In June 2019, the said Israeli partner secured a US\$153 million contract to provide a range of UAVs to the army of an un-specified country in Southeast Asia. Some of these UAVs could be produced in the Hyderabad facility. The JV which was initially established by producing the aerostructures for UAVs has slowly graduated into integration of complex systems, electronic and communication suites. This may give boost to other MSME and supplying partners in India and would provide them a platform to integrate into the global supply chain of such strategic class of UAVs.

Being the first such success story of potential of UAV manufacturing in India, this also provides a benchmark for future establishments and opens opportunities in the global UAV market for exports.

The Government of India could possibly provide incentives to JVs to enhance Indian defence export by giving their products the priority over the entities.

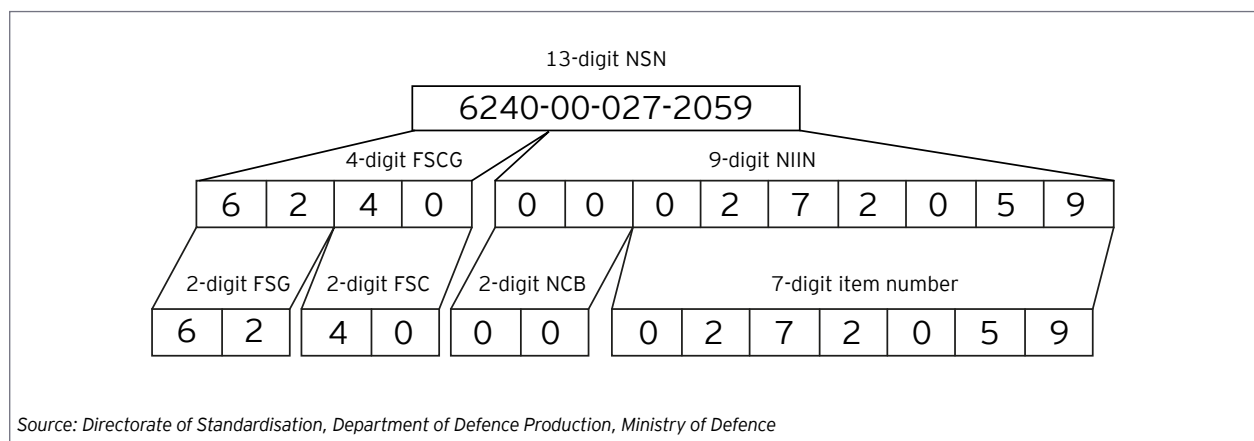
6.9 Directorate of Standardisation: NATO Stock Number

The NATO Codification System (NCS) is a uniform and common system for identification, classification and

stock numbering of items of supply of user nations. The system has been agreed by all signatories of the alliance and sponsored non-NATO countries for their use in identifying equipment and supplies²³. The NCS aims to create a common logistics system to ensure that each unique item of supply (IoS) available to the users of the NCS, is correctly characterized and assigned a NATO stock number or NSN²⁴. The database avoids duplication with respect to each item of supply therefore accurately keeping track of what is in use within the defence inventory.

A NATO Stock Number or National Stock Number is a 13-digit numeric code that identifies all the standardized material items of supply as they have been recognized by all NATO countries²⁵. The 13-digit code is comprised of the NATO supply class (NSC) and the national item identification number (NIIN), where the NIIN identifies the item while the NSC adds context by indicating how the item is generally classified.

The first four digits of code is the national supply classification group (NSCG), which comprises of the NATO supply group (NSG) and NATO supply class numbers. The remaining nine digits are the NIIN, with the first two digits being used for recording which country was the first to codify the item. This is understood to be the country of final manufacture of the item otherwise known as the country of origin. These first two digits are the country code otherwise referred to as the NCB or National Codification Bureau. This is usually because within each country, there is an agency (typically a government agency) in charge of maintaining a database. The remaining seven characters are a non-significant identification number. The image below helps in visualizing the structure of the NSN code.



23 https://ddpdos.gov.in/sites/default/files/2017-10/NCS_guide_en.5-17.pdf

24 <http://www.nzdf.mil.nz/what-we-do/dss/nato-codification/default.htm>

25 https://www.radiomuseum.org/forumdata/upload/nato_stock_number.pdf

The users of the system are not restricted to NATO member countries, however, even the 37 NATO-sponsored countries are eligible to utilize the system. Users of this system are classified into tiers, highlighting the country's level of participation and access.

Tier 1 countries: these are countries that have access to unclassified NSN data, through a one-way data exchange. They do not participate in the technical management of the system.

Tier 2 countries: the countries in this tier group have a codification system that has been certified as being compliant with the system. There is a two-way exchange of data and participation in technical management of the NATO Codification System (NCS).

Tier 3 countries: these are NATO member countries that have a full membership in the NATO Codification Bureau (NCB).

India falls under in the Tier 2 list of countries.

Benefits of the NCS system

The NCS system provides accurate information about the identification of an item of supply (IoS), recording sources of supply and other relevant data. However, the single most important function is the enabling a supply management solution by providing the users with the access to a single up-to-date source.

The benefits of NCS system can be broken up into three areas, namely, operational advantages, economic advantages and industry advantages.

Operational advantages

- ▶ Enhanced opportunities for standardization by recording and revealing the unique characteristics of items of supply in user nations supply systems, allowing users to efficiently and effectively use the parts from several weapons systems.
- ▶ The NCS provides access to complete information on all items of supply (IoS) in the inventories of user nations. This allows users to pool resources and share the burden regarding the acquisition of spare parts and the maintenance of common equipment.

- ▶ An accurate description of the IoS permits users to readily identify spares and/or substitute IoS to meet the requirement of a given weapon system, thus, reducing downtime and supporting force multiplication.
- ▶ The use of a common supply language understood by all users simplifies the technical dialogue between participating nations and other users.

Financial advantages

- ▶ The database allows the designer and project manager to screen for parts which are already stocked in the supply system and which could be utilized rather than producing new IoS. This practice reduces the variety of IoS to be managed and eliminates unnecessary costs for identification, storage and other related supply functions. Nearly 50% of the components used in the design of new equipment are already codified in the NATO inventory.
- ▶ Helps in improving the determination of material requirements and budgeting through greater knowledge of IoS in stock.
- ▶ Ensures effective co-ordination in procurement by enabling the elimination of concurrent acquisition and disposal of the same IoS, consolidating orders from several users to benefit from price reductions on bulk purchases and having a visibility of several potential sources of supply.
- ▶ Ensures effective use of assets by enabling supply support interchange between the linked organizations and between nations.

Industrial advantages

- ▶ Improves government-industry understanding and relations using a single identification system and common language.
- ▶ Descriptions of IoS by characteristics enable design engineers to accurately search for and select components or equipment meeting technical or functional characteristics more efficiently than with any commercial catalogue.
- ▶ The accurate descriptions recorded in the NATO Codification System including form, fit and functional dimensions as well as material and surface treatment for IoS facilitates the work of military and civilian standardization agencies responsible for developing guidelines.





7

Way forward

Defence production in India, with government entities having 70%-80% share, has increased over the years from INR74,121 crore in FY16-17 to INR80,502 crore in FY18-19 with a target of producing equipment worth INR90,000 crore in FY19-20²⁶. Defence exports, with government entities having around 10% of share in the last two years, have also increased in the same period from INR1,521.86 crore in FY16-17 to INR10,745 in FY18-19 with a target to achieve INR15,000 crore in FY19-20²⁷. The number of export authorizations issued to the private industry in 2018-19 alone stood at 668, more than double in the previous year²⁸.

The draft Defence Production Policy 2018 has set a target of INR1,70,000 crore worth of defence production and defence exports worth INR35,000 crore in defence goods and services by 2025²⁹. With the assumption that INR15,000 crore of exports are achieved in the FY20, it would require an average growth of ~19% each year to reach to the target of having INR35,000 crore exports by FY25. On similar footing, defence production would be required to grow at 13%-14% each year till 2025. In cases where defence production has increased at a Compound Annual Growth Rate (CAGR) of ~4% between FY17 to FY19, defence exports have also increased at a CAGR of ~165% in the same period.

India's current military fleet comprises ~70% of vintage platforms which are under modernization plans in the coming decade. These vintage platforms, with some retrofit or maybe even as-is, could be exported to countries which lack the level of firepower and would require the same to defend themselves. Bangladesh reportedly has 36 F-7s (export version of Chinese J-7s) in active service and a few Su-30s on order. However, the F-7 has seen a couple of crashes in the last decade³⁰ and hence, export of an LCA Tejas or further orders for the Su-30 or even the older but in-service MiGs from India's current fleet could be targeted for export purposes. This could be made into an old

product, new demand initiative where old and/or new equipment are exported basis old and/or new demand. Apart from the aircraft fleet, naval platforms are also a key area. Garden Reach Shipbuilders and Engineers Ltd (GRSE) was the first company to have exported a warship - an offshore patrol vessel named *Barracuda* to Mauritius in 2014³¹. GRSE has suggested a lot of thrust on exports from friendly foreign countries in South East Asian and Latin American countries³².

International forums play a major role in promoting a nation's export. In that context, FTAs provide a great opportunity for India, particularly with regards to the defence manufacturing sector. Not only will it provide an opportunity from a market access standpoint, but it may also allow for Indian companies to compete with regional and global players. Theoretically, this would allow a level playing field and higher efficiency in the defence export markets. India needs to explore and examine the possibility of setting up free trade agreements with its other existing trade partners. This could mean exploring the FTA's with both the EU and the US. Models that could be explored are the EU-Vietnam, United States-Mexico-Canada Agreement (USMCA) and Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) free trade agreements, and a particular focus should be given towards key issues such as Intellectual Property rights, investment, tariff and non-tariff barriers, environment and e-commerce².

From a defence offsets perspective, the way to further strengthen the acceptance/use of this option is to rephrase 3.1(a) as, 3.1 (a).(i) Direct purchase 3.1(a) and (ii) execution of export orders, as separate avenues for discharge.

With IDEEA as the nodal-agency of the Government of India tasked with handling exports of Indian military equipment, India can further enhance its export potential and integrate this agency with the DPSUs and the private industry.

26 <https://economictimes.indiatimes.com/news/defence/defence-production-target-set-at-rs-90k-crore-for-2019-20/articleshow/70781672.cms?from=mdr>

27 Defence Production Dashboard

28 MoD Annual Report 2018-19

29 Draft Defence Production Policy 2018

30 <https://www.dhakatribune.com/bangladesh/military-affairs/2018/11/23/air-force-pilot-killed-in-crash>

31 https://www.business-standard.com/article/economy-policy/india-s-first-warship-export-to-mauritius-114121900027_1.html

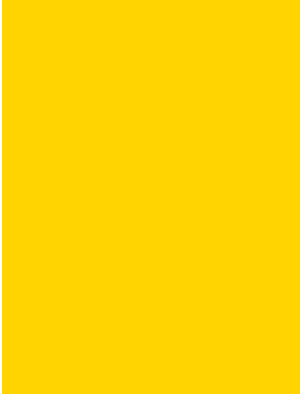
32 <https://economictimes.indiatimes.com/news/defence/as-india-focuses-on-defence-exports-grse-looks-to-engage-customers/articleshow/69437281.cms?from=mdr>

Aggressively addressing markets dominated by other competitive nations could also be considered as a milestone. As suggested in earlier sections, the countries could be categorized under four categories and accordingly focused upon for generation of exports. Also, India can regularly conduct military exercises with several nations depending upon the category they belong to. Such exercises may act as opportunities for conducting sessions to understand the requirements of those nations and filling those gaps with our defence exports.

The targets set forth in the draft Defence Production Policy 2018 are achievable with a concerted effort towards the same. The steps are being taken in the right direction and the results in the next few years would reflect on the efforts being made now.







Notes



Our offices

Ahmedabad

22nd Floor, B Wing, Privilon,
Ambli BRT Road, Behind Iskcon
Temple, Off SG Highway,
Ahmedabad - 380 015
Tel: + 91 79 6608 3800

Bengaluru

6th, 12th & 13th floor
"UB City", Canberra Block
No.24 Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 6727 5000

Ground Floor, 'A' wing
Divyasree Chambers
11, O'Shaughnessy Road
Langford Gardens
Bengaluru - 560 025
Tel: + 91 80 6727 5000

Chandigarh

1st Floor, SCO: 166-167
Sector 9-C, Madhya Marg
Chandigarh - 160 009
Tel: + 91 172 331 7800

Chennai

Tidel Park, 6th & 7th Floor
A Block, No.4, Rajiv Gandhi Salai
Taramani, Chennai - 600 113
Tel: + 91 44 6654 8100

Delhi NCR

Golf View Corporate Tower B
Sector 42, Sector Road
Gurgaon - 122 002
Tel: + 91 124 443 4000

3rd & 6th Floor, Worldmark-1
IGI Airport Hospitality District
Aerocity, New Delhi - 110 037
Tel: + 91 11 4731 8000

4th & 5th Floor, Plot No 2B
Tower 2, Sector 126
NOIDA - 201 304
Gautam Budh Nagar, U.P.
Tel: + 91 120 671 7000

Hyderabad

THE SKYVIEW 10
18th Floor, "Zone A"
Survey No 83/1, Raidurgam
Hyderabad - 500032
Tel: + 91 40 6736 2000

Jamshedpur

1st Floor, Shantiniketan Building
Holding No. 1, SB Shop Area
Bistupur, Jamshedpur - 831 001
Tel: + 91 657 663 1000

Kochi

9th Floor, ABAD Nucleus
NH-49, Maradu PO
Kochi - 682 304
Tel: + 91 484 433 4000

Kolkata

22 Camac Street
3rd Floor, Block 'C'
Kolkata - 700 016
Tel: + 91 33 6615 3400

Mumbai

14th Floor, The Ruby
29 Senapati Bapat Marg
Dadar (W), Mumbai - 400 028
Tel: + 91 22 6192 0000

5th Floor, Block B-2
Nirlon Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063
Tel: + 91 22 6192 0000

Pune

C-401, 4th floor
Panchshil Tech Park
Yerwada
(Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 4912 6000

Ernst & Young LLP

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