RESOURCE PAPER 51

INDO-JAPAN CHAMBER OF COMMERCE & INDUSTRY

Japan-India Cooperation in DASH :
(Defence, Aerospace, Space and Homeland)
Potentials and Prospects

by
Vibhu Vaibhav

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PREFACE

Dear Readers,

It is with great pleasure we present to our readers a very interesting and need of the hour Resource Paper - 'Potentials and Prospects for cooperation between Japan and India in Defence, Aerospace, Space and Homeland' by an expert, well known for his acumen in the field.

Col. VibhuVaibhav, a Veteran technocrat with a demonstrated leadership in the Indian Army and in the Corporate, he specialises in the Defence procurement, SCM, Infrastructure and Strategy. An analytical thinker and a problem solver, has been instrumental in handling complex Procurement Projects of the Indian Army through project planning and process improvement strategies for 'Make in India' vision.

India is a trustable and a highly dependable security and strategic partner. India's bilateral relations with most of the ASEAN member countries have been cordial. With the increasing dynamism in the Indo-Pacific area, the resource paper assumes greater significance. Japan, being an eternal friend for India, and with its pivotal role as a QUAD member, the opportunity for India-Japan cooperation in DASH sector is enormous. IJCCI plans to organise a seminar and an exhibition with the support of stake holders from Japan and India.

Author, Col.VibhuVaibhav, an authority on the subject has analytically and elaborately enumerated how Japan and India can cooperate in this sector for mutual benefits. I am confident that this resource material will ignite the SMEs of both countries to explore and exploit.

Happy reading!

October 2024

Suguna Ramamoorthy
Secretary General, IJCCI

Japan-India Cooperation in DASH (Defence, Aerospace, Space and Homeland) : Potentials and Prospects

1. **Prologue**: In all nations across the globe, the Defence Aerospace and Homeland sector is the one which takes up a substantial part of the GDP. The aim of defence procurement primarily is to obtain for the armed forces, weapon systems and defence equipment, of the right quality, in right time, at right price. It involves identification, acquisition, induction, training and the logistics support before deployment in the field. The competency in this field to manufacture cutting edge systems tuned for modern warfare and its dynamics is highly restricted to a select group of Nations. With the shift in geopolitical and geostrategic dynamics, the DASH sector is fast emerging as a new Sunrise Sector globally. In India every aspect of the

Indian defence sector - be it policy, organization, procedure, or stakeholders' approach has evolved with an aim to indigenise the defence sector. Over the past few years, it has advanced further and become the overarching narrative of 'Make in India' to achieve 'Atmanirbharta' or Self Reliance by empowering the domestic industry and enhancing the capabilities and the capacity to meet them.

2. **Major Indo-Japan Geostrategic Initiatives:** Both Japan and India have a deep connect through the History. Of late, both India and Japan have taken major steps to foster closer relations in terms of various Geostrategic initiatives and Defence Cooperation. Japan's Free and Open Indo-Pacific (FOIP) strategy and India's Indo-Pacific Oceans Initiative (IPOI) have provided the framework for the two countries to deepen their strategic partnership and cooperation in the region. Both the countries are a part of the QUAD and G20. ACSA (Acquisition and Cross-Servicing Agreement) signed on 10 September 2020, enables the exchange of military logistical support and supplies. (Japan, 2021). The Tokyo Declaration for India-Japan Special Strategic and Global Partnership was signed in Sep 2014. (Embassy of India, Tokyo, Japan, n.d.). A Joint Working Group on Defence Equipment and Technology Cooperation (JWG-DETC) has been formed with an aim to facilitate interaction between companies & MSMEs involved in Defence Production between the two countries. (Embassy of India, Tokyo, Japan, n.d.). Defence Policy Dialogue and 2+2 Dialogue started in Jun 2018 as a step forward in strengthening the bilateral relationship. (Embassy of India, Tokyo, Japan, n.d.) All three services of Indian Armed Forces interact bilaterally with JSDF with multiple joint exercises (Embassy of India, Tokyo, Japan, n.d.). (Press Information Bureau Govt of India, 2022)

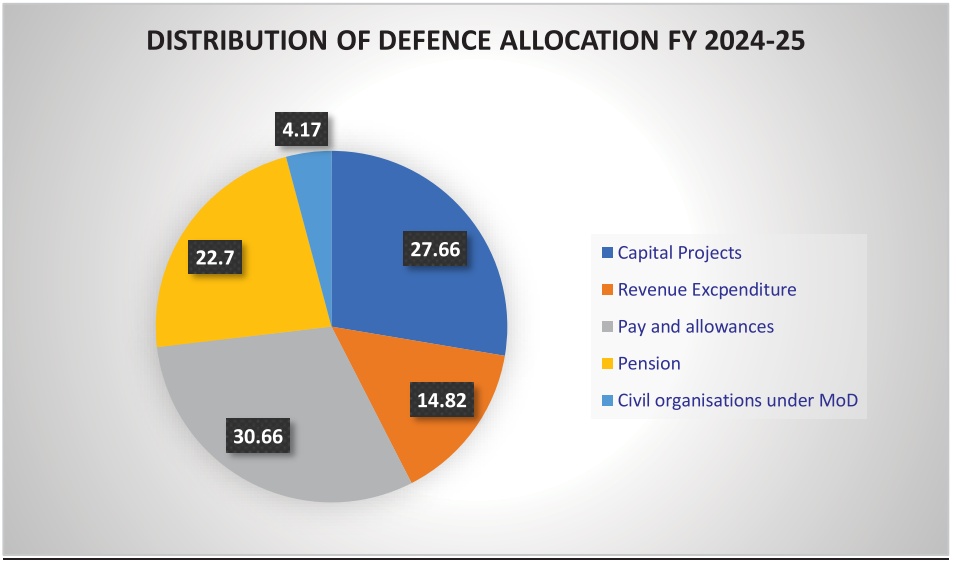
3. **An Overview of the Japanese Aerospace and Defence Sector:** Japan has been a major military power for centuries and has a rich history of

being self-reliant to a large extent in Aerospace and Defence Industry. The JSDF are catered for largely by the domestic industry which has entered into several successful tie ups to manufacture equipment which has Japan specific tailormade QRs. The aircraft manufacturing industry led by Japan Aerospace Exploration Agency (JAXA) is mainly involved in joint/licenced manufacturing. Space has become a major frontier with a substantial indigenous effort being made. The nation's government agency for aerospace research and development was formed in 2003, merging the Institute of Space and Astronautical Science (ISAS), the National Aerospace Laboratory of Japan (NAL), and the National Space Development Agency of Japan (NASDA). (Statista, 2024). The aircraft maintenance is a major business. Concerted substantial endeavour is being made in the arena of defence electronics and development of niche missile technologies. The collaborative 'Tempest' the sixth gen fighter programme is a good example of synergising efforts together across the spectrum of geostrategic domains. In 2022, the Japan Aerospace and Defence Market Size was valued at USD 65.11 Billion in 2022 and the projected growth of the market size is at a CAGR of 5.1% right till 2032 by then where it is expected to reach USD 106.96 Billion. (Spherical Insights, 2023).

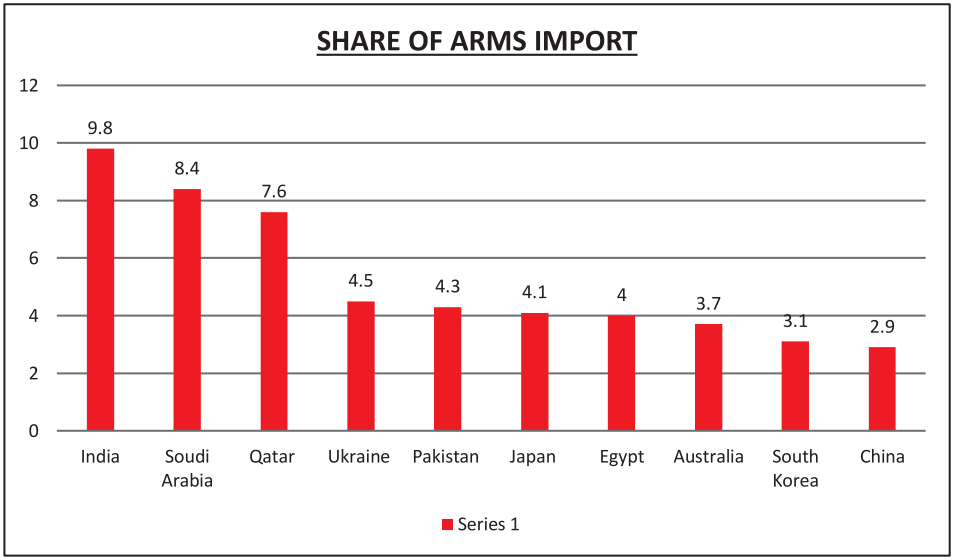
4. **A Brief Understanding of Indian Defence Procurement Process:** In India, the procurement strategy flows out from the National Security Strategy and is a collaborative effort between the Armed Forces and the Defence Ministry and associated stakeholders. Given the technical complexity and specialist nature of much of the military's requirements, significant barriers existed to develop the requisite tooling, plant, materials, training, logistics and infrastructure required to build a defence industry capable of meeting its military and security needs, and the related aerospace and homeland security capabilities. This need became the driving force to look inwards and

initiate reforms which over a period of time has translated into a well streamlined procurement process driven by systems and guidelines. The Indian Defence procurement system is guided by the Defence Procurement Procedure (DPP) and the Defence Procurement Manual (DPM). The DAP (Defence Acquisition Procedure) 2020 gives an impetus to the Make in India initiative of the Government of India to focus on increasing participation of Indian Vendors including MSMEs. Cutting down permissible timeframes for various activities and institutionalising robust mechanisms to monitor for probity at various stages of the acquisition process are the major attributes. It favours swift decision making, provides for suitable timelines and delegates power to the appropriate authorities to ensure an efficient and effective implementation of the acquisition process, by all stakeholders concerned. It aims to further 'Self Reliance' of the country in the defence sector and implement 'Ease of Doing Business'.

5. **The Indian Budgetary Allocation for Defence:** Over a period of time, there has been increasing realisation that Self Reliance is the only way out to limit the impact of huge imports, gain control over the supply chain, reduce dependence on critical technologies while promoting domestic industry and employment. In the Union Budget of Financial Year (FY) 2024-25, Ministry of Defence (MoD) has been allocated Rs 6,21,940.85 crore (approx. US $75 Billion). (Press Release Ministry of Defence India, 2024). This allocation is higher by 18.43% over the allocation for FY 2022-23 and 4.79% more than allocation of FY 2023-24. MoD has earmarked 75% of modernisation budget amounting to Rs 1,05,518.43 crore for procurement through domestic industries during this FY. This is expected to have a positive impact on GDP, employment generation and capital formation. Overall, the total allocation comes out as approx. 12.90% of Budgetary Estimate of Union of India.

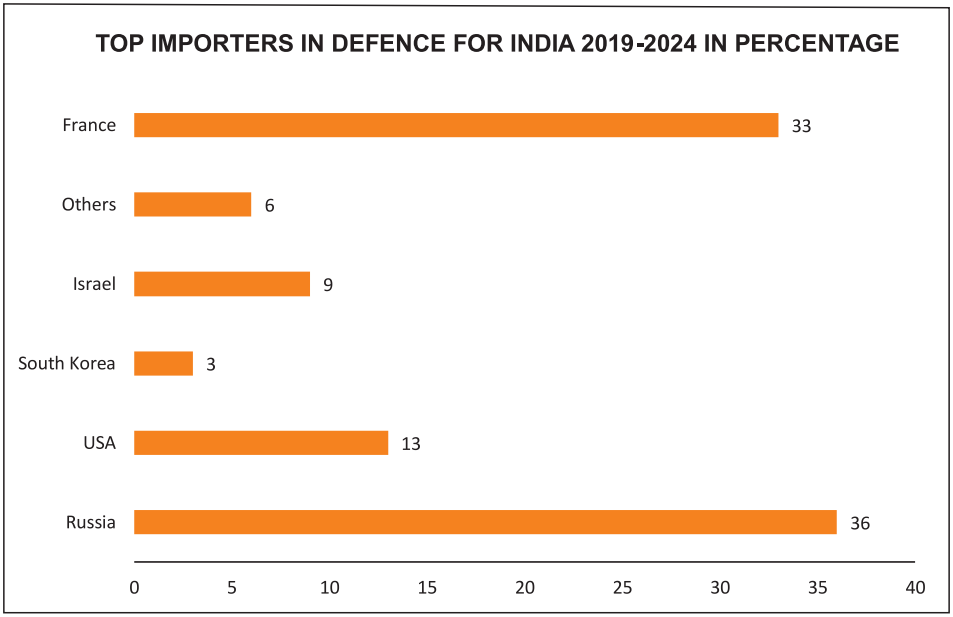


6. **The Defence Import Conundrum for India:** India has been the biggest arms importer in the world for the consolidated period of 2019-2023 consuming a substantial part of the budget. India's tensions with Pakistan and China largely drive its arms imports. India's arms imports



increased by 4.7 per cent between 2014-18 and 2019-23, making it the world's biggest arms importer in 2019-23 with a 9.8 per cent share of all arms imports (SIPRI , 2024).

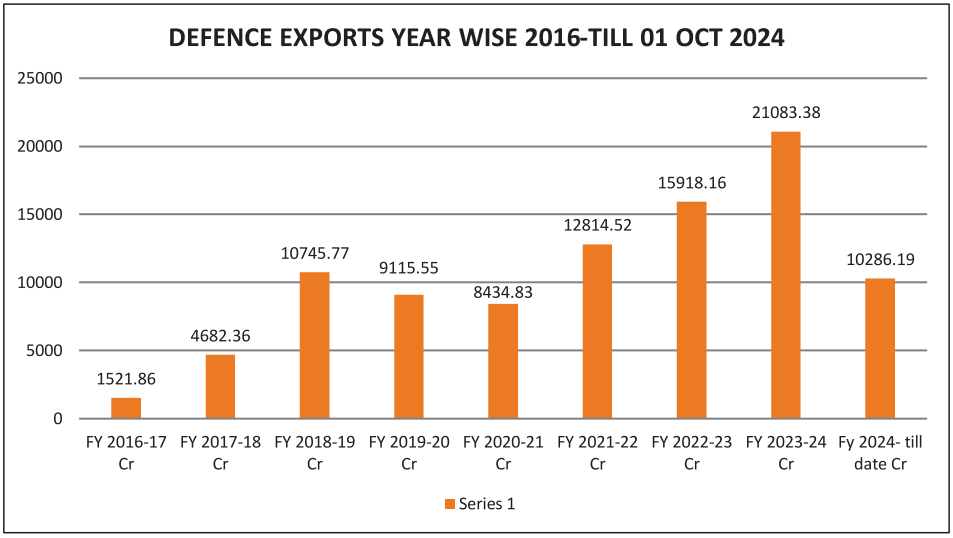
The graph below reflects the top import countries in defence for India for the duration 2019-20.

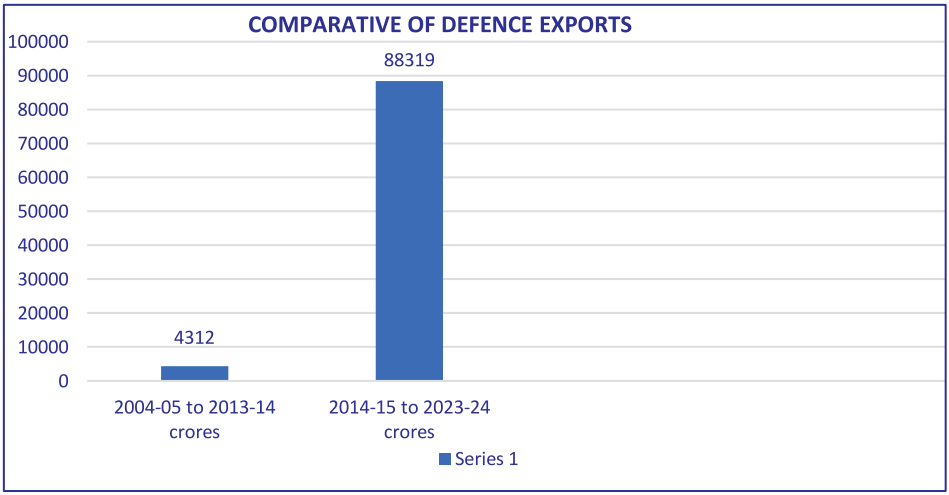


7. **Major Initiatives by India to Promote Self Reliance in DASH:** This has mainly been fuelled by a need to prune down the daunting defence import bill while at the same time, strive to reduce dependency on critical technologies and capabilities which will also aid in enhancing skill sets, increasing efficiency, generating employment and increasing consumption. A few of such initiatives are mentioned below: -

- **Filip to the Indian Defence Exports:** In FY 2023-24, the defence exports touched a figure of approx. USD 2.63 Bn which is a growth of 32.5% over the FY 2022-23. The number of export authorisations issued to the defence exporters has increased from

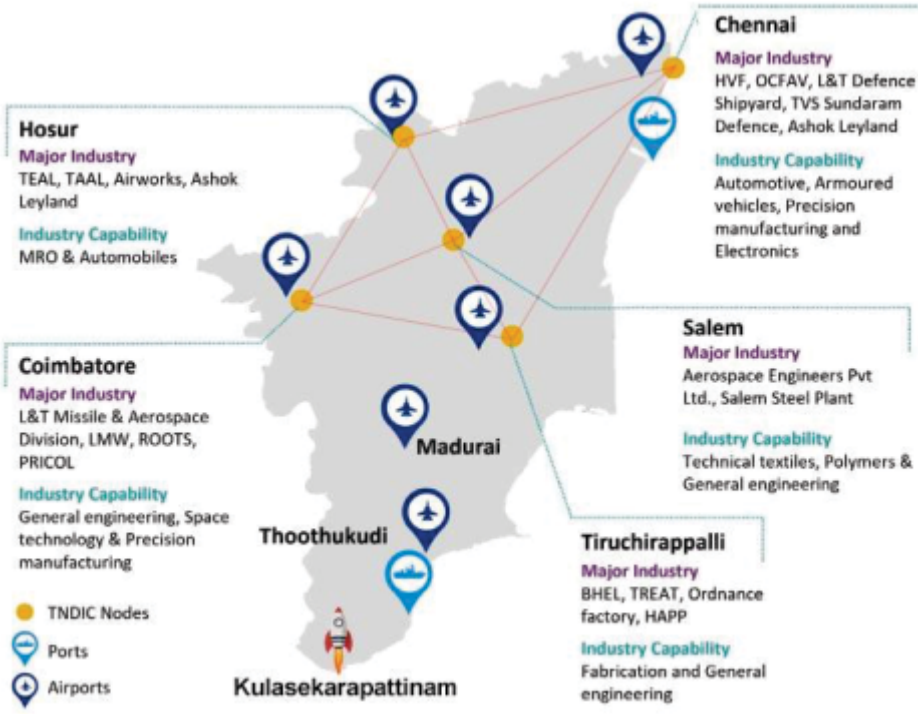
Rs. 1,414 to Rs. 1,507. A comparative analysis reveal that while the total defence exports during the consolidated period FY 2004-05 to FY 2013-14 were Rs. 4,312 crore, which has gone up to Rs. 88,319 crore in the consolidated period from 2014-15 to 2023-24. (The Hindu, 2024). Quite a few of the global major players have setup JVs in India. Boeing in collaboration with collaboration with TATA group is manufacturing helicopter gunship fuselages and other components. Lockheed Martin with TATA group is manufacturing components for aircrafts and helicopters. Airbus has a JV with TATA group to manufacture C 295 aircraft in India. Indian Gun systems and missiles are being exported now to other countries. India is slowly becoming a major player in export of bullet proof jackets, small arms ammunition and artillery ammunition. Global players are now seeing India as a hub for MRO (Maintenance, repair and Overhaul). The Department of Defence DDP Dashboard gives out interesting figures about year wise growth in the Indian Defence exports. (Departmrnt of Defence Production Dashboard, 2024).





- **Positive Indigenization Lists:** To give an impetus to domestic production, the Indian Govt. has over a period of last five years has taken out five Positive Indigenization lists which has brought out certain components and products out of the ambit of the import list and these have to be manufactured in India itself.
- **Increased FDI in Defence Sector:** The Indian govt after listening to the concerns of the industry and also with an aim to facilitate technology absorption, has increased the FDI limit to 74% through the automatic route and 100% through the govt route.
- **DTIS (Defence Testing Infrastructure Scheme):** The DTIS has been launched by the MoD in May 2020 with an aim to set up state-of-the-art testing facilities in collaboration with private industry and respective Central/State Governments. Currently, seven such testing facilities have been approved in India. It provides up to 75 per cent government funding as 'Grant-in-Aid', with the remaining 25 per cent funded by the Special Purpose Vehicle (SPVs), comprising Indian private entities and respective State/Central Governments.

- **The Tamil Nadu Defence Industrial Corridor:** This corridor has been established with an aim is to create new defence production capabilities equally bolstered by test and evaluation facilities, export facilitation and technology transfer. The current figures are INR 21825 Crores investment attracted and INR 4604 Crores invested so far till 04 Sep 2024. (Departmrnt of Defence Production Dashboard, 2024). The MoD in the month of July 2024 has signed a MoU under the DTIS (Defence Testing Infrastructure Scheme) to establish three state-of-the-art testing facilities for Unmanned Aerial System (UAS), Electronic Warfare (EW) and Electro Optics (EO) domains in Chennai under the Tamil Nadu Defence Industrial Corridor. The image below sourced from the TIDCO (Tamil Nadu Industrial Cooperation Ltd) website gives out the various centres. (TIDCO, 2024).



- **The Uttar Pradesh (UP) Defence Industrial Corridor:** The Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) is the nodal agency to execute this project in conjunction with various other nominated state agencies. A total of 154 MoUs have been signed, (Uttar Pradesh Defence Industrial Corridor, 2024). The current figures are INR 28,124 crores of investments attracted and INR 3,727 crores invested as on 04 Sep. 2024 (Departmrnt of Defence Production Dashboard, 2024). The industries are mainly in aerospace, missiles, arm and ammunition amongst others. The image below sourced from the UPEIDA website as given as reference gives out the centres in the state.

- **iDEX (Innovation for Defence Excellence):** The iDEX scheme launched by the Indian Govt in 2018, aims to foster innovation & technology development in defence and aerospace by engaging innovators & entrepreneurs over a collaborative platform to deliver technologically advanced solutions for modernizing Indian Military. The iDEX runs challenges for Indian startups, MSMEs, and individual innovators and it is a major initiative to foster start Ups, encourage creativity and provision of grants to facilitate product development in certain niche critical technologies. The iDEX Prime Scheme offers funding support of up to INR 10 Crores. (iDEX, 2024).

- **Initiatives to promote R&D and MSMEs in Defence:** Ine Indian Govt of late has taken positive steps to promote MSMEs and R&D. Government funding provisions have been introduced through Technology Development Fund (TDF) and iDEX. The TDF Scheme, executed by DRDO, supports indigenous development by MSMEs and start-ups. Funding under the TDF scheme has been increased from USD 1.2 Mn USD 6 Mn approx. per project.

- **AI (Artificial Intelligence) in DASH:** From autonomous unmanned robotic systems to supply chain management, drones, swarm drones, data analytics the opportunities for AI are immense. The Indian Govt has set up the AI Task force in Feb 2018 and an AI Roadmap has been formulated in Aug 2019 for the DPSUs. The DAIC (Defence AI Council) and DAIPA (Defence AI production Agency) were created in Feb 2019 and INR 100 Crores has been earmarked by each service.

8. **DASH as Sunrise Sector and Areas of Interest for Japan and India:** Implications of DASH being a strategic sector and the sensitive technologies involved can simply not be ignored and this dictates the need to be self-reliant as well as have mutually beneficial long term

collaborative efforts focussed approach. Some of the major areas of mutual collaborations are as under: -

- **Defence Electronics and Semi-Conductors:** There has been a major thrust given by the Indian Govt. An initial outlay of USD 8.94 Bn has been made by India for this sector. Japan as a world leader can play a major role in efforts to gain competency in this field.
- **Composite Materials:** Because of their high strength-to-weight ratios, lightweight materials such as carbon fibre composites, titanium alloys, and advanced polymers are increasingly sought after by the aerospace and defence industries. These materials not only reduce aircraft weight but also improve structural integrity, fuel efficiency, and operational costs.
- **Aerospace Industry:** The aerospace industry is embracing lightweight materials to reduce carbon emissions and comply with stringent environmental regulations. This is consistent with the trend toward environmentally responsible solutions, which ensures a positive environmental image. Aerospace industry has a major market in terms of aircraft components, engines, avionics, MRO etc.
- **Drone Systems:** Drones have a vast application transcending beyond the domains of DASH in terms of usage and relevance. The key is to indigenise the key components including the critical drive trains within India to make them more cost effective while keeping a control over the complete component supply chain management.
- **Metallurgy:** Advance metallurgy is the key to manufacturing high performance defence platforms. The desired skill sets are with very few countries in the world. A collaborative effot in this field will be of immense value.
- **Advance Battery Systems:** There is a need to collaborate on new generation battery systems which can have multiple usage.

Advanced, power dense with optimised weight, these power packs can be a game changer in DASH. India is already exploring this arena and any ToT will be a welcome step forward. Possible usages will include those for drones, unmanned ground systems and Li Ion batteries for new generation submarines.

- **Development of Powerpacks/Engines:** Efficient, light weight, power dense, robust and resilient powerpack/engine systems ate the heart of any military platform. India is seeking to develop high efficiency gas turbine engines for its warships. The same is the case when it comes to developing new generation engines for various fighting platforms. Japan has traditionally been very strong in this arena.

- **AI and Robotics:** Both AI and robotics are going to change the way the world functions in a major way. Japan is a world leader in robotics. There are a host of autonomous platforms which have a major military application based on robotics. India is a known powerhouse in IT. Synergy of efforts in these domains is the natural course of action to reap benefits mutually.

- **Skill Development:** India is grappling with low labour productivity and lack of requisite technical skill sets in certain critical areas. Skill development and enhancement of requisite technical skill sets is the need of the hour. The Indian govt is giving major emphasis on skill development with a strong belief that enhanced skills will make the vast Indian labour force more productive and empowered.

- **Replicating model of Maruti Suzuki:** Maruti Suzuki is a shining example of how a well enmeshed collaboration has made an impact of such a great magnitude in India. It has absolutely transformed the automotive industry. The complete eco system has been woven around with numerous sub component and component manufactures down to MSMEs as stakeholders. It brought about

discipline, systems and processes, standardisation, efficiency and increased productivity coupled with enhanced skill sets. The same model can be replicated with for different domains also.

- **Maritime Domain:** In the Maritime Domain, there are multiple opportunities. India has sought investments and technology transfer from both South Korea and Japan for ship building and ship repair clusters. The area of SAR (Search and Rescue) and HADR (Humanitarian Aid and Disaster Relief) holds promise of synergy. The famed Cochin Shipyard in India has been made with the technical collaboration with the Mitsubishi Heavy Industries. India is looking to be amongst the top five countries globally in terms of ship building capacity by 2047 from the current rank of 22. For this, they are actively seeking support both from Japan and South Korea to build up the complete eco system.
- **Missile Systems:** Advanced hypersonic missiles for coastal defence akin to Brahmos have a common strategic purpose for both the countries. The critical missile technologies will involve the seekers, composites, advance high density propulsion systems, active and passive seekers, launchers, telemetry etc.
- **Space:** There is an immense scope for mutual collaboration in space. Reusable rockets, advanced composite materials, observation and communication satellites, space situational awareness systems, advance fuel systems are domains to name a few.
- **Cyber Security:** The cyber domain is a game changer. Almost everything that we do today, the cyber has an impact either directly or indirectly. The scope in this field is immense and a separate topic of discussion in itself. From national security to business confidentiality, the scope of application is immense. Any collaboration in this field is a win-win scenario.

- **New Generation Technologies:** These are a host of exciting areas where new generation technology can be a game changer. Radars are one such field. Recently there have been talks about transferring the stealth Unified Complex Radio Antenna (UNICORN) for Indian warships and related technologies (Bharat Shakti, 2024). The AESA radars have a major futuristic role to play both in aircrafts and missiles. Similarly, there is ample opportunities in the fields of military communication, electronic warfare, intelligence systems, GaN (Gallium Nitrate) based TR modules etc where synergy can be explored.

9. **Synthesis:** The DASH sector is at a transformational cusp and at point of inflexion in India. The signs are obvious for an exponential growth if right steps are taken well in time and with trusted collaborations. Collaborative efforts in terms of ToT, best practices, development of right skill sets, due investments etc are the need of the hour. The Indian govt has taken a bold step to push ahead with reforms in the defence procurement arena. The Make in India initiatives are a huge and determined effort to get the industry, MSMEs, users and all other stakeholders together on a same platform. The risks and rewards for this venture have high stakes. India, a developing country and the biggest democracy in the world, needs to ensure that in times to come, the development comes with the right balance of Self-reliance, empowered populace through skill enhancement and create greater consumption within the country which is matched by equitable production. The desire to widening the DIB (Defence Industrial Base) and its resultant implications for a much-desired vibrant MSME ecosystem will also be a challenge. For this effort, both the capacity as well as the capability building will need to take place. India will also need long term strategic partners who have similar interests. Both Japan and India have a lot in common in geostrategic interests.. Given the stakes involved and the commonality of efforts put in over the last

few decades, there is a fair amount of positivity that a lot can be achieved if these two Asian giants collaborate in the DASH sector. Tried and tested partners are a must to achieve next level of exponential growth.

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