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JAPAN'S DRONE INITIATIVE IN THE INDO-PACIFIC AND INDIA'S STRATEGIC CALCULUS

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Abstract

Japan is making significant changes to its security policies and commencing technological and strategic engagements with its regional partners. Drones remain one of Japan's key technologies on which it is making significant investments. China's dominance in this sector also encourages Tokyo expand its drone sector. Under the Official Security Assistance framework, Japan has a list of key like-minded countries to which it aims to supply its drone technology and strengthen their capabilities in this sector. Meanwhile, India aspires to be a global drone hub by 2030 and has made efforts through various initiatives to strengthen its capabilities in this sector. To achieve its goal of becoming a drone global hub, New Delhi needs to collaborate with its foreign partners, with Japan playing a crucial role in this effort. The paper examines the various areas of cooperation between the two countries, the challenges they face and the various mechanisms to mitigate them.

Introduction

The nature of warfare has changed significantly since the end of the Cold War. Drones also known as Unmanned Aerial Vehicles (UAVs) play a crucial role to fight these wars. Drones are dual-use technologies and have the ability to transform the dynamics of modern-day warfare but also businesses and government. In this context, New Delhi aspires to become a global drone hub by 2030.[1]

In this century, India, the biggest democracy in the world and one of the fastest-growing economies, has a big influence on global political and economic challenges. Nonetheless, the growing power has some internal and external security issues. India is threatened by cross-border terrorist organisations as well as its neighbours, particularly China and Pakistan. Prioritising self-reliance co-development and co-production with like-minded countries technology manufacturing is essential to addressing these issues.

Meanwhile, Japan remains a close strategic partner of India, and both the countries share a “Special Strategic and Global Partnership”. Japan has commenced investment in its drone firms and encourages the supply of drones to its partners in the Indo-Pacific. This could create enough opportunities for India to collaborate with Japan in this sector. Furthermore, Japan has also begun to strengthen its capabilities in manufacturing and exporting dual-use drones as an alternative to dominant Chinese products. The paper explores the various initiatives both the countries have taken in this sector. It has critically analysed Japan’s Official Security Assistance list and India’s absence in it. There also exist various factors that impede the smooth transfer of technology from Japan to India. The paper discussed a few strategies to mitigate such challenges between the two nations.

India’s Major Drone Initiatives

To strengthen the drone sector, New Delhi has undertaken various initiatives. Launched in 2018, the Innovation for Defence Excellence (iDEX) is a scheme that aspires to bring technological advancements and innovation into the aerospace and defence sector. The scheme aims to modernise the Indian military, by providing them with advanced indigenous technology. The various stakeholders involved include R&D

institutes, MSMEs, academia, individual innovators and start-ups. These stakeholders are encouraged to co-innovate and co-create technology for the defence and aerospace sectors of India.[2] Thus, the core objectives of the scheme can be summed up as innovation and indigenisation of technology.

Various measures have been undertaken by the government to facilitate stakeholders participation, including:[3]

- Grant of substantial funding.
- Faster and easier access to government testing facilities.
- Smoother procedures for operation along with reduced documentation.
- Making procurement easier.

iDEX also fosters such cooperation through various challenges such as:[4]

- Defence India Startup Challenge (DISC)
- Open Challenge
- Thematic Open Challenge
- ADITI Challenge (Advancing Defence Innovation Acing Development of Innovative Technologies with iDEX).

iDEX acts as the executive arm of the Defence Innovation Organization (DIO), a non-profit founded by BEL and HAL. The DIO oversees the management and funding for the scheme, while also providing it with high level policy guidance.[5] The government budget released to iDEX-DIO during 2021-22 amounted to INR 45 crore.[6] For projects that require support of more than INR 1.5 cr, iDEX-Prime provides funding upto INR 10 cr.[7]

The Ministry of Defence launched the first Defence India Startup Challenge (DISC) challenge on 4 August 2018, in collaboration with Atal Innovation Mission. The aim of this challenge is to support MSMEs, Start-ups or Innovators in creating prototypes and/or commercialising products or solutions for national security/defence. Research as well as academic institutions are also eligible to apply for funding under the scheme.[8]

On 29 October 2024, the 13th DISC challenge was launched with a grant of upto INR 1.5 cr. The challenge was closed on 3 December 2024. The challenge included 7 problems from the three armed forces of India[9]:

- Advanced Autonomous AI-Driven Cyber-Security Framework for Isolated LAN Environments.
- C-UAS Equipment (Cyber Takeover).
- AI for Adaptive Networks.
- IR Light based Communication System.
- Radar Obscurant Cloak for Aircraft.
- IP-based Gateway Interface between Different SDR Networks.
- Development of Battery-Operated Taxi Bots For Aircraft Movement.

The DRDO has also initiated the Development Cum Production Partner (DcPP) programme to solicit industry engagement in developing and producing defence technology. The initiative decreases the timeframe for the cycle of development-to-induction of new technology. These partners get free access to DRDO's technological expertise and patents. This boosts the self-reliance on Indian defence sector manufacturers, and allows them to compete globally.[10]

Partners are selected based on the rules and procedures set out by DRDO. The parties then collaborate for executing the programmes and projects of DRDO.[11] A notable example of this was the "Vertically-launched Short-range Surface to Air Missile system (VL-SRSAM) project", which was opened for private sector participation in April 2021. This all-weather missile system is capable of providing "point and area defence" against a variety of airborne targets. The strike range of the system is around 40 km.[12]

The Technology Development Fund (TDF) was launched by DRDO with the aim of providing funding to indigenous industries engaged in the defence sector. Funds are provided in the form of grants-in-aid, for designing and developing military technology. The initiative nurtures innovation and gives a boost to indigenous manufacturing of defence technology.[13]

A total of INR 100 cr has been set up as TDF by DRDO.[14] A potential project can have a budget of upto INR 50 cr.[15] 90% of the project cost can be availed by the industry as funding from TDF. The project may target:[16]

- The indigenisation of defence sub-systems, components or products.
- Development of new technology that is required by DRDO, DPSUs or Services.

The Ministry of Defence released the Defence Acquisition Procedure (DAP) in 2020. The DAP serves as a comprehensive guideline for procuring equipment and systems for the defence sector. The aim is to modernise the Indian military and promote self-reliance in the defence manufacturing sector. It was amended in 2022 to further simplify the procedures, especially for MSMEs and start-ups. It was also made mandatory to indigenously source equipment for modernising the three Services as well as the Indian Coast Guard.[17] This move is in line with the government's 'Make in India' & 'Aatmanirbharta' initiatives.

On 28 August 2024, the Indian Air Force released an Expression of Interest (EoI) for the "Design, Development and Procurement of Drone/Unmanned Aircraft System (UAS) Mounted Aircraft Emulator" or DMAE. This would be procured under the Make-II Procedure of DAP 2020. Domestic manufacturers are invited to design an advanced drone system that can mimic the Radio Frequency (RF) signature of numerous aircrafts at the same time.[18]

On 15 October 2024, India and the US entered into a deal for procurement of 31 armed MQ-9B SkyGuardian and SeaGuardian High Altitude Long Endurance (HALE) drones. This would be a significant boost to the intelligence and surveillance capabilities of India. It is also in line with the US's objective of reducing India's military cooperation with Russia. The deal also acts as a counter to the growing dominance of China.[19]

The iDEX **Open Challenge Programme (OCP)** invites state-ups, MSMEs and innovators to submit innovative proposals and solutions under emerging technologies. The challenge aims to harness private sector innovation to boost the military superiority of India. It provides a platform for innovators to connect directly with the military via DIO and its Partner Incubators. Selected innovators receive government support to

transform their proposals into viable solutions. The latest iDEX Open Challenge was announced with a deadline of 31 March 2025.[20]

Furthermore, the Indian Army has equipped itself with an indigenous swarm of 100 heterogeneous Unmanned Aerial Vehicles (UAVs) that can be used in combat zones. This makes the Indian Army potentially the first military force to use a "high density swarming UAS" in operation. Drones in the swarm have the capacity to carry bombs and hit targets at a distance of 50 kms, at the very least. This swarm has been developed by NewSpace Research & Technologies Pvt Ltd (NRT), a defence and aerospace company based in Bangalore. The development of this swarm is a major milestone in India's "Made in India" and Atmanirbhar Bharat initiative.[21]

Swarm drones use advanced technology to execute mission protocols with the least amount of human interference. They are capable of complex behaviour such as obstacle detection, collision avoidance manoeuvres and self-organisation. They can make decisions collectively and re-organise themselves if one drone fails or is taken down.[22]

The above paragraphs reflect the strides India has made in the drone sector while emphasising on innovation, indigenisation and self-reliance. There is an ardent push for an advanced drone warfare capabilities. Despite such efforts, New Delhi faces challenges in terms of global competitiveness and mass production. At this point, it becomes crucial for India to seek collaboration with its global partners such as Japan. Japan is known for its advancement in imaging sensors, AI driven drone application and other expertise in this area. This aligns with India's drive for self-reliance. A drone technology collaboration between India and Japan will not only help counter China's dominance in this sector but also promote ways for joint R&D, military applications and manufacturing.

Japanese Government Initiatives on Drone Technology

- **Framework for Fukushima Innovation Coast:** A world standard research base was established for innovative R&D in the region, named Fukushima Robot Test Field.[23] AI equipped drones are being developed by Eams Robotics under the framework. These drones would be tasked with survey/inspection of difficult terrains. These may include bridges, wind farms, dams etc. These

drones would also be used to deliver supplies to remote and difficult locations. Disaster relief data gathering would be another key focus of the drones. Real-time monitoring of disaster hit areas would allow for quicker and targeted responses. The company has also established horizontal cooperation with local industries for developing the drone market in Fukushima.

- **Japan's Defense Buildup Program:** In December 2022, Japan released its Defense Buildup Program under the National Defense Strategy, 2022. Accordingly, the Japanese Self-Defence Force (JSDF) started the process of upgrading their existing helicopter fleet with drones/ unmanned aerial vehicles (UAV). Long-range UAVs and marine vessels would be procured under the Program. Such UAVs would boost the ISR (intelligence, surveillance, and reconnaissance) capabilities of the JSDF. Advanced drones with cameras and thermal sensors would be used for disaster relief operations. These drones would be developed using emerging technologies via public-private collaboration.[24]

- **Loyal Wingman drones:** In 2021, Japan's Ministry of Defence announced the development of their Loyal Wingman drone programme. These drones would be carried aboard the next-gen F-X fighters. The drones would detect threats that would then be targeted by the fighters. It is expected that the drones would have the capability to mount air-to-air missiles in the future.[25] The JSDF aims to deploy Loyal Wingman drones for its next-gen fighter planes by 2035.[26]

This highlights Tokyo’s structured approach towards the development of UAV with special focus on regulatory frameworks. Japan also promotes the growth AI driven drones for both industrial applications and disaster relief. Apart from the civilian use, Japan’s efforts in integrating advanced UAV in military operations cannot be undermined. These efforts clearly align with India’s drone manufacturing under Atmanirbhar Bharat especially for ISR and combat applications. Since, both the nations share common security concerns in the region, there are various areas in this sector where they could cooperate to mitigate these challenges.

Indo-Japan Technology Partnership in the Indo-Pacific

The relationship between India and Japan has historically been one of friendship. In 2014, this relationship was upgraded to a Special Strategic and Global Partnership. Multiple defence cooperation agreements have been signed between the two nations as part of their bilateral ties, including:[27]

Digital collaboration between the two countries is further strengthened by the Memorandum of Cooperation on Semiconductor Supply Chains, as well as the Semiconductor Policy Dialogue. The launch of the India-Japan Forum in 2021 was a boost to the cooperation between India and Japan.[28]

The growing alignment regarding strategic interests and a shared vision for the Indo-Pacific has further deepened this cooperation. Various initiatives and projects have been undertaken by the two nations in the field of technology.

- **Unified Complex Radio Antenna (UNICORN) Masts:** On 15 November 2024, India and Japan inked a Memorandum of Implementation (MOI) for developing Unified Complex Radio Antenna (UNICORN) Masts. These antennas will be fitted on ships of the Indian Navy. The design for these masts would be provided by Japan, whereas co-production and integration would be done by India.[29] The system possesses the capability for detecting drones and missiles over a wide area.[30] This Agreement is the first of its kind between the two nations, and is expected to set a precedent.[31]

  Traditionally, a ship has different antennas for communication, electronic warfare and radar. These antennas are attached to various masts, increasing the ship's radar cross section (RCS). This makes a ship more prone to detection by enemy radars. The UNICORN mast consolidates all these antennas into a single horn-shaped radar dome (radome). This reduces the electromagnetic signature of the ship, making it harder to detect. Furthermore, the system is installed with a strip for diverting lightning, called Fibre Reinforced Plastic (FRP) radome. This ensures that the mast remains weather resistant in the open sea.[32] The radio frequency functioning, stealth technology and weather resistance employed by the antenna makes it a top-quality weapon-grade antenna. The

Japanese Navy currently employs these antennas on their Mogami-class frigates. In contrast, the Indian Navy utilises the Advanced Composite Communication System (ACCS), supplied by Bharat Electronics Limited (BEL). This is a 4th gen voice and data integrated system used for external communication. And although they are reliable,the stealth security provided by UNICORN is far greater.[33]

UNICORN comes as a response to the growing concern of the two nations regarding China's increasing presence in the Indo-Pacific. Of particular concern are two laws enacted by China in 2021 - the Data Security Law and the Personal Information Protection Law. Under these laws, Chinese vessels can turn off their Automatic Identification Systems (AIS) in particular locations.[34] This poses a huge challenge in the effective monitoring of the maritime waters of the region by other nations. This not only strengthens China's maritime force, but is also a direct threat to India and Japan, who have a substantial interest in the region.

- **eVTOL Aircrafts:** A Memorandum of Understanding (MoU) has been signed between India's Marut Drones and Japan's SkyDive focusing on electric vertical take-off and landing (eVTOL) aircrafts. These aircrafts, which are also known as air taxis/ flying taxis, amount to a pivotal change in air transportation. They are battery operated, and integrate the hoverability of helicopters with a fixed-winged aircraft's efficiency. As such, they present an efficient and uncommon means of transport that has zero emissions.[35]

  Marut Drones are set to identify and connect SkyDrive with potential networks and customers. This would include connecting with government agencies, infrastructure providers and securing airfields. Research on the potential of short-distance flights in India would also be undertaken.[36]

- **Autonomous Swarm Systems for Intelligent and Swift Turnaround (ASSIST):** NewSpace Research & Technologies Pvt Ltd (NRT) is collaborating with Autonomy HD of Japan, to establish a disaster management initiative called Autonomous Swarm Systems for Intelligent and Swift Turnaround (ASSIST). The Unmanned Aerial Vehicles (UAVs) developed by NRT use proprietary

technology that allow the swarm drones to be the optimal first response for disaster hit areas. These swarms have different endurance capacities, and are capable of distributing assignments amongst themselves depending on what is needed. This makes them capable of working non-stop for a long duration.[37]

The first demonstration of the swarm was carried out on 1 August 2023, at the Tochigi Prefecture. It was attended by Japanese experts in disaster management, drone industry seniors and government officials. ASSIST's capabilities in data collection, rapid detection, efficient logistics, medical aid transportation and rescue operations were showcased in this demonstration. Kenzo Nonami, the chief robotics scientist of Autonomy HD, stated regarding the demonstration, "The demonstration by NRT was a historic event, and we are very proud of collaborating with NRT, which has built world-class swarming technologies. We will work with NRT now for developing technologies for applications in Japan."[38]

- **Project Arrangement Concerning the Visual SLAM-based GNSS Augmentation for UGV/robotics between Japan and India:** In July 2018, Japan's Acquisition, Technology and Logistical Agency (ATLA) and India's Defence Research and Development Organisation (DRDO) entered into an agreement for researching and developing Unmanned Ground Vehicle (UGV) and Robotics.[39] The project, titled "Project Arrangement Concerning the Visual SLAM-based GNSS Augmentation for UGV/robotics between Japan and India", was successfully completed in April 2024. The focus of the project was to develop state-of-the-art navigation technology for autonomous military vehicles.[40]

  Traditionally, military operations employ the Global Navigation Satellite System (GNSS). These signals are vulnerable to disruptions from various factors, such as terrain and enemy interference. Autonomous vehicles require a high degree of precision, which cannot always be provided by GNSS. In contrast, Visual SLAM (Simultaneous Localisation and Mapping) uses sensors and cameras to provide a real-time map of the vehicle's surroundings. The data provided by GNSS is supplemented by this map, increasing the reliability of navigational systems.[41]

The development of this technology is of much salience for defence and technology cooperation between the two nations. It lays down the foundation for further development in the field of robotics and UGV for both countries.

India Absent in Japan's OSA list

In April 2023, Japan developed a new cooperation framework called "Official Security Assistance (OSA)" for the benefit of military forces and allied organisations from like-minded countries with the goal of increasing security cooperation. OSA is the most recent addition to Japan's assistance program, and it is distinct from "Official Development Assistance (ODA)," which is intended to promote the economic and social development of developing nations.[42]

Japan sends equipment and supplies to partner countries, as well as aid with infrastructure development, to boost their security and deterrence capabilities for international peace and security.[43] The National Security Strategy 2022 of Japan also refers about the role of OSA.

Speaking about the official security assistance (OSA) program, a government official stated to The Japan Times, "Both ... partner and candidate countries have been showing increasing interest in Japanese drones and related equipment, so we have begun looking into this."[44]

Armed forces throughout the world have started incorporating drones into their units, whether for use in the air, on land, or at sea, in the hopes that these increasingly powerful and frequently autonomous systems will provide them with an advantage. The fact that many nations, including Japan, learnt from the conflict in Ukraine that drones may serve as force multipliers while reducing casualties and running constantly for extended periods of time is perhaps another factor contributing to the rising interest. The Foreign Ministry has asked for ¥8 billion ($52.5 million) for the OSA framework for fiscal 2025, which begins on April 1. This would represent a 60% increase, or ¥3 billion, if the Parliament approves it.[45] Tokyo wants to bolster the security and deterrent capacities of "like-minded" nations in the face of mounting worries about the regional security environment.

The predicted rise in OSA spending would be the third since the program was inaugurated in 2023 with an initial ¥2 billion budget.[46] This breaks with Tokyo's previous policy of avoiding the use of development aid for reasons other than disaster relief.

Malaysia, Indonesia, the Philippines, and Mongolia, all existing recipients, as well as Papua New Guinea, are among the up to nine nations being considered for the third OSA tranche.[47]

The Japanese government intends to provide drones to Asian and Pacific island states for infrastructure inspection, as well as airspace and territorial water surveillance. The main driving element behind Japan’s endeavour to expand its drone sector is an increasing demand for drones, especially the ones used for surveillance purpose in the region. Tokyo recognises that the Chinese DJI drones have already captured the largest share of the civilian markets and focuses on investing in this sector to strengthen its capabilities. When compared with the Chinese drone companies, the Japanese companies are small and new and stand nowhere close to competing with the Chinese giants. The Government of Japan has encouraged subsidies and other mechanisms for the growth of its domestic companies.[48]

In this context, it is crucial to understand how far India can collaborate with Japan in this sector. Both the countries share common concern and are committed to ensure peace and stability in the region. Nonetheless, New Delhi is not a part of Japan’s OSA framework despite being significant strategic partners. Although both the countries have signed several agreements and encourage technology transfer but most of their plans could not materialise as expected.[49]

Navigating the Challenges

There are several factors which impedes the growth in technology transfer between the two nations. Some of them have been discussed in the following paragraphs:

- **Different Regulatory Frameworks:** Both the countries have regulatory frameworks for their technologies and drone technology too have certain policies and frameworks. New Delhi initiated its Drone Rules 2021 along with

the Production Linked Scheme (PLI).[50] The PLI scheme is designed to enhanced drone manufacturing capability of India by earmarking norms for both MSME and Non-MSME.

Nonetheless, in terms of defence related technologies, Tokyo has very stringent rules. Although it came up with the "Three Principles on Transfer of Defence Equipment and Technology" in 2014 but its export controls on defence related technologies are not very smooth.[51] Aligning the technology transfer policies of both the countries remain quite challenging.

- **IP and Export Restrictions:** Two major issues in transferring advanced drone technology from Japan to India are intellectual property and export restrictions. Furthermore, it remains challenging for New Delhi to create a resilient supply chain for drones. Overcoming such challenges remain crucial to ensure a smooth transfer of drone technology from Japan to India.

- **Strategic Priorities do not Align:** Although New Delhi and Tokyo are committed towards shared concerns in the Indo-Pacific, but their strategic priorities may not always align. Under the OSA, Japan has identified a list of countries with which it focuses to strengthen its strategic cooperation. Nonetheless, India is not listed under Japan's OSA list, and it maintains its own strategic autonomy, such as New Delhi's defence cooperation with Russia. Taking this into consideration, considerable diplomatic efforts would be required between Tokyo and New Delhi to initiate bilateral drone cooperation.

- **Limited Joint Ventures:** The level of investment between India and Japan is limited in term of joint ventures. Market demand and uncertainties in polices are certain factors due to which Tokyo is reluctant to invest in India. Meanwhile, to match Tokyo's advancement in technology, New Delhi needs infrastructural support and financial backing. Bridging this gap through joint R&D, government backed incentives and private sector collaboration is essential to collaborate between the two countries.

Navigating the Path to Collaborative Growth between India and Japan

- **Creation of a India Japan Drone Cooperation Framework:** As mentioned earlier that India is not a part of the OSA list of Japan, it is crucial that India could come up with an alternate bilateral agreement which would focus on stronger cooperation between India and Japan and enhance drone technology capabilities of India. This would also align with India's Atmanirbhar Bharat initiative and enable New Delhi to benefit from Tokyo's advanced drone technology.

- **Encourage Industrial Collaboration:** The governments of both the countries could commence collaboration between their firms. New Delhi could collaborate its drone companies under Make in India initiative with Japanese drone companies such as Yamaha, Subaru and VFR. In order to scaling up production, it is essential to encourage joint ventures from both sides, which could eventually overcome the mass production challenges that Japan is facing.

- **Offer Incentives:** New Delhi could offer attractive incentives to the Japanese drone firms to encourage manufacturing in India. This could include schemes such as Production Linked Incentives (PLI), tax incentives and dedicated industrial zones. Such initiatives could strengthen New Delhi's drone supply chain along with creating jobs and reduce costs.

- **Commence Security and Defence Cooperation in Drones:** India could promote other bilateral agreements which would be defence focused drone collaboration. This could include co-production or co-development of drones mostly used for surveillance purpose, maritime patrol drones and UAVs for border security. All of them could be under one separate security framework.

- **Collaborate in Drone Export Initiatives Aligning Indo-Pacific Strategies:** Since both the countries are committed to coordinate in their Indo-Pacific strategies they could cooperate in providing alternative drone solutions to countries who are looking for non-Chinese products. New Delhi could align its defence exports with Japan's OSA beneficiaries and grow their influence in the region.

Conclusion

Japan's initiative to supply drones to its partners in the Indo-Pacific reflects its significant shift in its security policies and aims to foster its domestic industries while countering China's dominance in the drones sector. Its OSA framework is a significant mechanism through which Tokyo is making strides to strengthen the drone capabilities of the like-minded countries in the region. Nonetheless, India's absence from the list, despite being one of Japan's closest partners, raises questions about the depth of their strategic relationship. However, this does not define their relationship as both the countries have already inked several agreements and focused on co-development and co-production of technologies, in addition to technology transfer. Both New Delhi and Tokyo recognise that drone collaboration between the two countries could offer non-Chinese alternatives to its partners in the region. It is to be noted that, the success of such technology cooperation would require more diplomatic efforts and sustained political will from both the nations.

DISCLAIMER

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