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Book Review

# INDIA USHERING IN THE NEW ERA OF WARFARE: DRONE INDIGENISATION PROSPECTS AND CHALLENGES

**RICHA TOKAS**

## **INTRODUCTION**

In the age of technological advancement, Unarmed Aerial Vehicles (UAVs) have gained significance due to an increase in border encroachment, domestic crime, terrorist threats, and security concerns. This is largely because UAVs are functionally versatile and can be operated in any kind of circumstances. This shows that in addition to being an aerial aircraft, it has a system that incorporates ground stations, satellite connectivity, occasionally onboard weaponry, and other components. Due to their ability to carry out precise strikes on distant targets without causing collateral damage and their ability to be utilised for surveillance, these systems are becoming increasingly important from a military perspective. UAVs can be used for a variety of tasks, including determining the direction of artillery fire, obtaining electronic intelligence (ELINT) data, lasing targets for fighter aircraft, and post-strike damage assessment (PSDA).<sup>1</sup>

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1. Major General PK Chakravorty, VSM (Retd.), "IAF: Unmanned Aerial Vehicles (UAVs) Indian Perspective", *India Strategic*, February 2012, at [https://www.indiastrategic.in/topstories1369\\_Unmanned\\_Aerial\\_Vehicle.htm](https://www.indiastrategic.in/topstories1369_Unmanned_Aerial_Vehicle.htm). Accessed on August 2, 2022.

Systems like these highlight a transformational change in warfare and result in considerable cost savings while enhancing the value of information obtained. In the past few years, UAVs have become more sophisticated. UAVs—popularly known as Drones—are being deployed in a war zone and are making a difference in the outcome of day-to-day military operations. The practicality and the sheer ease of use of these UAVs in war zone operations in Syria, Libya and Nagorno-Karabakh have altered and shifted the dimensions of controlled and restricted conflict. Events like these have pushed countries to incorporate drones into their traditional war strategies and methods.

### **THE INITIATIVE OF THE GOVERNMENT OF INDIA— BECOMING AATMANIRBHAR**

India is among the fastest-growing markets for UAVs, and India's armed forces have been using UAVs procured from foreign suppliers for a long time now. India is in fact one of the top UAV importers for military use in the world.<sup>2</sup> India accounts for about 20 per cent of global UAV imports. Moreover, the Government of India's "Make in India" initiative is likely to push domestic manufacturing of these drones, driving India's UAV market forecast revenues over the coming years.<sup>3</sup> The Government of India (GOI) is aiming to match global standards and make India a global drone hub by 2030. For this GOI has liberalised drone regulation in 2021 and taken initiatives like Drone Shakti (a production-linked incentive scheme) which will offer a total incentive of INR 1.2 billion (US\$ 162 million) to the entities developing and manufacturing UAVs.<sup>4</sup> These developmental initiatives showcase India's effort to encourage the indigenisation of

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2. "Unmanned Aerial Vehicles: India Fastest Growing Market for Unmanned Aerial Vehicles", *The Economic Times*, March 26, 2018, at <https://economictimes.indiatimes.com/news/defence/india-fastest-growing-market-for-unmanned-aerial-vehicles/articleshow/63466658.cms>. Accessed on August 2, 2022.
  3. "India UAV Market (2017-2023)—Size, Share, Trend, Forecast", 6Wresearch Market Intelligence Solutions, November 2021, at <http://www.6wresearch.com/industry-report/india-unmanned-aerial-vehicle-uav-market-2017-2023-forecast-by-types-by-uav-range-applications-regions-competitive-landscape#>. Accessed on August 1, 2022.
  4. "India's Emerging Drone Industry", KPMG, July 2022, at <https://assets.kpmg/content/dam/kpmg/in/pdf/2022/07/indias-emerging-drone-industry.pdf>. Accessed on August 2, 2022.

drone manufacturing and production. These initiatives taken by the Government of India are likely to result in encouraging individuals and businesses and start-ups. More patent applications will probably be made in the near future. India had an increase of 34.4 per cent in the number of drone start-ups between August 2021 and February 2022, totalling 221 start-ups.<sup>5</sup> The restriction on the import of foreign drones was declared by the government in February 2022, however, imports of drone parts were still permitted.<sup>6</sup> Other steps taken by the Government of India to strengthen, enhance, and develop the ecosystem of the indigenous drone industry include Drone Airspace Map, National Unmanned Aircraft System Traffic Management (UTM) policy framework, followed by the 2022 Drone certification scheme and single-window Digital Sky Platform.

#### **INCREASING EFFICIENCY—MILITARY-SPECIFIC DRONES**

For ensuring success in the event of warfare, the Armed Forces of India must be capable of rapidly mobilising and deploying our forces as well as resources. For the armed forces to counter adversaries strategically and gain an edge, they need to have access to a sufficient number of UAVs as well as anti-UAV capabilities. The armed forces of India are keen to acquire safe, reliable and secure UAVs made indigenously. Domestic industries must meet the military requirements of UAV airframes and ruggedised Ground Controllers. However, for the UAV industry of India to effectively achieve self-reliance, there is a need to focus on solutions for UAV Flight Controllers to meet military standards. The use of UAVs in contemporary combat has already resulted in changes and adjustments in the COMSEC (Communication Security) and TRANSEC (Transmission Security) and Electronic Warfare (EW) policies.<sup>7</sup> Buyers in the arms industry closely scrutinise such specifications in the equipment brochures because every modern Surface-to-Air Missile (SAM) system with Air Defence (AD) allows

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5. Ibid.

6. Ibid.

7. Milind Kulshreshtha, "Drone Mahotsav 2022: Need for Defence Focused Technology to Achieve Indigenisation", *The Financial Express*, June 13, 2022, at <https://www.financialexpress.com/defence/drone-mahotsav-2022-need-for-defence-focused-technology-to-achieve-indigenisation/2559003/>. Accessed on July 30, 2022.

for UAV or drone hunting capabilities.<sup>8</sup> The continuing Ukraine-Russia war in which Unmanned Aerial Combat Vehicles aka weaponised drones are being used have advanced navigation/control features combined with an effective optical day/night sensor. Its use has highlighted the effectiveness and use of drones as a lethal weapon against adversary targets.

### **INDIGENISATION OF UAVS—GAPS IN DEVELOPMENT**

It is important that UAVs must meet military-grade standards to be effective in the terrain where they are to be utilised. Cybersecurity infiltration tests must be performed efficiently and carefully to find and recognise possible and prospective weaknesses in security. Apart from that indigenous drone industry needs to modify and amend airframes and ruggedise the external hardware. To promote local drone manufacturers, it is also important to deal with the competition created by the Chinese made subsystems which are being used and preferred in indigenously made drones for cost-effectiveness. One of the main obstacles to the expansion of the Indian UAV market is the government's propensity to drag its feet when it comes to approving an agreement or project. For instance, it has taken longer than a year to finalise the agreement for the Heron TP Armed drones. Furthermore, slow domestic manufacturing growth leads to a rise in reliance on imports as a result of procurement delays.<sup>9</sup>

The market for UAVs has been increasing as days pass. Recent events, like the acquisition of 10 Heron TP MALE UAVs from the Rustom series and the conversion of the fleet of existing unmanned aerial vehicles (UAVs) to unmanned combat aerial vehicles (UCAVs), have made it abundantly clear how important it is from a geostrategic perspective to develop our indigenous inventory to prepare for future warfare. Hindustan Aeronautics, Israel Aerospace Industries, Bharat Electronics, Idea FORGE, and Dynamic Technologies are some of the significant Indian businesses that are

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8. Ibid.

9. "Increasing Need for Smart Avionics and Rising Defense Spending Would Surge the Growth of India Unmanned Aerial Vehicle Market", 6Wresearch Market Intelligence Solutions, August 21, 2017, at <http://www.6wresearch.com/press-release/india-uav-market-unmanned-aerial-vehicle-share-trends-forecasts-size-growth-opportunity-media-news>. Accessed on August 1, 2022.

assisting the UAV market to develop into a viable and significant global market.<sup>10</sup> To keep pace with the advanced technology and the innovations that are being made in the field of defence and security, the Government of India's decision to support and move towards motivating and encouraging the domestic drone industry signifies that, in the coming years, India will emerge as an Aatmanirbhar (self-reliant) Nation.

### **CAPACITY BUILDING—RIGHT APPROACH TOWARDS INDIGENISATION**

There is a need to educate and impart industry-ready skills and provide access to technology to the youth of India. Recently a Memorandum of Understanding (MoU) was signed by Drs. Kiran & Pallavi Patel Global University (KPGU) and IG Drones have. Both parties (KPGU and IG Drones have) have consented to cooperate and join forces and synchronise training infrastructure. This is an initiative taken in the right direction as it will offer vocational courses to the youth, providing them with the tools and knowledge that will impart industrial awareness, and placement opportunities. Initiatives like this mark positive and practical change to make India the world's next Drone Manufacturing Hub and align and support the government's Skill India and Aatmanirbhar Bharat initiatives.<sup>11</sup>

### **DEVELOPMENT AND PROCUREMENT OF UAVS IN INDIA**

In 1999, Nishant UAV was deployed in the Kargil war. Nishant UAV was developed by Defence Research and Development Organisation (DRDO) in 1988. With time, innovations and advancements in drone technology took place at a rapid pace. To meet operational requirements for Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA), drone deployment in the armed forces across the world took a toll. In the 1990s Indian Army procured

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10. n. 7.

11. "KPGU, Vadodara Partners up with IG Drones to Build a World-Class Drone Ecosystem in India", 6Wresearch Market Intelligence Solutions, February 1, 2022, at <https://www.6wresearch.com/news/425/kpgu-vadodara-partners-up-with-ig-drones-to-build-a-world-class-drone-ecosystem-in-india>. Accessed on August 3, 2022.

Searcher Mark I from Israel. Searcher Mark II from Israel was procured for the Indian Air Force and Indian Navy, this drone can carry a 68 kg payload, has a max speed of 200 kph, has a range of 300 km, endurance of 18 hours, and a service ceiling of 20,000 feet.<sup>12</sup> India also acquired Heron UAV from Israel Aerospace Industries (IAI) in 2000. Acquisition of Heron, a Medium Altitude Long Endurance (MALE) UAV, was based on the proposal of the Kargil Review Committee formed after the Kargil conflict. Heron UAV is efficient in target acquisition, adjustment of Artillery fire and Post Strike Damage Assessment (PSDA). Development of Rustom-1 UAV was taken up by DRDO. It was an ambitious project to replace Rustom-1 with Heron UAVs, but this project was closed due to issues of cost overruns. However, Rustom-2 which is a Medium Altitude Long Endurance (MALE) UAV was successfully tested by DRDO in 2020. It has the ability to provide and perform the task of intelligence, surveillance and reconnaissance (ISR). In addition, India recently purchased 50 Heron UAVs from Israel.<sup>13</sup> The possibility of buying US MQ-9 Reaper drones is being investigated by India. India is the world's top buyer of drones since domestic drone production is still in its early stages.<sup>14</sup> Project Cheetah, which is a Rs 3,500 crore project, is taking place in partnership and collaboration with IAI of Israel, the project is also likely to incorporate indigenous solutions, thus conforming to the 'Make in India' theme. Under this project, the current Heron UAVs are being armed with laser-guided bombs/PGMs and air-launched Anti-Tank Guided Missiles (ATGMs). A hunter-killer drone named "Harop", which was also built by IAI operates in "kamikaze" mode and launches itself at a preset target. This UAV has anti-radar homing capabilities and can loiter. According to reports, the IAF paid \$100 million for 10 Harops.<sup>15</sup> The project also contains a smaller drone that is capable of carrying less powerful explosive payloads, which is

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12. Brig Arvind Dhananjayan (Retd.) and Team Chanakya, "India's Tryst with UAV: From Surveillance to Strike", Chanakya Forum, July 21, 2012, at <https://chanakyaforum.com/indias-tryst-with-uav-from-surveillance-to-strike/>. Accessed on August 2, 2022.

13. "Drone Warfare—Challenges and Opportunities", Forum for Integrated National Security, February 9, 2021, at <https://finsindia.org/drone-warfare-challenges-and-opportunities/>. Accessed on August 3, 2022.

14. Ibid.

15. n. 12.

one-fifth the size of the original drone.<sup>16</sup> Niche Technologies such as Swarm Technology, High Altitude (HA) Surveillance and Logistics UAVs, Nano/Mini Drones and Counter Drone Technology, Loitering Munitions, Runway Independent UAVs, Minefield Detection UAVs shall be co-developed with pioneers of drone technology so that India can keep up with the advancement that is ongoing in Defence and Security field.

For boosting strategic surveillance capabilities along the LAC, the Indian army is looking forward to deploying four Unarmed Israeli advanced Heron TP (Eitan) MALE UAVs. Heron TP is fully equipped with redundant avionics, autonomous taxi take-off and landing (ATOL), and satellite communication (SATCOM). These UAVs have been leased for a period of three years at a cost of US\$ 200 million. Such leasing of military equipment by the Indian army has been made possible after the introduction of the leasing clause in the latest version of the Defence Acquisition Procedure.<sup>17</sup>

### **CHALLENGES IN THE OPERATION OF UAVS**

How can we trust a machine to accurately identify a target and fire a weapon without human intervention is a critical question that has not been resolved.

Inventions in technology are taking place at an accelerating pace. Indeed, it contributes to the development of society and the economy altogether. The need for, and importance of, the growth and development of the drone Industry in India has been highlighted in the previous section. But, with the development of drones, we need to address some concerns. UAVs as mentioned above are of great use to gather intelligence and strategic information but at the same time, they can also contribute to the loss of potential intelligence. Using them in the missions for hunter and killer will do no benefit as it will neutralise the target and the intelligence that could be gained through capture/surrender will be lost as the dead have no stories to tell. Drones are man-made machines controlled by pilots from a distance. Because of this, they are prone to mechanical errors and at

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16. Ibid.

17. Ibid.



times may cause civilian fatalities. In situations like this, who would be held accountable?

Moreover, there have been concerns about the precision with which UAVs can strike their target and the collateral damage which can occur because of Drone Strikes. In war-affected areas, there have been reports that these Drone Strikes have made a deep impact on the civilian's mindset, affecting them mentally. There is a constant fear of attack in the mind of civilians, keeping them in a perpetual state of anxiety.<sup>18</sup> UAVs are Unmanned Aerial Vehicles, they are unmanned in the sense that no one is actually physically flying these aerial vehicles. However, flying and operating these UAVs may engage a whole lot more manpower than is required for flying and operating a conventional aircraft. This means that all the personnel operating the UAVs need to be specifically trained for operating these UAVs. Therefore, making it all the more a cost-intensive operation where, apart from the capital investment, operational costs are also huge.<sup>19</sup> As the UAVs are being remotely controlled and consist of advanced technology that is usually based on niche software that is installed both on the Drones as well as the systems, it makes them more prone to hacking. Armed forces cannot afford to have their UAV hacked and used on them as it will defeat the purpose of UAVs. Therefore, securing the UAVs from any Cyber threat must be a priority for the developers of UAVs.

Further, there is also a need to avoid crashes and accidents in the already congested and crowded air space. It is imperative that a nodal agency be established at the tri-service level which should work in sync with the Directorate General of Civil Aviation for the management of airspace and establishing guidelines for their effective use. This needs to be done as UAVs have come to play an effective and active role in internal security, law enforcement, and other proposed civilian uses.

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18. n. 13.

19. Col Amar Ramdasani, "Conceptual & Ethical Dilemmas in Employment of Armed UAV's in CT/CI Operations in Indian Context", The United Service Institution of India, January 2013, at <https://usiofindia.org/publication/usi-journal/conceptual-ethical-dilemmas-in-employment-of-armed-uavs-in-ct-ci-operations-in-indian-context/>. Accessed on August 3, 2022.

## CONCLUSION

To build confidence and strengthen the indigenous capability for becoming technologically advanced in the defence and security arena, Aatmanirbhar Bharat is the right way of doing it. Being self-reliant is the need of the hour. This cannot be achieved in a day, therefore we must first explore collaborations with foreign defence partners for co-development, co-production, and technology transfer as it will contribute to evolving domestic capabilities and technologies. This will provide the indigenous players with experience and technical knowledge by collaborating with foreign players and will help them achieve their objectives and vision. The uncertain global developments taking place in the world such as the Ukraine-Russia War and recent Chinese War Exercise over Taiwan, coupled with the large incidence of drone incursions along our borders, have made us realise that National Security is the priority and for that, we can't be over-dependent on foreign countries for effectively securing our interests. The trend of importing defence equipment from foreign countries needs to be reversed, given larger national interests.

UAVs have become a necessary and essential component of modern warfare as they enhance the combat capabilities of the armed forces of the nation. But to be battle ready and attain superiority over the adversary's coordination, the synergy of manned and unmanned will always prove to be an essential and viable option to attain superior hard power capabilities not just in the sky but also on land and ocean. A rational and practical indigenous defence manufacturing approach or strategy is essential and crucial to ensure a secure and sustained supply of UAVs and UCAVs for enhancing the strategic and national security interests of India. UAVs may not completely replace the manned strike force shortly, but they have considerably reduced the use of conventional fighter planes. This is because drones effectively reduce the threat to the pilot of the aircraft as well as save very costly fighter planes. In such coordinated situations or scenarios, a drone can be sacrificed to save the life of a human operator in a manned system. In all three terrain, land, air, and ocean, conflicts and war will be fought with the increased use of unmanned systems and the use of artificial intelligence and robotics. India has a vast region geographically and its armed forces face more strategically complex,

deliberative, and tactical risks. While advancing and investing in the crucial and potential defence systems of unmanned systems, India must take into account prospects, challenges and opportunities that can crop up during future conflicts. For gaining an edge during future conflicts and autonomously handling them, India needs to strengthen its indigenous industry and focus on the development of unmanned systems. India should consider focusing on cyber and electronic countermeasures and develop aerial and maritime autonomy. The development of these advanced systems has a long-lasting impact on adversaries. UAVs can have that impact on adversaries as UAVs transcend their roles from surveillance to strike and can effectively operate in numerous scenarios. Due to the utilisation of drones during deployments, UAV technology is more adaptable, effective, quick, and safe for service members.<sup>20</sup>

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20. n. 13.