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# DRONE WARFARE

**CAPACITY BUILDING IN SECURING  
INDIA'S NATIONAL INTERESTS**



Harshini Nag

**Drone Warfare**  
**Capacity Building in Securing**  
**India's National Interests**

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## ***Abstract***

*This paper seeks to make a case for the utility of drone warfare in securing India's national interests. It begins by establishing how drone proliferation acts as a threat and opportunity in the context of India's security objectives and discusses the importance of drone warfare capacity building in countering the security threats faced by India. It then highlights the benefits and areas of operation where the Indian military could use drone warfare to achieve its objectives from ISR and Dull, Dirty and Dangerous' missions to counter-terrorism and logistics. It also talks about anti-drone technology and the challenges associated with the same. Then, the paper examines the current state of drone and anti-drone warfare capacity in India. Finally, it discusses five considerations that must be addressed in the way forward for drone warfare capacity building. The paper argues that considering India's geopolitical realities, it is impertinent that India takes action to build its drone warfare capacity both via indigenous production and international procurement.*

## Introduction

From conducting elaborate counter-insurgency operations across borders to targeted strikes, Intelligence, Surveillance and Reconnaissance (ISR) Missions in the Indian Ocean Region (IOR), the Indian military is donning various hats to counter the diverse range of threats faced by the country in the 21st-century geopolitical environment (Bhardwaj, 2021). Planning, preparing and neutralising such threats requires a proactive approach towards adopting new military technology, the tactical knowledge to use such technology and the political ability to manage the security implications of such actions (Chopra, 2022).

Drones or Unmanned Aerial Vehicles (UAVs) are one such cutting-edge tools of warfare that have established themselves as an essential part of surveillance and punitive operations (Chopra, 2022). Owned by over a dozen countries, drones are no longer limited to counter-terrorism operations by the United States in Pakistan and Afghanistan. UAVs have not only played a decisive role in the armed conflict between Armenia and Azerbaijan but they are also being used extensively by both sides in recent Ukraine – Russia conflict.

For India, this situation comes with both nuanced security threats and opportunities. The terrorist attacks on the Jammu IAF base in June 2021 have confirmed suspicions that non-state organisations are gaining access to capabilities that will enable the employment of drones in acts of terrorism (MC, 2021). Further, the Chinese surveillance of Indian Naval ships through underwater drones shows that the technology has also enhanced the damage-inflicting abilities of traditional security concerns (Bajpai, 2022). However, on the other hand, India showcased a fleet of drones in the 2022 Republic Day parade – drones that can be used effectively for leadership decapitation, information gathering, degrading enemy morale and reducing military casualties.

Thus, considering the costs of lagging in drone warfare and the benefits of the ability to use such technology, developing drone warfare capacity, especially indigenous, is of increasing importance for the Indian military. (Bajpai, 2022).

## **Aim of Research/Research Question**

To highlight the importance of drone warfare capacity building in countering the security threats faced by India.

To explain the benefits and areas of operation where the Indian military could use drone warfare to achieve its objectives.

To examine the current state of drone warfare in India and provide recommendations on how the country can proceed further.

## **Research Design**

This research paper is divided into six sections. Section one provides a brief overview of drone warfare and its history. Section two discusses India's security concerns in the 21<sup>st</sup> century and the role drones play in helping India combat these concerns. This section highlights the need for India to fund the development of drone warfare capacity and discusses drones as an opportunity, a threat, and as an important instrument in India's drive for self-reliance. Section three delves further into the advantages and uses of drones both in warfare and counterterrorism. The objective of the section is to explain in what circumstances drones are currently being used and provide an overview of the potential drone warfare holds for the country. Section four discusses crucial aspects of anti-drone technology and the state of anti-drone systems in India, especially against non-state actors. Section five will explain the limitations and critiques of drone warfare to offer a balanced perspective. Finally, section six concludes by explaining the

current state of drone warfare in India and discussing five considerations that must be addressed to pave the way forward for India in developing drone and anti-drone capabilities.

The scope of the paper is limited to making a case for drone warfare capacity building in India rather than exploring facets of drone warfare itself.

## **An Overview of Drones Warfare**

Drone is an umbrella term used to refer to any remotely controlled aerial vehicle with no human crew on board. It encompasses what is referred to in the military as both Remotely Piloted Aircraft (RPA) and Unmanned Aerial Vehicles (UAV). Drones began finding ground in military circles by the end of WWI and were first prominently used for reconnaissance by the United States during the cold war in the late 1950s (Chopra, 2022). However, they failed to enter mainstream operations as they were unreliable and expensive and required pilots to operate them from within the range of the drone's analogue radio signals (Bhardwaj, 2021).

Three major technological developments contributed to changing the world's perception of drones by the early 2000s: a) Enhanced endurance of modern drones, b) Replacing the use of radio signals with satellite networks, and c) Arming drones to step up their abilities from ISR to actually striking targets. From Predator to MQ 9 Reaper, drones became the United States' tools to deal with problems abroad and today, the country owns over 8000 drones (Bhardwaj, 2021).

While over a dozen countries possess drones, few produce them at home. The US sells its closely guarded drone technology to chosen allies while China, Israel and Turkey have developed their own UAVs. India first began developing its drone warfare capacity by acquiring surveillance drones from Israel in the 1990s (Bhardwaj, 2021). Two decades later, the country's



drone programme is limited to a few Heron Surveillance drones and the Harop loitering munitions (Chopra, 2022). However, not only is India far behind its competitors in its drone warfare capacity, but the country also faces a serious need to move beyond reconnaissance drones to armed drones. With technology in drone warfare evolving faster than ever before, drones are no longer the future of warfare, they are the present.

## **The Need for Drone Warfare Capacity Building**

India, in the 21<sup>st</sup> century, plays an influential role in global political and economic affairs as the largest democracy and one of the most rapidly developing economies in the world. However, India's national security landscape is often stressed and prone to conflict due to the actions of both internal and external actors.

A few factors dominate the Indian security apparatus' strategic concerns. First is India's regional threat perception - primarily because of Pakistan and China and, to a lesser degree, other neighbouring countries (Paranjpe, 2016). Second is the threat posed by terrorist and insurgent groups, often operating across borders and threatening civilian and military establishments. Finally is the urge for self-reliance – India's need to shift to developing military technology and equipment in the country and reducing its dependency on imports in the defence sector (Paranjpe, 2016).

Drone warfare can play an essential role in allowing the military to neutralise security threats by facilitating the assessment and management of these concerns, enhancing the efficiency of current operations and improving the country's preparedness for potential threats in the future. With adequate investment and collaboration in the research and development of drones, UAVs can be at the forefront of the military's modernization drive (Chopra, 2022). However, considering the cost commitment involved in the development of comprehensive drone warfare capabilities, one must

evaluate the necessity of drones for India in three aspects:

1. How can drones improve India's response to the current military challenges?
2. How is India affected by its adversaries developing drone warfare capacity?
3. How do drones fit into the broader vision of India's military modernisation drive?

## **Drones as an Opportunity**

From border control and counter-terrorism to external surveillance and combating weapon trafficking, drones can act as crucial force multipliers and improve the accuracy of operations being conducted by the defence forces. Their ability to loiter for long durations and be programmed to adapt to diverse climatic conditions make drones crucial in ISR missions, especially in high-altitude mountains like the Himalayas and the desert regions of the North West. Remote Piloted Aircraft Systems with day and night functionalities can be used to help forward posts, especially in Ladakh, to receive a more comprehensive view of the situation against China and direct artillery fire accordingly (Bisht, 2022).

Aerial and underwater drones can significantly bolster the Navy's ability to secure India's maritime borders by searching, locating, and tracking adversaries with better manoeuvrability and stealth than current alternatives (Bajpai, 2022). Maritime reconnaissance is especially critical considering China's increasing presence in the IOR. Drones enable better intelligence gathering across the Indo-Pak border to secure India against the threat of terrorists and allow the country to perform counter-terrorism operations without putting personnel on-ground (Farrow, 2016). It can

allow India to undertake a covert war against opportunity targets across the border, producing lethal effects at a lower financial cost. UAVs can also prove beneficial in responding to the trafficking of drugs and arms across the Line of Control (LC) by tracking smugglers and identifying enemy drones carrying trafficked items.

Finally, acquiring drones is a crucial part of improving India's preparedness for war (Bhardwaj, 2021). The employment of drones in the Nagorno-Karabakh battlefield was a game changer because it was a low-cost, casualty-minimizing option for the Azerbaijani forces to destroy the Armenian air defence (Patil & Kallenborn, 2022). Drones can also be used to destroy critical infrastructure and interrupt operations during wartime. For a country that has experienced four wars since independence, acquiring military equipment that is changing the nature of warfare in the modern world is a necessity.

## **Drones as a Threat**

These opportunities with the mainstream usage of drones for the Indian military come with their fair share of threats from the proliferation of drones – from states like China and Pakistan and non-state actors. China is a world leader in the drone production industry and sells drone capabilities to states in the middle east and Africa. The country has already deployed drones for non-lethal missions in the Himalayas, Indian Ocean Region and the South China sea (Chan, 2022). Without anti-drone capabilities, India not only suffers from the disadvantages of not having similar operational facilities at the LAC but is also susceptible to spy drones. China also possesses offensive capabilities via its best-seller Wing Loong and Caihong combat drones, and further research is being conducted into long-distance gliders and drones that can operate both in the air and underwater (Chan, 2022).

Further, being Pakistan's all-weather ally, the Chinese threat is also magnified by its sale of these capabilities to Pakistan. China has sold CH-4 unmanned aircraft and armed drones with a 99 percent kill rate in regional conflicts to Pakistan, among other UAV equipment. In addition to these drones, Pakistan is collaborating with Turkey to produce a medium-altitude, long-endurance multirole UAV system named Anka. (Patil & Kallenborn, 2022). Further, illegal drone activity across the border has continued to rise amid India being incapable of effectively detecting and neutralising hostile drones with its 'human eyes and guns' anti-drone infrastructure (Hindustan Times, 2022). These drones could be carrying explosives and drugs or collecting intelligence against India that could destabilize the country and harm its security interests.

Lack of an elaborate drone program puts India at a further disadvantage in case of a two-front war. In 2021, India experienced an attack via drones carrying explosive devices on its Jammu Air Force Station, after which two Lashkar-e Taiba (LeT) members were arrested with IEDs (MC.R, 2021). Considering the ease of developing and using drones for such attacks and the low cost of developing sacrificial drones, terrorist organisations have begun using drones to coordinate and conduct aerial attacks. In addition to military establishments, this puts critical infrastructure, including gas pipelines and power distribution plants, at risk of attack and civilian lives at stake (MC.R, 2021).

India thus must move beyond being a reactionary state and take steps towards acquiring drone and counter-drone capabilities to improve its intelligence and offensive abilities and protect its security interests from the threats posed by such emerging technologies.

## **Drones for a Self-Reliant India**

From *Atmanirbhar* Bharat to the 'Make in India' policy, self-reliance has been a crucial element of the Modi government's agenda. As India modernises its defence capabilities, domestic drone production can be at the core of the country's indigenous defence industry, with DRDO, DFI and several start-ups and MSMEs across the country showing immense potential (Singhal, 2022). Drone warfare capacity building in this context will not only provide the economic benefits of new job opportunities and reduced imports, but it will also act as a boost to India's technological advancement in the aerospace industry. More importantly, this can be key in reducing India's defence sector dependency on other countries, ensuring that supply is not affected by any geopolitical tensions and offering India a step up at the crucial strategic autonomy that it has so desperately wanted since independence.

If its current manufacturing potential is tapped into, India could achieve 40 percent hardware indigenization by 2025 and 60 percent by 2030, with massive benefits for the defence sector (Singhal, 2022)

## **Advantages and Tactical Uses of UAVs In Traditional and Counter-Terrorism Operations**

Drones, today, are increasingly being employed in a diverse and complex range of tasks, either replacing manned systems or providing opportunities in ISR and strategic strikes that previously did not exist. The removal of risk to human life, and fewer mistakes the drones make compared to other weaponry systems both by reducing the chances of human error and employing technologies like AI for better precision and decision making. Massive potential of drones to become even more accurate and infallible explains why drones are being hailed as the future of warfare (Bruntstetter, 2012).

## **Role of drones in Traditional Security Operations**

The advantages of UAVs in comparison to other military systems can be divided into two broad components. One is its ability to loiter across international borders without the risk of casualties and collect surveillance data and determine the best time to strike using data analysis, computation and artificial intelligence. Two, drones give states the ability to pick a limited covert strike over war by offering pinpoint accuracy and reducing collateral damage (Bruntstetter, 2012).

Use of drones in warfare can be divided into non-lethal and lethal roles. Drones are replacing manned aircraft in non-lethal roles on primarily the 'Dull, Dirty and Dangerous' missions. This involves long reconnaissance missions, missions involving flying over nuclear or chemical environments and operations that are placed in highly sensitive environments (Pant, 2020). Beyond this, drones are also capable of managing weapon delivery, electronic intelligence (ELINT) gathering, Directing of Own Artillery Fire (DOOAF), logistical support, aerial refuelling and enforcement (Pant, 2020). Drones equipped with Visual Detection and Ranging (VDR) capabilities can detect and identify a large number of objects of all sizes in the diverse climate conditions of the sea. They are thus extremely effective in maritime search and rescue missions (Pant, 2020).

Lethal roles for drones are still being explored and are currently limited to precision targeting in combat missions and as sacrificial weapons against high-risk targets (Pant, 2020). Drones are also flown in coordinated swarms in manned-unmanned teams to overwhelm the enemy's anti-drone systems, and attack and degrade the enemy's defences. In the future, it is expected that as technology advances in terms of aerial combat capability, speed and endurance, advancement of sensors and payload carrying capacity, UAVs will share most combative roles that manned fighter aircraft perform (Bruntstetter, 2012). The US Defense Advanced

Research Projects Agency is already working on projects set to facilitate the use of fleets of UAVs in urban warfare equipped with geo-fencing and collision avoidance capabilities (DARPA, n.d.).

## **Role of Drones in Counter-Terrorism Operations**

Counter-terrorism (CT) involves disrupting the ability of terrorist groups to conduct operations. It can either be defensive – increase protection on sensitive sites and borders or offensive – to work on disrupting finances, leadership decapitation and destruction of training camps. Offensive CT operations involve two steps (1) identifying the threat and (2) eliminating the threat (Pant, 2020). A nation must first seek out enemy combatants through intelligence and then take aggressive action to remove key figures and force the other terrorists to disperse. This process is cyclic, with intelligence leading to strikes and strikes leading to the need for more intelligence (Pant, 2020).

Drones are an effective tool for counter-terrorism operations because of their ability to simultaneously and continuously conduct both ISR and strikes at the same time. It minimises the coordination required between different systems, considerably expands the ability of a state to monitor and collect intelligence on the targets, saves crucial resources for the military and uses technology to transfer the risk of the operation from one's own soldiers to enemy combatants. Politically, it helps combat the body bag syndrome and eliminates the need to send personnel on the ground. Tactically, it allows for critical missions, including leadership decapitation with the use of High Altitude Long Endurance (HALE) drones and precision-guided munitions (Byman, 2013). As General David Deptula, the first deputy director of ISR in the United States Air Force and the current Dean of the Mitchell Institute of Aerospace Power Studies, stated in the USAF's first drone flight plan: 'Drones allow you to project power

without projecting vulnerability' (Farrow, 2016).

This ability of drones is increasingly essential, considering that today, terrorism does not originate from a single aggressor or location. Reliable intelligence is critical to disrupt the operational capacity of the terrorist network and determine when or where the next attack will emerge from. Drones use optical and long loiter capabilities to provide effective targeted intelligence. They are equipped with high-definition thermal cameras that allow pilots to search and follow targets and collect helpful intelligence on the behavioural patterns of the enemy (Byman, 2013). Further, being unmanned, drones have the capacity to loiter in the air longer than traditional aircraft, with better fuel efficiency and increased reconnaissance time.

The second phase of CT is to eliminate the threat – both by eliminating the leader and by disrupting operations and forcing terror groups to retreat. Leadership decapitation via precision aerial drone strikes is effective because: 1) leaders in such organisations have a major ideological influence and experience, and 2) succession lines in terrorist organisations lack clarity and may lead to splits within the group (Farrow, 2016). The psychological effect of knowing drone strikes could occur at any point forces leaders to devote resources to protection than planning an attack. Further, disrupting the weaponry supply chain and communication channels significantly degrades the ability of the terror group to act effectively (Byman, 2013).

## **Anti-drone Technology and Challenges**

While the previous section establishes the military benefits of the emergence of drone technology, the threat posed by mushrooming number of commercially available and inexpensive drones that can be modified by terror groups to hamper a country's security interests cannot be ignored. In the first half of 2022, over 110 hostile drones entered India via Punjab, with



the Border Security Force (BSF) being able to shoot down only six of them (Hindustan Times, 2022). Not only does the Indian security apparatus currently lack the ability to counter drones with small radar signatures, but such drones also fly below radar operating heights (Philip, 2021). This has meant that the BSF, among other such military and paramilitary forces, has been regularly using the 'human eyes and guns' approach to shoot down drones based on the buzzing sounds made by UAVs, leading to poor detection rates and even worse destruction rates (Hindustan Times, 2022).

Countering the threat posed by drones has both preventive and corrective components. Preventive measures include denying access to UAV components and technology to terrorist groups by establishing a comprehensive regulatory regime, regional intelligence sharing and effective border control for the sale of UAVs (UNCTC, 2017). However, these measures are unlikely to be effective with India's geopolitical realities and the indigenous manufacturing abilities of terror safe haven countries in the region. Thus, India must focus on corrective counter-drone measures and the development of anti-drone system capacity.

Anti-drone systems are essentially aimed at the detection of a UAV, identification of its status as hostile or not hostile, tracking hostile UAVs and then disabling or neutralising the drone as necessary. This requires interactions between several systems and these systems and human operators (UNCTC, 2017). Further, a specific counter-UAV system is only effective in the environment and context that its capabilities were built for, making procurement and large-scale deployment of anti-drone technologies challenging.

India has taken its initial steps towards developing anti-drone capacity with DRDO's *Drone Detect, Deter and Destroy System* (D4S), which is equipped with both soft-kill and hard kill-capabilities. A similar anti-drone system was used during the 2022 Republic Day to enforce the no-fly zone over

Delhi's Red Fort Area (Indian Express, 2022). While this is an important milestone for India's indigenous military equipment industry, the reality of the country's anti-drone capacity is far from optimistic. Sophisticated anti-drone systems are currently in place at very few tactical locations in the country, meaning that the rest of India continues to use counter-measures that were developed for traditional threats. While the Army, Air Force and Navy have placed orders for more such anti-drone systems to counter the aerial threat, domestic production is unable to meet the demand, with most systems still in trial stages.

Further, only a few countries, including the United States, France and Israel, have fool-proof anti-drone systems and this technology is closely guarded and inaccessible to India (Linganna, 2022). Even the Smash 2000 plus anti-drone system that the Indian Navy was able to acquire from Israel works on the basis of human contact with drones instead of on radar, radio or IR frequencies (Philip, 2021). India, today, is installing quadcopter jammers and multi-shot guns across the LC to counter drones when the situation calls for multi-sensor, multi-kill anti-drone systems that can enforce no-fly zones with minimal collateral damage and provide air situational pictures and alerts based on user-defined criteria (Linganna, 2022).

Then, there is the threat of swarm drones. While such an attack has not been witnessed yet, a coordinated multi-drone attack can only be countered with a swarm-against-swarm architecture (Gopal, 2020). Technological challenges, including Heterogenous Sensor Fusion, Prevention Against Jamming (JAM-ME) Techniques and Hardware Sandboxing, also burden the Indian anti-drone capacity development strategies (Gopal, 2020).

Thus, a renewed focus on drone warfare capacity building must come with equal attention being devoted to securing the country's security interests from such drone warfare by the development and implementation of anti-

drone technology. This will need greater collaboration between the public and private sector entities in R&D, building regulatory frameworks and enabling full-scale production of counter-drone systems. This will also require management of the administrative, bureaucratic and policy hurdles faced by innovators and producers in India and better collaborative space with research organizations and government agencies abroad. Further, India must do everything in its power to deny access to counter-drone technologies to terror groups operating in the region.

## **Limitations and Critiques of Drone Warfare**

It is crucial to understand that while drones can allow India to perform operations that would have otherwise been impossible or too expensive, one must not get ahead of themselves on the future of warfare being unmanned. This section will provide a very brief overview of the operational barriers, often unimpressive success rates in certain geographies, moral critiques and political costs that a country must be aware of before adopting drones.

In adverse environmental conditions like lightning, rain and forest fires, drones may either have limited functionality or be unfit to fly altogether. Concerns regarding reliability further increase when one notes that failure rates for drones have been higher than those for manned aircraft. However, advancement in technology is likely to solve this issue (Pant, 2020). Only two percent of the 3000 plus people killed by US drone strikes since 2004 in Pakistan were high-profile targets, the rest being civilians, alleged combatants and “others” (Hussain, 2021). Morally, the collateral damage and civilian deaths coupled with a “PlayStation mentality” syndrome have been heavily criticised. Activists have called drones “killer robots” that increase the likelihood of perpetual war (Hussain, 2021).

While the legal framework for the use of drones in battle zones is clear, the question of sovereignty and the International Humanitarian Laws'

principle of distinction and proportionality comes into question when drones are used against non-state actors in another country's territory (Bhardwaj, 2021). While currently, the use of drones across borders has resulted in proportional responses, it could lead to escalation of conflict when a nation is on the brink of war (Pant, 2020). Thus, the adoption of drone warfare comes with accepting the political risks and backlash regarding drone warfare from legal, ethical and operational standpoints. It is of little use for a country to develop expensive weaponry systems if the political will to use those systems in critical operations does not exist.

## **Current State and Future of Drone Warfare Capacity Building in India**

While India currently uses drones in limited numbers for reconnaissance and surveillance operations along the border with Pakistan and China, there has been a massive surge in interest and demand for both combat and non-combat drones in the Indian security apparatus in the recent years. The Army, Navy and Air Force have signed several agreements with both Indian and International producers and have been seen as keen to expand India's drone arsenal since the late 2020s (Phillip, 2022). After the Indo-China standoff in 2020-21, India's Heron drones were integrated with Israeli satellite-based UAVs to improve India's surveillance capacities. The Army has also invested in indigenously manufactured switch drones, swarm drones and has ordered over 100 tactical Indo-Israeli kamikaze drones (Phillip, 2022). The IAF is looking at investing in technology that can allow collaboration between drones and fighter aircrafts. It has also awarded a 155 crore contract to Indian anti-drone systems manufacturer Zen Technologies (Linganna, 2022). The Navy is working closely with the Drone Federation of India and is focusing on naval drones that can contribute to both loitering munitions and logistics. The three services are collaborating for 'Project Cheetah', aimed at upgrading India's Heron

drones to possess satellite navigation and advanced sensor capabilities (Linganna, 2022). The government is not far behind with its focus on developing India's domestic drone production capabilities for both civilian and military use. It has released crucial guidelines for the sector in the Drone Rules, 2022, which is expected to be key in boosting indigenous production (Phillip, 2022).

However, while the future of drone warfare in India seems bright despite the limited application at the moment, several considerations must be taken into account before moving ahead.

First, the question of cost must be addressed. It is undeniable that a massive upgrade of India's military capabilities will be necessary for India to reach the level of its competitors' drone capacities in the region and that such an upgrade will be expensive. However, a cost-benefit analysis of drone usage reveals that drones are, in fact, a cost-effective instrument to achieve national security objectives (McLean, 2023). According to estimates in a project supported by the University of Tasmania, it costs US \$3250 to fly the MQ-9 Reaper drone each hour in Pakistan. While the costs of other drones may vary, one must also note that in counter-terrorism operations, the human element and 'hearts and minds' strategy is a deterrent rather than an advantage (McLean, 2023). These operations involve targeting particular individuals based on signal intelligence. When one considers these risks and the costs of training, deployment and support for soldiers, it is easy to realise that drones are much cheaper to operate (McLean, 2023).

Second, one must discuss the future of drones in the context of indigenous production. While India appears to already have the vision in place for capitalising on the drone revolution, a comprehensive action plan to create robust demand, improve manufacturing capabilities and quality, enable public-private partnerships, attract investment and allow exports is necessary to move further (Singhal, 2022). With India's drone industry

expected to be worth US\$ 4.2 Billion by 2025, growing to US\$ 23 Billion by 2030, the government must focus on accelerating adoption and simplifying processes through the Three Ps - Procurement Processes, Permissions and PSUs (Singhal, 2022). Investment in indigenous production of drones will be crucial for the future of drone warfare, considering the limitations and constraints surrounding international procurement.

Third, it is important to understand the role of laws and regulations in the future of drone warfare capacity building. A more elaborate law detailing norms for civilian usage detailing rules regarding registration and licensing, operational limits such as maximum altitude, distance, and flight time, privacy and no-fly zones can be helpful in regulating the industry. Further, laws protecting military personnel from harassment by Human Rights activists are also necessary to ensure that such personnel can perform their duties as necessary (Bhardwaj, 2021).

Fourth, the need for a joint doctrine for drone warfare and military strategy must be elaborated upon. India must develop a clear and comprehensive strategy for the use of drones in military operations, ensuring that such strategy is in consonance with political aims. A dedicated drone force within the military, responsible for the operation, maintenance, and training of the drone fleet and the integration of drones into existing military systems is the next big step. India must also consider developing a joint doctrine for the use of drones by all three forces and synergised application of drone warfare when the situation demands (Bhardwaj, 2021).

Finally, is the crucial dilemma of international partnerships. While indigenous production can be one arm of India's drone warfare capacity-building strategy, diplomatic and financial investment in international partnerships on drone warfare is the other. India has a lot to gain, not only by procuring drones internationally while domestic production matures but also by collaborating with like-minded countries in establishing

international standards for military-grade drones and sharing information and technology related to the development of drones. Thus, while domestic production must be prioritised, it is essential not to ignore the advantages of international cooperation in any sphere.

## Conclusion

Drones, also known as Remotely Piloted Aircraft (RPA) or Unmanned Aerial Vehicles (UAVs), refer to remotely controlled aerial vehicles with no humans on board (Bhardwaj, 2021). In the last couple of decades, Drones have become an integral aspect of military operations as advanced tools that are used extensively in both non-offensive and offensive actions. These have played an important role in the victory of the Azerbaijani forces against the Armenian army and are being seen as playing a crucial part in the Russia-Ukraine war. India currently lags behind its competitors in its drone warfare capabilities, and it is imperative for the country to advance its drone technology to include armed drones (Pant, 2020). With the rapid advancements in drone technology, it is clear that drones are no longer just a question of future potential but a current reality.

Drones can act as force multipliers to India's current defence operations, from border control to counter-terrorism, and aid in improving the precision of the operations being carried out by the defence forces. The increasing proliferation of drones in the region has meant that India faces the threat of drones being used against it, not only by countries like Pakistan and China but also by non-state actors. Further, drone warfare capacity building can act as an important instrument in defence equipment self-reliance for India, providing economic, strategic, and technological benefits (Bhardwaj, 2021).

Drones offer a range of benefits in traditional military operations from gathering surveillance data and conducting strikes without risking the

lives of soldiers to precision targeting and maritime search and rescue (Pant, 2020). As technology improves, UAVs are expected to take on more combative roles traditionally performed by manned aircraft. Further, Drones have found increasing relevance in counter-terrorism operations, enabling India to take action against specific targets across the border, achieving significant results at a lower financial expense (Farrow, 2016).

There is also the question of anti-drone technology that India must consider due to the availability and use of inexpensive drones by non-state actors in the region. While DRDO and other indigenous organizations are working towards developing such infrastructure, India is currently using traditional counter-measures to combat drone warfare, leading to low levels of detection and destruction (Philip, 2021). This must be addressed by both providing a boost to domestic innovation and international procurement.

While the benefits of drone warfare capacity building are being explored, one must also consider the operational, moral, legal and political limitations of the use of drones (Pant, 2020). The reliability of drones, especially in adverse conditions, must be examined. Further, the question of sovereignty in cross-border drone strikes and the civilian deaths, collateral damage and 'PlayStation Syndrome' must be considered (Bhardwaj, 2021). One must note that if a country does not have the political resolve to use its weapon systems in essential operations, it is of little benefit to having developed those systems in the first place.

In the last couple of years, India has entered the drone procurement race with the Army, Navy and Airforce undertaking multiple indigenous and international contracts to buy drones with a wide range of capabilities (Phillip, 2022). This paper puts forth five considerations for the way forward. One is the fact that drones are cheaper than using soldiers, especially for counter-terrorism missions (McLean, 2023). Two, how the government must approach a boost to indigenous production. Three, law-



making in the space of drones and drone warfare. Four, developing a drone warfare doctrine for India and enabling tri-service cooperation and Five, the importance of international partnerships (Bhardwaj, 2021).

Thus, this paper argues that drone warfare will act as an instrumental player in enabling India to meet its security challenges in the 21st century and recommends the development and implementation of a comprehensive plan for the research, procurement and integration of drone technology into military operations to ensure that India is well-prepared for its current and future threats.

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