



DEFENCE AND DIPLOMACY

IN PURSUIT OF NATIONAL SECURITY

VOL. 11 NO. 4

ISSN 2347 - 3703

JULY-SEPTEMBER 2022

- Airborne Early Warning and Control:
Crucial to Battle Management
Anil Chopra
- Effects of Russia-Ukraine Crisis on West Asian
Oil Scenario: India's Concerns
Anu Sharma
- Evolving Chinese Nuclear Strategy and
Conventional Deterrence
Anubhav S. Goswami
- Indo-Russian Energy Dynamics
Ngangom Dhruba Tara Singh
- Arming the Indian Arsenal with UCAVs
Richa Tokas
- Intelligence Set-Up in India: An Analysis
Sushil Tanwar
- Diluting the Deterrence: Evading Sanctions
through Cryptocurrency
Khyati Singh
- China-Pakistan Alliance: Security and
Economic Challenges
Dinesh Kumar Pandey
- Book Review*

ARMING THE INDIAN ARSENAL WITH UCAVS

RICHA TOKAS

INTRODUCTION

Unmanned Aerial Vehicles (UAV) are pilotless small aircraft that are controlled and managed by remote control and can be accessed and managed by a single person through simple devices like a smartphone app. The whole set-up including the UAVs and the person handling it with the remote system controlling it together form an Unarmed Aircraft System (UAS). UAVs can offer enormous operational benefits and advantages which include defence as well as other sectors like security by law enforcement agencies and other sectors having a great impact on the economy. UAVs can be significant as they not only will impact the way an organisation works in the sense that they will prove to be quite easy to operate and obtain the objectives at a lower cost without impacting its efficiency. It will also help in generating employment and help achieve economic growth due to its reach, versatility, and ease of use. In view of its traditional strengths in innovation, information technology, frugal engineering and huge domestic demand, India has the potential to be a global drone hub. Because of their ability and potential to select targets in time-sensitive

Ms **Richa Tokas** is Research Associate at the Centre for Air Power Studies, New Delhi.

and risky environments, Drones have become an essential and vital part of military arsenals across the world.

UAVs with capabilities that can be utilised by defence forces are known as UCAVs, that is, Unarmed Combat Aerial Vehicles. India must not be left behind in acquiring and developing UCAVs with advanced military capability for its security needs. In June 2021, the attack on Indian Air Force Station in Jammu, where the enemy used drones which were flying at a low altitude and dropped two explosive devices, clearly brings out the fact that Drones are the future of Modern Warfare. The role of Unmanned Combat Aerial Vehicles (UCAVs) is expanding day by day in the defence sector. UCAVs are the ideal platform for vanquishing the challenges quite easily and discreetly as they carry out various tasks for intelligence, surveillance, reconnaissance, electronic warfare, and strike missions. Unmanned Combat Aerial Vehicles mark the commencement of a significant new security challenge for India.

Modern Warfare has led to the induction of Unmanned Combat Aerial Vehicles (UCAVs) in all of the leading security forces of the world. The importance of UCAVs stems from the fact that being unmanned saves many lives, and being compact in size, it can dodge the conventional RADAR systems. This makes it an effective tool for modern warfare. UCAVs were conceptualised long back in the 19th century where Austrian forces used Incendiary Balloon carriers during the siege of Venice. The development of UCAVs started during World War I when the Royal Navy of England utilised them for target practice. And during World War II UCAVs were used by Nazi Germany forces as anti-aircraft target drones. Post-World War II the development of modern UCAVs can be credited to the USA and Israel which realised the effective use of drones for reconnaissance missions as well as using UCAVs as decoys to distract the enemy into wasting their expensive anti-aircraft missiles on them. UCAVs are now an indispensable part of all modern armed forces inventories. The advent of new technology and artificial intelligence has revolutionised and transformed the role of UCAVs in surveillance and combat operations. UCAVs have become more sophisticated and intelligent and have developed their niche in defence technology.

UCAVS: SIGNIFICANCE AND CAPABILITY

UCAVs are performing a wide variety of functions and have come to play a significant role across all wings of security forces such as border surveillance, exploration mission, transporting arms, offensive strikes and search and rescue. The use of progressive UAV technology offers an alternative to manned aircraft. UCAVs effectively and efficiently in providing ISTAR, i.e., Intelligence, Surveillance, Target, Acquisition and Reconnaissance capability as well as Suppression of Enemy Air Defences (SEAD). Also, in places where there is a much greater threat from hostile aerial defences, UCAVs provide robust and intense penetration capabilities. Because of their capability to move stealthily undetected across target locations, they can provide high-resolution visual and thermal imaging and visualisations of the location. They provide live feedback that helps in attaining information about the target person or area or any vehicle, which increases the efficiency and safety of ground forces, augments the capability of each soldier and speeds up the decision making process during ongoing active missions and solidifies the defence ecosystem and the frontline.¹

OPERATIONAL UCAVS IN INDIA

During the Kargil War in 1999, UAVs were used by the Indian Army for surveillance and reconnaissance missions. The Indian Army's UAV operations have grown considerably in the last few years, most recently to keep tabs on the Chinese incursions in Ladakh. India stands at number three worldwide when it comes to importing UCAVs, with a 6.8 per cent share of the total UCAVs procured across the globe ending 2020, according to Stockholm International Peace Research Institute's (SIPRI) Arms Transfers Database.² The bulk of the UCAVs owned by our armed forces have been imported from Israel, around 200 in number. They have been tasked for surveillance and targeting. India has also procured Israeli Harop

-
1. "Drones are Modernizing the Indian Army. Here's How", ideaForge, February 17, 2021, at <https://www.ideaforge.co.in/blog/indian-army-drones/>. Accessed on December 30, 2021.
 2. "How \$3 billion Contract for 30 Predator Drones with the US will Help India", *Firstpost*, October 26, 2021, at <https://www.firstpost.com/india/how-3-billion-contract-for-30-predator-drones-with-the-us-will-help-india-9989631.html>. Accessed on December 30, 2021.

“Killer” or Kamikaze drones, which can destroy enemy targets and radars just like a cruise missile. Surveillance and Target Acquisition unit of Artillery procured Israel-origin Searcher UAV which is developed by Israel Aerospace Industries for acquiring targets in-depth and does assessment of post-battle damage. Searcher Mark II is its upgraded version and is being operated by Indian Armed Forces. It can carry a payload of 70 kg and its endurance is 18 hours. For target practice the Bulgarian origin RUM 2MB the first Target UAV was used by Army Air Defence (AAD).³ Army Air Defence has also acquired an aerial target system for training of the forces from United Kingdom.⁴

ADVANCEMENT AND PROGRESS OF UCAVS/UAWS IN INDIA

Defence Research and Development Organisation’s (DRDO) Aeronautical Development Establishment (ADE) in collaboration with Council of Scientific and Industrial Research-National Aerospace Laboratories (CSIR-NAL) developed unmanned micro aerial vehicle and unmanned mini aerial vehicle. Three small high-endurance surveillance vehicles named Black Kite, Golden Hawk and Pushpak have been developed by DRDO and National Aerospace Laboratories. All of these are totally autonomous drones which are quite capable of transmitting high-quality video to their ground control station. Imperial Eagle and Slybird are the two lightweight unarmed aerial vehicles which can be launched from the hand and are quite simple to operate.⁵ DRDO Rustom-1 is the first Indian Short Range Remotely Piloted Aircraft System (SR-RPAS), has great landing and take-off capability just like any other conventional aircraft. This drone is capable of carrying out identifying targets and tracking them, and at the same time it can independently capture images for surveillance. Rustom-II is another drone developed by DRDO for surveillance and reconnaissance missions which uses a home-grown GPS system. This drone also has Artificial Intelligence capabilities which make it efficient in achieving its objectives. It is an Air Force requirement but at some stage the Army may also use it. Currently, DRDO is working

3. Ibid.

4. Ibid.

5. Ibid.

towards achieving more endurance in terms of the time and the altitude it can comfortably maintain while carrying out surveillance and surveillance missions. Recently, DRDO has successfully tested its 'Ghatak' drone which is a Combat drone which has the capability to bomb its targets. This drone is also capable of carrying out the tasks stealthily and it would really help in reducing the loss of human lives during testing times of war. DRDO in collaboration with ADE has also developed another Drone 'Lakshaya' which can be quite useful by acting as a decoy during a war to divert the attention of the enemy and help our forces to become more lethal.

NEED FOR DEVELOPING UCAVS—ATTAINING EDGE OVER ADVERSARIES

India, being surrounded by hostile neighbours on both eastern and western fronts, is much more susceptible to foreign incursions. Now, UCAVs have provided a better platform to our enemies to launch small but effective attacks on our land. Moreover, the Chinese Air Force (PLAAF) is said to have been developing UCAVs for over a decade now and has been moving towards making UCAVs an integral part of its arsenal. The capabilities of UCAVs cannot be underestimated. The Drone Attack on Jammu Air Force Station has made it quite clear that there is an urgent need for a vision and good planning for the procurement and development of UCAVs. Apart from having attack and surveillance drones, India needs drone-killer drones or such technology which can identify detect and expose drones more effectively and destroy them. While seeking innovative and sophisticated counter-drone technologies, it would be prudent to visualise different kinds of futuristic drones of different sizes and range. That should be based on its stealth ability and manoeuvrability at much faster speeds and range. Therefore, without any delay the Armed forces should be armed with credible, reliable, manageable, manoeuvrable, and portable Unmanned Combat Aerial Vehicles (UCAVs) as it will give an edge to the armed forces with live visual and thermal terrain surveillance, infiltration/exfiltration detection, mission reconnaissance, in real time.

EMPHASISING CAPACITY BUILDING

The Indian Armed Forces have at present an inadequate number of aerial vehicles. However, as the forces have realised that UCAVs can enhance their operational capabilities, the demand for a wide variety of UAVs in all three services has risen. Unlike the traditional methods, the operation of UCAVs saves time, cost and, most importantly, human lives. To fulfil its requirement of UCAVs, the Indian armed forces are currently dependent on foreign suppliers. It is necessary for the Indian armed forces to be operationally ready, strengthen security and always remain a step ahead of adversaries by obtaining appropriate and real-time information. It is high time India starts investing in strengthening its manufacturing industry of UCAVs as it can't always remain dependent on other nations for its defence needs. Further, other nations are reluctant to provide the latest technology and equipment, and even if they do, there are a lot of after-sales aspects that make us dependent on that nation till the time that equipment is operational. Therefore, India needs to develop cutting-edge technology, enhance its manufacturing capability, focus on indigenous development, and harness the potential talent of domestic innovators. It is important to encourage initiatives that promote skill and provide training based on practical knowledge, especially the students of engineering, as it will bring India a step closer to the Prime Minister's vision of *Atmanirbharat*.

Promoting and encouraging the spirit of research and development is also a prerequisite to bridging the gaps in the development of the indigenous market of UAVs and UCAVs. It is important to understand the significance of well-developed education system to build active skilled and technical scientific trained manpower. In its absence, carrying out R&D in developing new equipment will make little sense, and reverse engineering of inward technology transfer to upgrade domestic capabilities will become impossible to achieve.

In future, the ecosystem of UAVs will see more advancements and innovations. With the boost in manufacturing UAVs, the growth in the market for maintenance, repair, and overhaul of drones will also be witnessed. The demand for a wide variety of UAVs and their application are expected to only accelerate. Collaborating and

advocating synergy among academicians, academic institutions, and other stakeholders such as DRDO, agencies of R&D and PSUs, combined with a favourable policy environment, will help in overcoming the challenges and hurdles on the way towards having a dynamic, strong and competitive, self-reliant (*Atmanirbhar*) UAV industry. Prioritising the modernisation and indigenisation of UAVs and building a strong innovative modern domestic drone infrastructure and industry will bring India a step closer to achieving its war objectives, and help India achieve its aspirations of becoming a great power in the changing world order and gaining dominance in the battlefield.

SETTING IN MOTION THE INDIGENOUS DEVELOPMENT OF UCAVS

The future battlespace will be shaped by technological superiority and will determine the outcome of modern warfare. The advent of innovations and artificial intelligence has made the development of UCAVs imperative. It is essential to reduce dependency on imports and promote indigenisation, and for that, technological self-reliance should be the mantra for the future. Accordingly, the Ministry of Defence put the procurement of Mini-UCAVs on the Import Ban list from December 2021. This will certainly boost the morale of the Indian defence industry and help strengthen the defence industrial base. Further, IAF conducted Mehar Baba Swarm Drone Competition to identify, promote, and support the indigenous defence start-ups of India. This initiative is a step taken in the right direction as various start-ups and companies were awarded. In this competition, a Bangalore based start-up NewSpace Research and Technologies was awarded for having the Best Swarm Architecture, a team from Delhi Technology University in collaboration with Adani Defence was awarded for having the Best Communication Architecture and Dhaksha Unmanned Systems was awarded for the Best Drone Architecture.⁶ In

6. Snehesh Alex Philip, "3 Indian start-ups win IAF swarm drone competition, at least 2 in line for defence contracts", *The Print*, October 25, 2021, at <https://theprint.in/defence/3-indian-start-ups-win-iaf-swarm-drone-competition-at-least-2-in-line-for-defence-contracts/756314/>. Accessed on December 30, 2021.

addition, the winner of the Swarm Architecture award, NewSpace Research and Technologies, which is a Bangalore-based start-up founded by an Indian Air Force veteran, has been awarded a contract of \$15 million for 100 swarm drones by the Indian Army under the emergency procurement rules. Such competitions give rise to the competitive spirit and encourage proprietary design, skill enhancement, and development of the latest technologies and manufacturing products.⁷ This local manufacturing of drones having advanced home-grown technology will provide us with low-cost solutions adhering to the specifications provided by the forces without compromising on the quality of the equipment. Such competitions give rise to the competitive spirit and evolve and encourage proprietary design, skill enhancement, development of the latest technologies, manufacturing products with the latest skill and techniques, and production of low-cost solutions and achieve results in the quickest time ensuring that technological development is adequate and matches with our desired military capability.

CHALLENGES TOWARDS INDIGENOUS DEVELOPMENT OF UCAVS

However, the development of a robust UAV programme that is effective in real time is still distant. As India relies on the acquisition of UCAVs from other countries, it's time that we question ourselves why, despite having a world-renowned IT sector, India lags behind in technologically advanced equipment. It should be understood that depending only on DRDO for technological advancement is not the only option; rather, policies should be framed in a way to promote and encourage private sector players to contribute to India's military modernisation programme.

In addition to indigenous drones and counter-drones technology for completely destroying enemy swarm drones, it is essential to focus on technologies that can capture live drones of adversaries electronically by identifying and classifying decoys to conserve our own effort, and destroy enemy drones through electromagnetic pulse

7. Ibid.

(EMP) attacks individually and in swarms.⁸ UCAVs are effective and strong force multipliers as they are the only aerial means of ISR and target acquisition available to the Field Commander for employment of his long-range vectors to engage targets in depth. Focus on upgradation and development with no compromise on Transparency and Accountability, the pace of procurement procedure of UCAVs should be scaled up so that it can respond to the rapid progress taking place in new technologies. It is essential for production technology and technical skills to remain up to date to be able to develop capabilities that can exploit new and emerging opportunities to respond to emerging threats.

It is essential to strengthen and enhance the current available holding of UCAVs to afford wide-range, comprehensive, inclusive and gap-free surveillance all along the borders.⁹ India needs to speed up drone and counter-drone technologies including HPM (High-Powered Microwave to defeat or kill drone swarms out of the sky) weaponry to cater for emerging threats. This can be expedited in conjunction with strategic partners. With this India might capture a significant share in the international market for defence equipment. For time-bound anti-drone measures, it is important to form a proficient, experienced task force. Apart from R&D agencies like DRDO, National Aerospace Laboratories (NAL) and Hindustan Aeronautics Limited (HAL), it is imperative that we engage personnel from the armed forces during the conceptualisation stage of the equipment to be developed. Personnel from the armed forces can provide valuable inputs because of their experiences during the design and drawing stage.

CONCLUSION

The fact that UCAVs are the future of modern warfare, cannot be denied. Nations all over the world are focused on the development

-
8. Lt General P. C. Katoch (Retd.), "The Looming Drone Threat", *SP's Land Forces—Defence | Military | Army | Air Defence | National Security | News Magazine from India*, 2021, at <https://www.spslandforces.com/story/?id=750&h=The-Looming-Drone-Threat>. Accessed on December 30, 2021.
 9. "Our security response system needs to encompass the entire spectrum of conflict", *SP's MAI—Military, Aerospace and Internal Security | Homeland Security | Cyber Security | UAVs | Defence Magazine*, 2016, at <https://www.spsmai.com/military/?id=3799&q=Our-security-response-system-needs-to-encompass-the-entire-spectrum-of-conflict>. Accessed on December 30, 2021.

of UCAVs and are more inclined to send UCAVs on missions to safeguard their soldiers, and because of their stealth capabilities. India cannot afford to lag in the global race to modernise its military technology. In this era of technology, each day brings to us new, innovative ideas that are being executed effectively. For India, the push to start-ups and providing impetus to private players in defence development can lead to development of highly advanced UCAVs. The government should keep on encouraging local talent and local industries so that qualified professionals get the environment to flourish in their homeland and obtain the results that are expected of them. This would truly help in achieving our objective of arming our forces with technologically advanced weaponry to keep the UCAV threats at bay and foil any operation carried out by the enemies.