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## The Defenders: Drones in Defence Sector

Suresh Kumar Dhayal, Dr Afroz Ahmed

Department of Political Science, RNB Global University, Bikaner (Rajasthan)  
Email: [id-sdhayal1988@gmail.com](mailto:id-sdhayal1988@gmail.com)

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**Abstract** There is a readily available and rapidly growing body of literature on armed Unmanned Combat Aerial Vehicles (UCAVs). However, smaller Unmanned Aerial Vehicles for military use, or what this paper refers to as tactical UAVs utilised by small and developing states, have received much less scholarly attention despite their rapid proliferation in the last decade. In order to start rectifying this dual neglect of more limited UAVs employed by small and developing states, the paper makes an empirical contribution to the study of tactical UAVs. Drawing on a substantial number of literature and studies, the paper examines the Indian government UAV program, which is in certain ways representative of an emerging state's efforts to incorporate UAVs into its armed forces. The paper argues that it is logical to think in terms of UAV as a system rather than the UAV as a free-standing resource to be used on its own. Given India's geographical dilemma, tactical UAVs may have a significant role to play in asymmetric conflicts.

**Keywords** Ucavs, Uav,rpa, Combat, Tactical

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### 1. Introduction

While the use of Unmanned Combat Aerial Vehicles (UCAVs) dates back to the US intervention in Afghanistan in 2011 unarmed UAVs have been in use for a much longer period of time. One of the main pioneers of utilizing UAVs, the Israeli Air Force (IAF), has employed them for surveillance purposes since the early 1970s and target acquisition since the early 1980s (Rodman 2013, 83–92). Not only states utilize UAVs for military purposes, however Hezbollah, as the first non-state actor, has used a range of different UAVs since 2004, of which the IAF has intercepted and destroyed a considerable number (Plaw and Santoro 2017). More recently and testifying to the ease with which they can be acquired and put to use, the Al-Nusra Front as well as ISIS used UAVs for intelligence gathering tasks in the Syrian War (Warrick 2017). Moreover, while unarmed UAVs have been used for military purposes for some fifty years, recent years have witnessed their virtual proliferation (Boyle 2015). In 2000, 17 countries' armed forces were using UAVs. By 2019, that number had exponentially increased to some 100 countries, with some 30 000 systems currently in use (Gettinger2019). It seems safe to assume that, in the not too distant future, virtually all armed forces in the world will use UAVs (Franke 2018, 341). However, smaller UAVs, or what I in this paper refer to as tactical UAVs, have received much less scholarly attention. It is fairly common, even in the academic literature, to fail to distinguish between the different types of UAVs (Franke 2013, 120). Tactical UAVs, as understood in this paper, are often unarmed, used for intelligence gathering, fly at a lower altitude, and operate at a much narrower range than HALE and MALE UAVs. To be sure, tactical UAVs are less spectacular and at least on the face of it herald less implications of strategic import. Nevertheless, there are several reasons for why tactical UAVs are worthy of more scholarly attention. Unlike the expensive strategic ones, virtually all of the world's armed forces, as well as a range of non-state actors, including terrorist groups, are in a position to acquire and operate them. Moreover, tactical UAVs have been used with increasing frequency in all of the major conflicts since the end of the Cold War, not least in the 2014 war in Ukraine (Karber 2015, 11–15). Use of tactical UAVs in Afghanistan has somewhat made a strong case



to suggest that UAVs carrying out surveillance and reconnaissance missions were of greater perceived operational value than the use of armed ones (Franke 2018, 344).

Moreover, the extant literature is heavily inclined towards the US UCAV program. Again, such emphasis is understandable given the significant, albeit contested, role that UCAVs have played in the War on Terror. Nevertheless, what has been obscured in such a focus is the roles which UAVs play in developing countries like India's armed forces. How are they used in the field by such countries? What are the potentials they open up and the constraints that they face? In what ways, if at all, do they change the tactics in the field? In order to start rectifying the dual scholarly neglect of tactical UAVs used by developing states, the paper examines the Indian Armed Forces' development and utilization of UAVs. It does so by mainly drawing on a substantial number of research papers as done by Manohar Parrikar institute for defence studies and analysis and government of India research studies.

## **2. The emergence and deployment of tactical UAVs: a brief history**

In a seminal study, Michael Kreuzer has argued that the development of UAVs should primarily be understood in relation to the so-called "information revolution," with the invention of the microprocessor at its core, along with the "precision revolution" in the military, with the GPS allowing for precision in navigation as well as targeting at its core, which together formed the first phase of what is usually known under the label of a Revolution in Military Affairs (RMA) (Kreuzer 2017, 27). An important part of the RMA was that it enabled precision targeting. It thus became possible to strike at fixed targets with an extraordinary degree of precision. Mobile targets, however, were a different matter. The UAV, then, emerged as a response to the problem of how to strike at targets that are not fixed, and one of the major functions of UAVs became target acquisition. If one rather stresses the role of the UAV for gathering intelligence in a more general sense, which may or may not be used for targeting, the history of the UAV clearly predates the RMA. The main enabling technological innovation is the decreased size as well as increased quality of the onboard image sensor coupled with high quality data links.

Historically, the first unmanned aircraft flew in 1849 and was used by the Ottoman Empire in the siege of Venice for intelligence gathering purposes (Bartsch et al. 2017, 20). However, as far as a remotely piloted aircraft goes, the first of its kind is usually called the Ruston Proctor Aerial Target, which was developed by the Royal Flying Corps as a guided missile and flew for the first time in 1916 (Bartsch et al. 2017, 24). Another pioneering UAV was the so-called Kettering Bug, which was commissioned by the US Army Signal Corps and flew in 1918. After the First World War, it was common to convert piloted aircraft into pilotless to serve as practice targets or as missiles (Bartsch et al. 2017, 20). In the Second World War, a variety of unmanned aircraft were deployed by all sides. The so-called OQ-2, an unmanned aircraft originally designed primarily to train anti-aircraft gunners, was manufactured in some 15 000 copies for the US Army during the Second World War (Bartsch et al. 2017, 20–27).

Until the early 1960 s, UAVs were mainly used as aerial targets for practice shooting (so-called "target drones"). However, the use of UAVs truly came to the forefront in the Yom Kippur War in 1973 where Israel used them on a large scale to defend itself against the joint attack by Egypt and Syria (Kreis 1990). In the 1982 Lebanon War, UAVs were again used for real-time surveillance, target acquisition and even, although not officially confirmed, armed attack (Rodman 2013, 85). For instance, UAVs monitored Syrian air bases and alerted the IAF of Syrian fighters taking off (Lambeth 2011, 111). In the Second Lebanon War against Hezbollah, UAVs again played an important role in assisting the IAF with real-time reconnaissance, target acquisition and battle damage assessment. In total, UAVs completed some 1350 sorties (Lambeth 2011, 113; 110–126).

Beyond Israel, the US is undoubtedly the most advanced user of UAVs. In the early 1960 s, the US initiated developing UAVs for long-range reconnaissance missions under the code name "Red Wagon" (Bartsch et al. 2017, 28). In the Vietnam War, UAVs for reconnaissance purposes were widely used. The successful Israeli use of UAVs in the 1982 war in Lebanon had important repercussions for the US interest in them (Joshi and Stein 2013, 54). The Hunter UAV was acquired from Israel by the US Army in 1996. In terms of deployment, UAVs were used in the Gulf War and then later on in the 1990 s in the Balkans. The Predator was deployed for the first



time in the NATO intervention in Bosnia during the Bosnian War (Operation Deliberate Force) and even deemed to play “a key role” there by military aviation historian Whittle (2014, 108). In the Kosovo War in 1999, no less than six countries deployed unarmed UAVs on a large scale and for a range of different purposes such as Intelligence, Surveillance and Reconnaissance (ISR), battle damage assessment, and mine detection.

However, the “real turning point” for deploying UAVs occurred following the 9/11 terrorist attacks on the US. Between 2001 and 2012, the US UAV fleet grew tremendously from some 50 to 7500 vehicles (Nolin 2012, 5). By 2010, the UAV was described as having “quietly become one of the military’s most versatile tools on the Afghan battlefield,” the vast majority being used for ISR tasks (Drew 2010).

However, the first procurement of drones by the Indian Army dates to the 1990s when it acquired UAVs from Israel. It was first used during the Kargil War in 1999 for photo-reconnaissance. The DRDO has also been actively working in the development of drones, and the first fully functional unmanned drone system, Rustom-1, took flight in 2009. Recently, India has further extended its drone capabilities in collaboration with the US via the Defence Technology and Trade Initiative (DTTI), and in 2021, it signed a \$3 billion deal for procurement of 30 Predator/ MQ 9 drones that have the ability to carry out long-range precision airstrikes.

In addition, India has signed a pact of 100 explosive-laden drones with Israel’s Elbit Security Systems and Bengaluru-based Alpha Design-led joint venture. These Sky Striker Drones are loitering munitions with long-range capabilities of 100 km range loaded with 5 kg warhead. They are GPS enabled and capable of carrying out covert operations at low altitudes. The Indian armed forces have procured these drones to permanently enhance their operational capabilities, making it a force multiplier in futuristic warfare. Despite undertaking many steps by the Indian government to enhance their armed drones arsenal, still there is huge scope for developing capabilities for tactical drones given India's security dilemma.

### **3. UAVs: literature and key terms**

As noted in the introduction, the vast majority of scholarly work focuses on the US UCAV program, which motivates closer attention to developing states like India's usage of UAVs specially tactical drones. In this section, the study at hand is first situated in relation to the extant scholarly literature on UAVs. Second, the key terms that this study uses are presented and defined. While there is a substantial literature which deals with the legal and ethical ramifications of the employment of UAVs, the more military-oriented scholarship, often located at the intersection of Security Studies and War Studies, has tended to focus on two overarching themes: effectiveness issues and proliferation aspects. The literature on effectiveness is mainly preoccupied with evaluating the US UCAV program ranging from a narrow tactical focus to a broader strategic one. The literature on UAV proliferation, on the other hand, ranges from examining a narrower set of issues of what to expect from UAV proliferation in terms of military utility, to questions of broader implications of UAV proliferation for international security as a whole.

To begin with, a number of studies have tried to assess the military effectiveness of the US deployment of UCAVs in counter-terrorist operations. Assessments, while often tentative due to the inherent difficulties of measurement and data collection, vary considerably. Johnston and Sarbahi (2016) find that UCAV strikes reduce violence in areas where they are employed and draw the conclusion that they may therefore bolster US counter terrorist activities in Pakistan. In a somewhat similar vein, Javier Jordan (2014) has argued that there is some evidence pointing to the fact that the US UCAV strikes weaken Al-Qaeda’s ability to carry out terrorist attacks in the West.

However, have been much more skeptical of the military effectiveness of UCAVs, pointing to the dangers of “blowback,” and argued that any tactical gain tends to be offset by strategic losses in terms of UCAV strikes providing fertile soil for terrorist recruitment (Benjamin 2013; Boyle 2013). . By striking targets in Pakistan, Somalia, and Yemen it is argued that “the United States risks encouraging competitors such as China, Iran, and Russia to label their own enemies as terrorists and go after them across borders” (Cronin 2013, 54). Further, a joint study conducted by Stanford and New York University interviewed a large number of civilians and experts in Pakistan and found that not only do UCAVs kill civilians, they also produce a fear-filled environment detrimental to ordinary people’s lives, where “evidence suggests that US strikes have facilitated recruitment to



violent non-state armed groups, and motivated further violent attacks” (International Human Rights And Conflict Resolution Clinic at Stanford Law School and Global Justice Clinic at NYU School of Law 2013, viii). A second major debate concerns the implications of UAV proliferation for future international peace and stability. Some scholars have argued that UAV proliferation potentially has enormous implications, since they are likely to be used by states to test “the strategic commitments and the nerves” of rival states and, relatedly, risk triggering conflicts emerging from accidents (Boyle 2015, 76). Even more fundamentally, Peter W. Singer (2012), has argued that the deployment of UAVs risk blurring the distinction between war and peace and thereby potentially undermining democratic control over warfare. In other words, UAVs make it easier for executives to engage in the use of force without involving parliamentary bodies. Others, however, are less alarmed by the rapid UAV proliferation. Horowitz et al. (2016) have argued that due to the lowering of costs associated with the waging of war, some states and in particular casualty sensitive democracies, may be more likely to conduct attacks on militant groups. In addition, they argue that UAVs may play an important role in propping up various authoritarian regimes using UAVs to keep their own populations in check. Contributing to our understanding of developing states like India's UAV development and employment, the study at hand examines the challenges involved in developing, as well as the operational value of, unarmed UAVs for small states. However, before doing so, some key terms of the study will be defined and elaborated upon.

#### **4. Definitions and terms**

There is no universally recognized system for classifying different kinds of UAVs, where mass, range, flight altitude, endurance, and payloads are often considered (see Dalamagkidis 2014). The US Army recognizes five different classes based on capability, size, mission, and cost (Morris 2018, 41). NATO, on the other hand, recognizes three different classes (Joint Air Power Competence Centre 2010). The categorization by government of India, which is the focus for this study, The Ministry of Civil Aviation vide gazette notification CG-DL-E-26082021-229221 dated August 25, 2021 published the Drone Rules<sup>1</sup> and vide gazette notification CG-DL-E26012022-232917 dated January 26, 2022 published the Certification Scheme for Unmanned Aircraft Systems. Drones are Unmanned Aerial Vehicles (UAVs) or Remotely Piloted Aerial Systems (RPAS) that are controlled either by a pilot on the ground or with the help of technology. The unmanned aircraft system shall, based on the maximum all-up weight including payload, be classified as follows : • Nano unmanned aircraft system: weighing less than or equal to 250 grams; • Micro unmanned aircraft system: weighing more than 250 grams, but less than or equal to Two kilograms; • Small unmanned aircraft system: weighing more than Two kilograms, but less than or equal to 25 kilograms; • Medium unmanned aircraft system: weighing more than 25 kilograms, but less than or equal to 150 kilograms Large unmanned aircraft system: weighing more than 150 kilograms. India's Defence Research and Development Organization<sup>10</sup> (DRDO) has developed its own domestic Unmanned Aerial Vehicle (UAV) or Unmanned Aircraft Systems (UAS) program. The project aims to develop a domestic arsenal to replace and augment the existing fleet of unmanned vehicles.

Acquisition, employment as well as maintenance of UAVs, is undoubtedly much less complicated with it comes to a wealthy and technologically advanced state such as USA. Poorer countries face a different set of hurdles to overcome. In sum, as noted above, despite the wide use of tactical UAVs, very little is written in terms of how they are used beyond noticing the fact that they are being extensively used.

To start rectifying this neglect, the next section turns to the emergence and deployment of the Indian UAV program.

#### **5. The emergence and deployment of the Indian UAV program**

For almost a decade, Indian armed forces have used UAVs. The Indian army acquired unmanned aerial vehicles(UAVs) from Israel in late 1990s and the Indian air force and navy followed suit.

Initially DRDO was charged with creating a catapult launched UAVs with its aeronautical development establishment Bangalore. IAI Malat, whose UAVs were in service with several armies, supplied Indian armed forces most of its UAVs.



The Indian army first got the searcher mark I, which has a maximum operating height of 15000 feet and ultimately the heron with 30000 feet.

Notably Harop made its debut at aero india show 2009. This hunter like drone manufactured by Israel aerospace industries (IAI) does not carry armament like USA UCAVs.

The first drone that was designed in India was the Nishant. This drone was developed by India's Defence Research and Development Organisation (DRDO). The Nishant drone made its first flight in 1995. The DRDO is building Medium-Altitude Long-Endurance UAVs, or MALE UAVs.

These are standard drones being researched and developed and are also in service. The Indian Army currently has drones for operations such as surveillance and logistics support. The Indian Air Force employs drones for covert combat missions while the Navy uses drones for a number of purposes such as maritime domain awareness and naval missions.

Israel provides the greatest number of foreign-sourced drones in the Indian inventory alongside the United States. Jerusalem is a strategic defense partner of India and is involved in high-profile arms deals with New Delhi. By 2025, the global drone market is envisaged to reach \$30 billion. During the novel Coronavirus period, India bought Israel's advanced Heron drones following the fallout with China in Ladakh.

They were deployed for surveillance purposes in the eastern Ladakh sector in India's north. The new Herons are deemed as far more advanced than the earlier Israeli-made Herons that India already has in its drone inventory

In 2020, India decided to procure the Raven UAVs from the United States. This was following the protracted conflict in Galwan Valley in Ladakh with China. The Indian Army had decided to procure the RQ-11 Ravens for reconnaissance missions. Several state-owned and private companies are set to battle it out for this drone tender. One of India's most ambitious drone plans is the Ghatak UCAV. The Ghatak drone is in development and is designed to be a stealth UCAV that can operate on its own. It will be armed with missiles and precision-guided munitions. The prototype of this drone will be made available in 2024-25.

The Tactical Airborne Platform for Aerial Surveillance-Beyond Horizon-201 (TAPAS-BH-201) is an advanced UAV that has been unveiled at the Aero India 2023 show in Bengaluru. The TAPAS UAV is known as the Rustom II and has been in development since 2009. The first flight of the TAPAS UAV was in November 2016. The TAPAS UAV captured the Aero India rehearsal from 12,000 feet. India has come a long way from the failed Nishant to the advanced and competent TAPAS-BH-201. The TAPAS is designed in congruence with the MQ-1 Predator drone of the United States. It is only hoped that India's *aatmanirbharta* aspirations will lead to greatness in the drone industry.

## **6. Assessing the importance of tactical UAVs**

In order to assess the significance of tactical UAVs, the Indian experience of using them suggests that there are at least four components to consider that together make up the UAV-system. To begin with, two technological factors set limits to the overall utility of the system: namely the performance of the platform and the quality of the sensor. First of all there is the platform itself, which imposes limitations upon its operational usage. Most fundamentally, flight time and altitude do matter. In the Indian experience, it is also clear that the ratio between flight time and maintenance work is crucial. The second component in a UAV system is the sensor onboard. Many of the incidents testify to the importance of the quality of the image sensor onboard. Several experts also testify to the desirability of having more than one sensor onboard the vehicle. The third component that needs to be taken into consideration is the personnel issue. To train pilots and image operators takes time

Fourth and finally, one of the most important lessons regarding the use of UAVs is that it is crucial to think in terms of systems rather than the UAV as a free-standing resource to be used on its own. Some people still believe that if you send up an UAV you will see everything." Instead, the commanders quickly learnt that the use of a UAV had to be driven by specific intelligence needs. And with such primary knowledge, there is broad consensus among the experts that the tactical UAV increased intelligence gathering capabilities considerably. Moreover, the usefulness of the tactical UAV is also linked to the ability of the intelligence operator and image interpreter to select targets dynamically during the mission.

If India succeeds in the integration of tactical drones in its military arsenal, it is not too hard to imagine the Indian armed forces undertaking specific missions to deal with terrorist issues and eliminate high-value targets



in the process. This will hugely boost the country's affront against terrorism of all kinds, especially cross-border and transnational terror.

In 2020, India decided to procure the Raven UAVs from the United States. This was following the protracted conflict in Galwan Valley in Ladakh with China. The Indian Army had decided to procure the RQ-11 Ravens for reconnaissance missions. As is evident from this development, the Indian armed forces still procure high-end, readymade equipment such as advanced combat drones from partner countries. This is an issue that is in need of a fix and the *aatmanirbharta* programme is poised to provide the foundation of support for this endeavour. It will take time, of course, as all strategies and plans do. As of November 2022, the Indian Army has been seeking a large number (2,200) of drones for a variety of combat and tactical-related purposes.

## **7. Conclusion – drones are here to stay**

Only a handful of states have access to armed UAVs. Instead, a large number of states have experimented with how to best integrate tactical UAVs into their armed forces. This paper has examined India's UAV program, which in many ways is representative of how the majority of countries use UAVs, namely for limited ISR tasks. The paper has argued that in order to evaluate the importance of tactical UAVs, it is useful to conceive of the UAV as a part of a system, instead of a free-standing platform. There are at least four components that determine the operational value of the UAV: the vehicle itself, the sensor onboard, the training of the operators, and finally the processing of the intelligence obtained. The main conclusion that may be drawn from the Indian experience of utilizing UAVs is that a tactical UAV is at its most effective when used together with other sensors. Further, in the geopolitical security architecture following Russia's invasion over Ukraine, many European states have once again turned their attention to national defense. Whereas tactical UAVs have proved their utility in uncontested airspace, their role in conflicts where air supremacy may not be taken for granted is a lot more uncertain.

A major point of contention in the scholarship on UAVs has been whether tactical gains have come at the expense of strategic goals. This concern, as relevant as it is when it comes to targeted killing and the US and Israeli drone programs, does clearly not apply to unarmed tactical UAVs.

Despite India not excessively utilising drones for military purposes, drones remain integral to the Indian military. India is just about to conclude a deal for the MQ-9B Reaper drones from the United States for US\$ 30 billion. The *Make in India* programme is increasingly focusing on indigenisation and the *aatmanirbharta* campaign is poised to develop drones as an important component of defence improvements and modernisation. In fact, in February 2022, India banned the import of drones except those for defence research and security purposes.

Drones have also been used against India. Terrorists have made the most of this technology and have air-dropped packages such as grenades and other materials for use against India. In a raid in Hyderabad in late 2022, India uncovered that Pakistani drones had been used to air-drop grenades. This was clearly a conspiracy hatched by Pakistan's nefarious Inter-Services Intelligence (ISI) against India.

Drones will be further integrated into the Indian defence ecosystem through deals such as the one for the MQ-9B. The MQ-9B is needed for current operational requirements, as per Prof. Harsh V. Pant. Vice Admiral Pradeep Chauhan of the National Maritime Foundation describes the MQ-9B as "here and now". This means that the MQ-9B is a pressing requirement of the Indian military drone system and that the *Make in India* programme will take some time before its goals can be achieved. Further, drones are also likely to be integrated across the military forces – the Air Force and the Navy, too. As of December 2022, the Navy was inclined to purchase 30 Predator drones from the US. The Navy is also set to purchase four numbers of TAPAS-BH-201s. With so much going on, it is clear and apparent that drones are here to stay.

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