CSS | ISSUE BRIEF

Drones: The New Aerial Threat

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Introduction

It is considered that to develop each sector of the economy, technological advancement must happen. Technology has become a part of every aspect in our life. However, there have been numerous cases where the technological innovation has been used for malicious purposes. The Unmanned Aerial Vehicles (UAVs) are no exception to this trend.

UAVs are certainly gaining popularity within the commercial and military organizations. They are being used in photography and videography in big events. Multinational companies like Amazon and Flipkart are about to use the drones for the delivering of packages[1]. Drones are also used in disaster relief management to analyze seismic radiations and cyclonic emergences.[2] Thus, drones are innovative technologies that can benefit society. However, as every coin has two sides, the potential threat of the misuse of the technology ought not to be discounted.

This paper indicates the potential threats that are posed by the usage of the Unmanned Aerial Vehicles (UAVs). The article also brings in the element of the usage of the drones in the armed forces and highlights a few examples in which the drones were responsible for security breaches and threats. This paper offers a first step in identifying research and development needs to facilitate security against the UAV drones.

Security Incidents involving UAVs

Technological innovations also increase the threats to national and international security. Government and military officials must secure UAVs from getting into the wrong hands. This

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[1] Woolf, Nicky, and Samuel Gibbs. "Amazon to test drone delivery in partnership with UK government" *The Guardian*. July 26, 2016. https://www.theguardian.com/technology/2016/jul/25/amazon-to-test-drone-delivery-uk-government.

[2] Liu, Peter , Albert Y. Chen, Yin-Nan Huang, Jen-Yu Han, Jihn-Sung Lai, Shih-Chung Kang, Tzong-Hann Wu, Ming-Chang Wen, and Meng-Han Tsai. 2014. "A review of rotorcraft Unmanned Aerial Vehicle (UAV) developments and applications in civil engineering." *Smart Structures and Systems* 13 (6): 1065-1094.

section of the essay provides an overview of incidents where national security of different countries was threatened due to UAV use.

It was in the late 2014, an incident took place where unidentified UAVs made flights in the restricted airspaces above 13 nuclear power plants in France. There has been no one held accountable for the incident as of now. It was clear that the advancement of the technology has reached so far that, it has made it more difficult and complex for the special forces to investigate properly (Phillips and Gaffey 2015).

A civilian UAV crash landed on the lawn of the White House in Washington, D.C., in January 2014, causing no causalities. The UAV used was commercially popular, known as the 'Quadcopter.' It raised a few security concerns over the virtually unprotected government buildings.[3]

Since the Cold War, UAVs have progressed in terms of technical capabilities. Their overall cost of production has reduced. Their military use has gone up. UAVs are available in the commercial sector as well. For example, firefighters use drones to locate persons trapped in fires. Drones are used in environmental and wildlife surveys.

UAVs and the Armed Forces.

As far as the Indian Air Force is concerned, Swarm Drones (Smart War-Fighting Array of Reconfigured Modules) are the latest development. In January 2018, a collaborative drone strike attacked Russia's Khemim airbase in western Syria. This was the first time the world saw drone swarm warfare. On Army Day, India paraded a drone swarm of 75 drones which successfully eliminated a variety of targets.[4] These specific drones are capable of protecting and wreaking havoc deep inside the enemy camps at the same time. If the number of UAVs increase, it will increase drone swarm's potential. Azerbaijan's victory in the six-week long war with Armenia was successful due to drone use.[5] United States is currently leading investment in drone technology, followed by Russia, China and even Britain.[6]

Lethal Autonomous Weapon Systems (LAWS) are weapon systems that do not require any physical human intervention to detect, analyze and engage the target. It only requires certain algorithms. For example, high-tech aerial drones detected and tracked Iranian General Qasem Soleimani and then killed him remotely. Moreover, India can deploy Unmanned Combat Aerial Vehicles/Unmanned Ground Vehicles in urban areas and combat terrorist threats. Artificial Intelligence can be used in the Air Force as well. The US Air Force equipment uses the flying boom system which, with the help of the Boeing built KC-46 tanker, an refuel any fixed-wing

[3] Miller , J. Zeck. "Drone That Crashed at White House Was Quadcopter." Time. January 26, 2015. https://time.com/3682307/white-house-drone-crash/

[4] Hambling, David. "Indian Army Shows Off Drone Swarm Of Mass Destruction." *Forbes.* January 19, 2021. https://www.forbes.com/sites/davidhambling/2021/01/19/indian-army-shows-off-drone-swarm-of-mass-destruction/?sh=ce34a0623840.

[5] Eckel, Mike. "Drone Wars: In Nagorno-Karabakh, The Future Of Warfare Is Now." *Radio Free Europe Radio Liberty.* October 09, 2020. https://www.rferl.org/a/drone-wars-in-nagorno-karabakh-the-future-of-warfare-is-now/30885007.html

[6] Ayoub, Kareem , and Kenneth Payne. 2015. "Strategy in the Age of Artificial Intelligence." *The Journal of Strategic Studies* 39 (5): 816.

receiver capable aircraft in the air.[7] In an in-air demonstration in 2007, it was clearly shown by DARPA, that high-performance aircraft could easily perform automated refueling from conventional tankers. Though the point that is to be considered is that it was not fully automated as the pilot had to set the conditions and safety measures during autonomous refueling operation.[8] This demonstration might not had been successful if the teaming up with NASA had not been done.

Challenges

Though it has been observed that the popularity of the aerial drones shows an increasing graph, but bringing with itself a couple of challenges that the government and other concerned agencies must not ignore.

Commercial websites like Amazon are selling these drones for commercial purposes. These drones are unarmed and can be operated in the civilian environment, however with some modifications and engineering, weapons can be installed in these drones. Civilians can use these drones to spy on the neighbors, which is a privacy breach. Drones could also just be a perfect subject to step in somebody's house, by an excuse of crash-landing. Where should drones be allowed to fly? Who must be allowed to use the drones? How to ensure they are not misused by civilians? Who will be responsible for the damages that may occur to people, stray animals and as well as to their property and civil rights? These questions are of much relevance and needed to be answered by the government officials.[9]

Radar technologies are used to detect any flying objects, mostly metal. Many radars are designed in such a way that they avoid detecting birds or small flying insects. Hence, it may perhaps become difficult for the radars to detect tiny drones. However, some of the radars are designed to detect small drones, for instance the Active Electronically Scanned Array (AESA) currently being used in some fighter jets. Radio emissions can also be an effective way to detect any aerial drones, as certain types of UAVs use a radio connection to receive commands from a UAV operator at the base station.

Conclusion and future prognosis.

The new technological innovations are changing how the armed forces operate. They are generating arms competition among countries. They bring certain advantages to society, while creating new potential threats to critical infrastructure. Unmanned Aerial Vehicles (UAV) are a technology that are a game-changer for military and security organizations. Potential malicious uses of the UAV drones are security concerns that must not be ignored.

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[7] Boeing. 2021. *KC-46A Tanker.* Accessed August 19, 2021. https://www.military.com/equipment/kc-46a-tanker.

[8] Thomas, Peter R., Ujjar Bhandari, Steve Bullock, and Thomas S. Richardson. 2014. "Advances in Air to Air Refuelling." *Progress in Aerospace Sciences.* https://www.darpa.mil/about-us/timeline/autonomous-highaltitude-refueling.

[9] Solodov, Alexander , Adam Williams, Braden Goddard, and Sara Al Hanaei. 2017. "Analyzing the threat of unmanned aerial vehicles (UAV) to nuclear facilities." *Security Journal* 31 (1): 305-324.

This paper has highlighted some such uses, arguing that UAVs can pose a threat to both civilians and military. It has also highlighted protection measures government or other military organizations can adopt to safeguard their security. However, correct use of such technological innovations can result in fruitful outcomes as well.