Drones and the Law

International Responses to Rapid Drone Proliferation

Vivek Sehrawat

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About the Author

Vivek Sehrawat is an Assistant Professor of Law at BML Munjal University. He has extensive research and publication experience in legal issues relating to national security, international humanitarian law, international law, and privacy law. Vivek conducted extensive research on drones during his SJD at University of Kansas. After finishing his SJD, he joined University of California, Davis, as a Visiting Scholar. At Davis, he continued his work on drones as well as the legal implication of autonomous weapon systems. From that research, he authored this book. At Davis, he worked on the UN Human Rights in the field of cultural rights projects with the Special Rapporteur Karima Bennoune. He served on the editorial board of the UC Davis Business Law Journal during his LLM.

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Foreword

There have been a number of technologies introduced that have changed the world over the past several centuries, often in ways that nobody expected. Unmanned aerial vehicles, commonly known as drones, are one such technology. Born from hobbyists' remote-controlled model airplanes, drones have now come to be ubiquitous around the world. They are in use in multifarious ways, from military use as weapons platforms and surveillance devices on the battlefield to civilian uses to deliver packages and provide communications capabilities in rural areas. The use that has attracted the most attention from policymakers, senior military officers, and the general public is for targeted killing, what many refer to as assassination. This latter use, primarily by the United States in the past two decades, has led to a worldwide conversation among scholars about the best ways in which to regulate military drone usage. These discussions have been chaotic and often confrontational. Attempts to actually regulate military use of drones, such as those by the Talinn group, have unfortunately reflected these widespread disagreements and have been unsuccessful.

Dr. Vivek Sehrawat has provided a brilliant analysis of the issues surrounding military use of drones from historical, cultural, and legal viewpoints. His book will serve both beginners to this area as well as those who have studied these problems equally well. It makes a great contribution to an important debate and will provide new insights and guidance to those policy makers who must ultimately find ways to control this new and potentially dangerous technology.

M. H. Hoeflich
John H. and John M. Kane Distinguished Professor of Law
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Introduction

New technologies bring benefits as well as challenges for the society. This book responds to the legal challenges raised by one such emerging technology—drone usage. This book discusses world policy on drone strikes for counterterrorism purposes and the myths about current-generation drone's capabilities and implications. Military drones' usage has become more global. Drone strikes have proven to be spectacularly successful—both in terms of finding and killing targeted enemies and in avoiding most of the challenges and controversies that accompany using traditional forces. Therefore, drone policies are criticized by many scholars and most countries are struggling in adopting the drone regulations. The book identifies the legal framework and sources of law applicable to the current conflicts in which drones are employed.

Chapter 1 includes the definition of drones, historical background, and the evolution of predator drones. The chapter discusses the legal posturing and what drones really are: what technologies are out there and what is coming next. The chapter discusses the evolution of drones and a history of the use and rhetoric of drones that serves as the basis for robust analysis in following chapters.

Chapter 2 argues that drones should be treated as any other component of the arsenal. Further the chapter argues that drones offer extensive and enhanced opportunities for compliance with LOAC and other relevant laws governing the use of certain weapons.

Chapter 3 focuses on targeted killing as it pertains to drones employed as a means of warfare by the United States in its War on Terror. The justifications for targeted drone strikes can be broken down along three lines—operational considerations, theories of self-defense, and moral concerns. This project examines whether the use of drones for targeted killings comports with the IHL.

Chapter 4 is a comprehensive assessment of the consequences of current-generation drone proliferation in disputed territories and use by the non-state actors. This chapter analysis three legitimate concerns with drone proliferation: first, the use of drones in disputed territories; second, how it affects the war crisis and war escalation between states; and third, rogue drone use by violent non-state actors.

Chapter 5 analyzes the government and civilian uses of drones in these three countries and identifies the "best-practices" for global application. All three nations have drone regulating agencies. These agencies license drones, but they do

not provide any regulations for privacy issues. This leaves a gap between drone usage regulations and privacy protection of the people. The other areas of law can fill this gap, particularly when drone has a camera mounted. The chapter proposes legal and policy guidelines for the privacy issues of drone usage.

Chapter 1

Historical Introduction and Technology Used in Drones

1. Introduction

During World War II, a top commander in what was then the United States Army Air Forces, General Henry Arnold, developed a new way to attack U-boat stations and other heavily fortified German positions: he turned old B-17 and B-24 bombers into remotely piloted aircraft and loaded them with explosives.[1] Arnold wrote in a memo to his staff, "If you can get mechanical machines to do this, you are saving lives at the outset."[2] The missions had a poor track record, but that did not deter Arnold from declaring in 1945 that "the next war may be fought by airplanes with no men in them at all."[3]

Nearly seven decades later, Arnold's prophecy is slowly being realized: armed drones are starting to rule the skies.[4] Until now, the United States (US) has had a relative monopoly over the use of drones, but it cannot count on maintaining that for much longer.[5] Other states are quickly catching up.[6]

The drone proliferation has spawned intellectual debates on whether a country has the right under the international law to unilaterally deploy drones abroad for military purposes.[7] Drones are parodied, satirized, caricatured, excoriated, and fetishized in a wide variety of outlets and media, including late night talk shows, cartoons, Hollywood blockbusters, rock music, street art, gallery art, comedy shows, and the White House Correspondent's dinner.[8] People have heard about

[1]Sarah Kreps and Micah Zenko, *The Next Drone Wars,* FOREIGN AFFAIRS (March–April 2014), https://www.foreignaffairs.com/articles/2014-02-12/next-drone-wars.
[2]*Id.*
[3]*Id.*
[4]*Id.*
[5]*Id.*
[6]*Id.*
[7]Heeyong Daniel Jang, *The Lawfulness of and case for combat drones in the fight against terrorism,* 2 NAT'L SEC. L. J. 1 (2013).
[8]Arthur Holland Michel, *Drones in Popular Culture,* CENTER FOR THE STUDY OF THE DRONE AT BARD COLLEGE (September 4, 2015) http://dronecenter.bard.edu/drones-popular-culture/.

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drones, but they have heard different and contradictory things.[9] People are not sure whether they are for them, against them, or neither.[10] The overwhelming interest by militaries, hobbyists, and commercial purposes means this technology is significant.[11] Intention of people will determine whether the drones are used for progress or cataclysm.[12]

The nature and use of drones varies widely.[13] An increasing number of countries have access to this novel technology to fulfill various military objectives, including surveillance, reconnaissance, and targeted killing.[14] The legality of drones' use raises questions for a variety of reasons, some more grounded in fact than others, but despite these criticisms there is little question that the use of drones in surveillance and combat roles is on the rise.[15]

This chapter examines the legal posturing and what drones really are: what technologies are out there and what is coming next. The chapter discusses the evolution of drones and a history of the use and rhetoric of drones that can serve as the basis for robust analysis in following chapters. This chapter includes the definition of drones, historical background, and the evolution of predator drones. The chapter discusses two types of drones, i.e. surveillance, and their technologies. It is important to discuss technology used in drones because a drone performs its function with the help of these technologies. These functions cause various legal challenges for drone operators. For example, performing surveillance with drones presents unique legal threats to the safety and privacy of individuals. This chapter will help in developing legal analysis of drones in the following chapters that drones are not illegal to use but they are more complicated.

2. Drones

The term "drone" is consistently and materially employed throughout this book, as such, there is a need to stipulate to a working definition because of the term's importance. It will be helpful in addressing the legal challenges that underlie the use of drones.

2.1 What Exactly Is a Drone?

To ensure the same basic understanding of the term from the outset, this preliminary definition should help readers in addressing the legal issues that underlie the use of drones. The word "drone" encompasses everything from toy drones to

[9]Adam Rothstein, *Drone,* IX (2015).
[10]*Id.*
[11]*Id.*
[12]*Id.*
[13]Michael Schmitt, *Drone Attacks Under the Jus ad Bellum and Jus in Bello: Clearing the 'Fog of Law'* (2011) http://ssrn.com/abstract=1801179.
[14]Jang, *supra* note 7.
[15]Michael Lewis, *Drones and the Boundaries of the Battlefield,* 47 Tex. Int'l L. J. 294 (2012).

weaponized drones.[16] Categorically, "drone" refers to any unmanned, remotely piloted, flying craft ranging from something as small as a radio-controlled toy helicopter, to the 32,000-pound, $104 million Global Hawk military drone.[17]

In determining what exactly constitutes a drone under this language, one considers whether the vehicle or flying craft at issue (1) flies and (2) a pilot on the ground controls it; if the vehicle meets these criteria, it falls under the everyday-language definition of drone.[18]

> The International Civil Aviation Organization (ICAO) defines as:
>
> [a]n aircraft and its associated elements which are operated with no pilot on board.[19]
>
> 'Unmanned Aircraft' (UA) refers to the aircraft within the Unmanned Aircraft System (UAS) and is defined by ICAO as:
>
> [a]ny aircraft intended to be flown without a pilot on board … [it] can be remotely and fully controlled from another place (ground, another aircraft, space) or pre-programmed to conduct its flight without intervention.[20]

For ICAO, RPAS is a subcategory of UAS—this subcategory relating only to unmanned aircraft which are piloted from a remote pilot station.[21]

ICAO defines RPAS as:

> [a] remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design.[22]
>
> The US Army officially defines a drone as "a land, sea, or air vehicle that is remotely or automatically controlled."[23] The US Department of Defense defines a drone as:
>
> [a]powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly

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[16]Rothstein, *supra* note 9.

[17]Kelsey Atherton, *Flying Robots 101: Everything you Need to Know about Drones,* POPULAR SCIENCE (March 7, 2013) http://www.popsci.com/technology/article/2013-03/drone-any-other-name.

[18]*Id.*

[19]David Hodgkinson and Rebecca Johnston, *Aviation Law and Drones*, Routledge, at 2 (2018).

[20]*Id.*

[21]*Id.*

[22]*Id.*

[23]*Department of Defense,* DICTIONARY OF MILITARY AND ASSOCIATED TERMS, 109 (August 2011). (Original, Gregoire Chamayou, Translated by Janet Lloyd, *A Theory of the Drone,* 27, The New Press, New York 2015).

> autonomously or be remotely piloted, can be expendable or recoverable, and can carry a lethal or nonlethal payload. Ballistic or semi-ballistic vehicles, cruise missiles, and artillery projectiles are not considered unmanned aerial vehicles.[24]

The history of drones is that of a watchful eye turned weapon.[25] The drone is not a projectile, but a projectile-carrying machine.[26] Also, this book uses the term "drone" for domestic drones and military drones.

Military drones are referenced to as Unmanned Aerial Vehicles (UAVs), Unmanned Combat Aerial Vehicles (UCAVs), or hunter-killers,[27] Unmanned Aircraft (UA) Remotely Piloted Vehicle (RPV) and Remotely Operated Aircraft (ROA).[28] There are sub-categories such as First Person View (FPV) where the controller is guided by a live video feed from the craft, Micro Air Vehicle (MAV) for the growing swarm of insect-sized flying bots now being perfected in science labs, and Model Aircraft (MA) for the rapidly proliferating band of hobbyists.[29]

2.2 Origin of Term Drone

In Old English, drone referred to a male honeybee whose only role is to mate with the queen.[30] Unlike worker bees, need not worry about gathering nectar or pollen, they have often been seen as idlers, and by the sixteenth century, drone could refer to lazy humans.[31] Around the same time, the word drone began branching out as a verb, meaning to buzz like a bee or to speak in a monotonous fashion reminiscent of a bee's persistent hum.[32] Bees also played a key role in the use of drones for early radio-controlled aircraft, but for other reasons.[33]

According to the military historian Steven Zaloga, author of the 2008 book *Unmanned Aerial Vehicles*, in 1935, US Adm. William H. Standley saw a British demonstration of the Royal Navy's new remote-control aircraft for target practice, the DH 82B Queen Bee.[34] Back stateside, Standley charged Commander Delmer Fahrney with developing something similar for the Navy.[35] Zaloga wrote

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[24]Laurie Blank, *After "Top Gun": How Drone Strikes Impact the Law of War*, 33:3 U. PA. J. INT'L L 677(March 14, 2012).
[25]Gregoire Chamayou, Translated by Janet Lloyd, *A Theory of the Drone*, THE NEW PRESS, at 11 (2015).
[26]*Id.*
[27]Lewis, *supra* note 15.
[28]Mark Corcoran, *Drone wars: The Definition Dogfight,* ABC (February 28, 2013) http://www.abc.net.au/news/2013-03-01/drone-wars-the-definition-dogfight/4546598.
[29]*Id.*
[30]Ben Zimmer, *The Flight of 'Drone' from Bees to Planes,* THE WALL STREET JOURNAL (July 26, 2013) http://www.wsj.com/articles/SB10001424127887324110404578625803736954968.
[31]*Id.*
[32]*Id.*
[33]*Id.*
[34]*Id.*
[35]*Id.*

"Fahrney adopted the name 'drone' to refer to these aircraft in homage to the Queen Bee."[36]

The term fits, as a drone could only function when controlled by an operator on the ground or in a "mother" plane.[37] Following their lead, any machine that flew without on-board human control is termed a drone.[38] Early in the twenty-first century a drone was defined as a pilotless, radio-controlled military target-towing aircraft. Today drone is the popular description for anything that flies without a pilot at the controls, whether it controlled directly by an operator on the ground or is capable of autonomous flight with no direct human intervention.[39]

3. Historical Background

The drone's military value did not blossom overnight. The history of drones is ancient. Drone have a long history of being used for surveillance and deadly strikes against known enemy targets where it seemed essential to use covert stealth techniques. In China, kites carrying explosives were used by a warlord to assault the walled city of his enemies.[40] In 425 BC, Archytas, an ancient Greek philosopher reputedly built and designed a steam propelled "pigeon" which apparently flew 200 meters before running out of steam.[41] In 400 BC, a vertical flight device, the "Chinese top," was invented in China, which consisted of feathers at the end of a stick.[42] The stick was spun between the hands to generate enough lift before it could be released into free flight.[43] The Egyptian Saqqara bird, a bird-shaped artifact, with its 150 millimeter length and 180 millimeter wingspan is dated to 200 BC.[44] It may have been able to glide; its wings were angled at that of modern aircraft, and this indicates that the ancient Egyptians may have understood some of the processes of aerodynamics.[45]

In 1818, "a French solider designed an aerial balloon that would use a time delay to float over enemies and launch rockets down on top of them."[46] In August 22, 1849, when the Austrians, who controlled much of Italy at that time, launched some 200 pilotless balloons against the city of Venice.[47] The balloons were armed with bombs controlled by timed fuses or fuses electrically activated via signals fed

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[36] *Id.*
[37] *Id.*
[38] Atherton, *supra* note 17.
[39] Mark Corcoran, *supra* note 28.
[40] David Hodgkinson and Rebecca Johnston, *supra* note 19 at 4.
[41] *Id.*
[42] *Id.*
[43] *Id.*
[44] *Id.*
[45] *Id.*
[46] *Id.*
[47] Remote Piloted Aerial Vehicles: An Anthology, *RPAV* http://www.ctie.monash.edu/hargrave/rpav_home.html#Beginnings.

up trailing copper wires.[48] In 1862, less than two decades later, balloons were flown in the US Civil War with both Confederate and Union forces using them for reconnaissance and bombing sorties.[49]

Fast-forward to 1898, during the Spanish-American War, the US military fitted a camera on a kite, producing the first ever-aerial reconnaissance photos.[50] The origins of the electronic drone can be traced to the "target drones" used in the early twentieth century.[51] These "dumb" drones were used to test and train combat pilots and anti-aircraft gunners.[52] That was precisely what a target drone was: a dummy towing a target, inexpensively made, to serve a limited purpose, and be shot down.[53]

The history of technology suggests that technology is constantly evolving, and outdating its prior inventions. In 1916, and across a shrinking Atlantic, the idea of remotely-guided weapons sparked the interest of Captain Archibald M. Low of the Royal Flying Corps in the United Kingdom, Low oversaw the construction of a number of remotely-piloted planes that were fitted with explosive warheads.[54] This included the "Aerial Target," which was first launched in March 1917 from the rear of a truck in England.[55] The lightweight wooden plane along with successive incarnations largely failed to maintain its altitude.[56]

However, the United States tried to build pilotless aircraft during World War I, when the army experimented with a couple of "aerial torpedoes."[57] The one that came closest to being produced was the Kettering Bug, a tiny biplane designed to take off from rails and deliver a 200-pound warhead 50 miles away, guided by a complicated autopilot system that involved a barometer and a gyroscope.[58] The Bug never worked as planned, until a test a few days before November 11, 1918, the day World War I ended.[59] In Germany, Dr Wilhelm von Siemens was pioneering a similar project between 1915 and 1918.[60] The Siemens Torpedo Glider was a missile that could be dropped from a Zeppelin and then be guided toward its target by radio.[61] Crucially, however, for the period in which they were airborne, the Aerial Targets did respond to radio control.[62]

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[48] *Id.*
[49] Ian Shaw, *The Rise of the Predator Empire: Tracing the History of US Drones,* UNDERSTANDING EMPIRE (2014) https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/.
[50] *Id.*
[51] *Id.*
[52] *Id.*
[53] Chamayou, *supra* note 25, at 26.
[54] Shaw, *supra* note 49.
[55] *Id.*
[56] *Id.*
[57] Richard Whittle, *Predator: The Secret Origins of the Drone Revolution,* at 19 (2014).
[58] *Id.*
[59] *Id.*
[60] Shaw, *supra* note 49.
[61] *Id.*
[62] *Id.*

Remote control would not become fully functional without major strides in radio technology.[63] The Flying Bomb, the Bug, and the Torpedo Glider were all early forerunners to contemporary cruise missiles.[64] However, the existence of such planes remained at an experimental stage.[65] In the 1930s, the idea of using radio signals to fly airplanes remotely was pursued by Hollywood actor Reginald Denny.[66] He founded the Radio-plane Company in Los Angeles which turned its attention toward aeromodelism.[67] During World War II, the Germans deployed drone bombs that were launched from planes and steered to the target by a pilot using a radio-controlled stick.[68] The United States manufactured 15,000 drones for anti-aircraft practice at a plant in southern California during the war, and the career of Norma Jean Dougherty, later known as Marilyn Monroe, was launched when an Army magazine published a photograph of her working in a drone factory.[69] Thus the drone was born partly in Hollywood.[70]

In another incident in 1944, US Army Air Force's project Aphrodite, packed 22,000 pounds of high explosives into heavily-used B-17 bombers, which were rigged to be flown by remote control, then crashed into targets by a "mother ship" flying much higher.[71] Getting such a flying bomb airborne by radio was problematic, a crew of two airmen was needed to take off in the modified bomber, designated a BQ-7, to arm the explosives and engage an autopilot to turn control over to the accompanying mother ship, then bail over England.[72]

Denny's Radio-plane company continued to sell the US Army its propeller-driven remote-control target drones after the war, and in 1955 the company added a film camera to one, creating the world's first unmanned reconnaissance aircraft.[73] However, all this activity took place on the margins of warfare.[74] The problem afflicting drones was a lack of endurance in the air, and[75] their weapons delivery was blunt and inflexible.[76] In the 1960s and 1970s, Air Force engineers continued to tinker with drones for use in surveillance flights, which do not engage

[63] *Id.*
[64] *Id.*
[65] *Id.*
[66] Whittle, *supra* note 57.
[67] Chamayou, *supra* note 25.
[68] Peter Finn, *Rise of the Drone: from Calif. Garage to Multibillion Dollar Defense Industry,* THE WASHINGTON POST (December 23, 2011) http://www.washingtonpost.com/national/national-security/rise-of-the-drone-from-calif-garage-to-multibillion-dollar-defense-industry/2011/12/22/gIQACG8UEP_story.html.
[69] *Id.*
[70] Chamayou, *supra* note 25.
[71] Whittle, *supra* note 57 at 20 (revised).
[72] *Id.*
[73] *Id.*, at 21.
[74] Finn, *supra* note 68.
[75] *Id.*
[76] John Sifton, *A Brief History of Drones,* THE NATION (February 12, 2012) http://www.thenation.com/article/brief-history-drones/.

in complex flight maneuvers and require less sophisticated piloting.[77] Unfortunately, the drones kept crashing.[78]

3.1 Inventor of Drone: Abraham Karem and Evolution of the Predator Drone

This section discusses the evolution of predator drone and role of its inventor Abraham Karem. Abraham Karem, (Abe), was constantly worked on drones and dreamed of making them more efficient and effective. He developed an early fascination with building aircraft and gravitated toward drones in the early 1970s when Israeli aviation engineers tried to satisfy an operational need for real-time, front-line intelligence.[79]Abe's preoccupation with drones continued for 30 years.[80]

Abe was concerned about the lack of endurance of a drone in the air.[81] He wanted to increase the endurance of drones, some of which were crashing every 20 hours, by a factor of 100.[82] He felt certain he could get at least 2,000 hours flight time out of drones, making them far more cost effective, which would make them more attractive as carriers of expensive cameras and other gadgets that the military needed.[83]

Born in Baghdad, Abe was the son of a Jewish merchant who moved the family to Israel in 1951.[84] He was a born engineer.[85] From the time Abe was a toddler, he was always drawing things, making things, and taking things apart to see how they worked.[86] For instance, one day he climbed onto his Uncle Ezra's bed, found a round, brown light switch on a cord beneath the pillow, and took it apart, getting a 110-volt sting he seemed to regard as more interesting than painful.[87] Later Abe joined the Aero Club of Israel, where a young adult counselor was teaching youngsters like him to make model gliders that could fly.[88] Within a year, he was flying models in competitions.[89] Within two years, he was the instructor for his Aero Club chapter.[90] He then knew what he truly wanted to do with his life.[91] He was going to be an aeronautical engineer.[92] From the time he joined the Aero Club in Israel as a boy, Abe had read every book, magazine and

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[77] *Id.*
[78] Finn, *supra* note 68.
[79] *Id.*
[80] *Id.*
[81] *Id.*
[82] *Id.*
[83] *Id.*
[84] *Id.*
[85] Whittle, *supra* note 57, at 7.
[86] *Id.*
[87] *Id.*
[88] *Id.,* at 8.
[89] *Id.*
[90] *Id.*
[91] *Id.*
[92] *Id.*