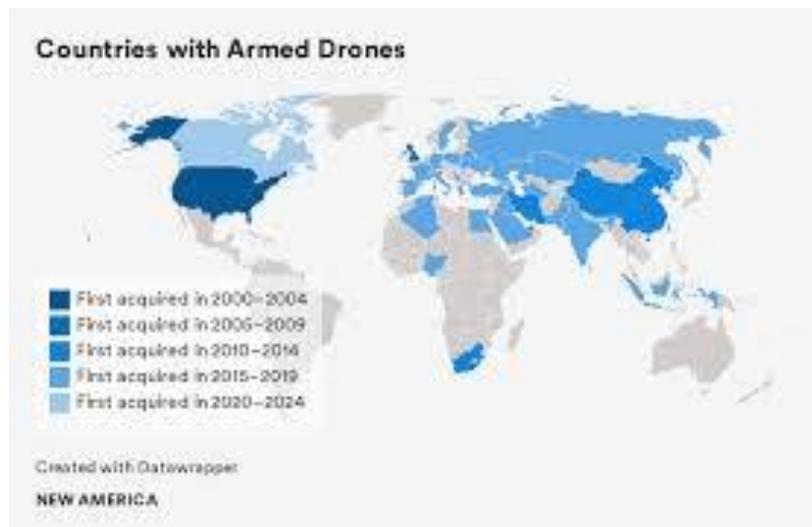


The Use of Drones and UAVs

Drones in a Historical Context

Drone and UAV usage in war has been a recent technological advancement for use in combat. The first official use of drones for combat was back in early 2002 by the United States in response to the 9/11 attacks.¹ Once the U.S. took advantage of drones, other states began using them and a market for drone technology developed. Drones allow militaries to covertly attack a position remotely without physically deploying soldiers. Drones are especially precise and will effectively be able to hit a target regardless of the size or location. Despite drones being used even earlier for reconnaissance, weaponized drone use is still fairly new. UAVs or



unmanned aerial vehicles, allow its user to control it from a separate location and to control its speed and altitude depending on the situation. Historically, the first unpowered aircraft was used during the First World War, all the way back in 1918 by the United States.²

Defining Drones

A drone is broadly defined as “an unpowered aircraft or spacecraft.”³ While they are used recreationally and commercially, drones are increasingly used in combat because they do not put the life of the pilot at risk. More specifically, an unmanned aerial vehicle (UAV) is a “military aircraft that is guided autonomously, by remote control, or both that carries sensors, target designators, offensive ordnance, or electronic transmitters designed to interfere with or destroy enemy targets.” Modern UAVs originated in the early 1980s by the Israeli Defense Forces (IDF), who fitted small drones with televisions and infrared cameras.⁴ It is important to note that drones are favored by strategic military planners because they are extremely cost-effective compared to human soldiers. For example, each US soldier deployed in Afghanistan in 2012 cost the government \$2.1 million.⁵ Using drones, on the other hand, is not only cheaper, but also mitigates the physical and mental risks soldiers have to take.

¹ “A Brief History of Drones.” *The Nation* <https://www.thenation.com/article/archive/brief-history-drones/#:~:text=It%20was%20ten%20years%20ago,drone%20in%20a%20targeted%20killing.&text=It%20began%20to%20fly%20armed,the%20Taliban%20in%20late%202001.>

² “A Brief History of Drones.” *Imperial War Museums* <https://www.iwm.org.uk/history/a-brief-history-of-drones>

³ “What Is A Drone?” *Space.com*. <https://www.space.com/29544-what-is-a-drone.html>.

⁴ “Unmanned Aerial Vehicle.” *Encyclopædia Britannica*. <https://www.britannica.com/technology/unmanned-aerial-vehicle>.

⁵ “Drones Are Cheap, Soldiers Are Not: a Cost-Benefit Analysis of War.” *The Conversation*. <https://theconversation.com/drones-are-cheap-soldiers-are-not-a-cost-benefit-analysis-of-war-27924>.

The United Nations and Drone Usage

The United Nations recognizes both the positive and negative uses of drones and UAVs within the international community. For example, Dr. Renata Dawan, the director of the United Nations Institute for Disarmament Research, has raised several concerns related to the increased use of UAVs, including “lack of transparency, need for a common understanding of use and proliferation, and compliance with international law.”⁶

Agnes Callamard, the UN Special Rapporteur on Extrajudicial, Summary, or Arbitrary Executions stated that, “as more governments and non-state actors acquire armed drones and use them for killing, there is a clear danger that war will come to be seen as normal rather than as the opposite of peace.”⁷ The increased use of drones and UAVs has the potential to normalize war and conflict on an international scale. Callamard stated that until recently, targeted killings using drones were primarily conducted against non-state actors, however the United States became the first nation to use an armed drone strike to target a high-level official in a foreign state.⁸ This was done in Iraq in January 2020, resulting in the death of Iranian General Qassam Soleimani.

There are also a number of benefits of UAVs. For example, in peacekeeping operations where forces are deployed in hostile conflict zones, drones and other forms of technology could be utilized to ensure peacekeepers are working safely and cost-effectively.⁹ Hervé Ladsous, the United Nations Under-Secretary General for Peacekeeping Operations, oversaw the deployment of UAVs for peacekeeping operations in the Democratic Republic of the Congo in 2014, and more recently in Mali and the Central African Republic.¹⁰ Ladsous stated that “UAVs do a better job in protecting civilians because they provide real-time pictures of situations as they develop on the ground. You can act more quickly and more decisively. They also provide better security to our people because you get prior warnings that an ambush or an attack is about to happen.”¹¹ This unarmed technology has proven to be an asset, providing both strategic and tactical surveillance in order to save lives. Currently, there are no international standards related to the use of drones and UAVs.

The Use of Drones by Non-State Actors

Non-state actors across the world, from South America to the Middle East, have drone capabilities. These groups utilize “commercially available rotary-winged drones to surveil enemy positions,” while others with greater access to technological resources, like ISIS have “armed these over-the-counter drones and used them in combat.”¹² The use of these technologies by groups including the Houthis in Yemen, Hamas

⁶ “The Expanding Use of Armed UAVs and the Need for International Standards – UNODA.” *United Nations*. <https://www.un.org/disarmament/update/the-expanding-use-of-armed-uavs-and-the-need-for-international-standards/>.

⁷ “All Drone Strikes ‘in Self-Defence’ Should Go before Security Council, Argues Independent Rights Expert | UN News.” *United Nations*. <https://news.un.org/en/story/2020/07/1068041>.

⁸ *Ibid.*

⁹ “Delegates Argue Merits of Unmanned Aerial Vehicles, Other Technologies as Security Council Considers New Trends in Peacekeeping.” *United Nations*. <https://www.un.org/press/en/2014/sc11434.doc.htm>.

¹⁰ “Drones Are Effective in Protecting Civilians.” *United Nations*. <https://www.un.org/africarenewal/magazine/april-2016/drones-are-effective-protecting-civilians>.

¹¹ *Ibid.*

¹² “World of Drones.” *New America*. <https://www.newamerica.org/international-security/reports/world-drones/non-state-actors-with-drone-capabilities/>.

in Palestine, and Hezbollah in Lebanon, has the potential to bring about even greater instability, as well as the threat of using drones in civilian spaces in countries not experiencing armed conflict.¹³

The most notable example of a non-state actor with drone capabilities is the Islamic State, which used “commercial drones in waging an aerial bombardment campaign against US-led forces in their defense of Mosul [Iraq] in 2016 and 2017.¹⁴” The system encountered by U.S. forces was thus deemed the “most daunting threat” faced in 2016. In addition to utilizing drones and UAVs for bombs, the Islamic State employed intelligence-gathering, surveillance, target acquisition, and reconnaissance (ISTAR) operations. This technique, also used by the Houthis—a rebel group in Yemen—improved the accuracy of strikes. The Islamic State was able to utilize this technology because of their access to military production facilities, which “manufactured equipment and explosives” that allowed them to expand their drone program.¹⁵ Additionally, they were able to purchase commercial drones beginning in 2014 from companies in Canada and the United States through “an extensive commercial network of five subsidiaries based in Wales.¹⁶” Once this network was dismantled, the Islamic State was then able to purchase drones and other equipment from companies in India, Turkey, and China.¹⁷ In conclusion, non-state actors are able to access drones because of their low price and the small size of the market, bringing about lower barriers to obtaining this technology.

Civil society groups, NGOs, and disarmament advocates are requesting the development of cohesive international standards on use of UAV and drone technologies. In order to bring this about, “more research is needed on how non-state groups adapt technologies and how particular contexts encourage the development and use of these weapons systems.”

Potential Uses for Aid and Development

Drones proved to be very useful for future development in complex environments where traditional development methods are not possible. They have brought technological innovation into a number of different industries, ranging from military, to agriculture and global health. According to Business Insider, drones and UAVs have worked towards “increasing work efficiency and productivity, decreasing workload and production costs, improving accuracy, refining service and customer relations, and resolving security issues on a vast scale¹⁸”

Drones and UAVs offer the UN and NGOs the possibility to get aid and necessary materials to areas where they were previously unable to reach. Delivering aid to those in need during active conflict is extremely difficult and drones offer a way to safely get aid to those with far less danger and risk.¹⁹ Drones and UAVs are being utilized by UN agencies and other humanitarian organizations in order to deliver much-needed materials, including “vaccines, contraceptives, and humanitarian aid.²⁰” UAVs reduce the time needed to deliver these items, which is especially important when they are being delivered to an area

¹³ “The Use of Drones by Nonstate Actors.” *Project Ploughshares*. https://ploughshares.ca/pl_publications/the-use-of-drones-by-nonstate-actors/.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ “Drone Technology Uses and Applications for Commercial, Industrial and Military Drones in 2020 and the Future.” *Business Insider*. <https://www.businessinsider.com/drone-technology-uses-applications>.

¹⁹ “Drones For Development: How UAVs are Supporting the Global Goals” *United Nations Foundation*. <https://unfoundation.org/blog/post/drones-for-development-how-uavs-are-supporting-the-global-goals/>.

²⁰ Ibid.

without adequate infrastructure or one impacted by a natural disaster, and have proven to be safe and inexpensive.²¹

One notable example of drones and UAVs being used for humanitarian purposes is exhibited by Zipline, a U.S.-based startup that has partnered with the Rwandan government. This partnership launched the “world’s first commercial drone delivery service, ferrying vital medical supplies to its far-flung hospitals by air.”²² Since December 2016, Zipline’s drones have delivered more than 4000 units of blood to 12 hospitals in Rwanda.²³ Without these drones, life-saving red blood cells, plasma, and platelets would have traveled for hours, and potentially not arrived at hospitals in time to save Rwandans.²⁴



Additionally, drones are being increasingly utilized to promote sustainable agricultural practices. Specifically, drones are being used in precision agriculture, which “seeks to use new technologies to increase crop yields and profitability while lowering the levels of traditional inputs needed to grow crops (land, water, fertilizer, herbicides, and insecticides).”²⁵ Precision agriculture typically employs GPS and GIS data to accurately monitor and map fields, allowing for the development of “more intense and efficient cultivation methods, which can help farmers adjust fertilizer prescriptions or identify crop diseases before they become widespread.”²⁶ Drones can be used to make practices like crop monitoring more efficient, and allow for the careful and high-quality surveillance of large areas of farmland.²⁷ Additionally, drone data would be beneficial when assessing crop fertility, as well as evaluate damage following a natural disaster.

Challenges Related to the Use of Drones and UAVs

While drones and UAVs have the potential to save the lives of people in conflict and surveillance, their use has proven to be controversial within the international community. In fact, they can actually result in greater casualties. There are no standards for legal accountability, since the actions are considered to be taken by a robot, limiting the ability for repercussions.²⁸

The use of drones and UAVs in conflict has significant environmental impacts. The remnants of explosives and other weapons are likely harmful to human health, and their use can bring the damage or destruction of “infrastructure, such as power, water, and sanitation facilities.”²⁹ In densely populated areas, the combination of building materials, particulate matter, chemicals, and munition can create

²¹ Ibid.

²² “Zipline's Drones Are Delivering Blood to Hospitals in Rwanda.” *Time*. <https://time.com/rwanda-drones-zipline/>.

²³ Ibid.

²⁴ Ibid.

²⁵ “What Is Precision Agriculture?” *Sustainable America*. <https://sustainableamerica.org/blog/what-is-precision-agriculture/>.

²⁶ “The Role of Drone Technology in Sustainable Agriculture.” *PrecisionAg*. <https://www.precisionag.com/in-field-technologies/drones-uavs/the-role-of-drone-technology-in-sustainable-agriculture/>.

²⁷ Ibid.

²⁸ “Advantages and challenges of unmanned aerial vehicle autonomy in the Postheroic age.”, pg 205. <https://commons.lib.jmu.edu/master201019/205>.

²⁹ “Environmental Harm.” *Women’s International League for Peace and Freedom*. <https://reliefweb.int/sites/reliefweb.int/files/resources/humanitarian-impact-of-drones.pdf>.

polluted environments with unknown human health impacts.³⁰ These issues are especially difficult, since the use of drones and UAVs in conflict can create humanitarian emergencies. Coupled with a lack of access and inadequate environmental data collection, the long-term environmental and health impacts can be devastating.

Drone operations can additionally cause significant harm for civilians. In Yemen, for example, which is referred to as the “United States drones’ playground,” drone attacks inflicted by the United States have shaped the “perceptions, fears, and life choices of a large proportion of the Yemeni population.”³¹ These individuals, known as the drone generation, view the skies as a “medium of death” and suffer “from mental stresses that also culminate into physical distress.”³² Those living in Yemen and other nations that regularly fall victim to drone attacks tend to have high prevalence of post-traumatic stress disorder (PTSD). Organizations like the Office of the United Nations High Commissioner for Human Rights (OHCHR) and the International Committee of the Red Cross (ICRC) have expressed concerns about the lack of awareness associated with the impact of mental health on drones.³³

Case Study #1: History of Drone Use by the United States

The United States is the world’s leader in remote targeted killings, and drones have become an important component of its national security for purposes ranging from intelligence, surveillance, and reconnaissance. Between 2002 and 2010, the Pentagon’s inventory of drones increased by forty times, and as of 2016 they planned to spend \$3 billion on drones.

Military technology advanced rapidly in the United States during the Cold War, beginning particularly in the Eisenhower administration. In 1962, Ryan Aeronautical Company, with funding from the United States Air Force, developed the first surveillance drones.³⁴ These drones, as early as 1964, were used in spying missions over Cuba, able to surveil in “denied areas.”³⁵ A turning point for modern drone warfare was the Vietnam War, labeled as the first “technowar” because of its use of “technical principles, statistical models, and machine systems.”³⁶ During the 1960s, the US Department of Defense worked to automate the battlefield by developing remote sensors to listen to enemy movement, and jet-powered drones.

On September 14, 2001, the U.S. Congress passed the 2001 Authorization for Use of Military Force (AUMF), which “authorized military action against those responsible for the 9/11 attacks and those who harbored them.”³⁷ Up until this point, the United States had primarily used drones for surveillance, however after 9/11, efforts were initiated to weaponize them. The Predator, the first armed drone deployed by the Central Intelligence Agency (CIA), was initially used for reconnaissance in Afghanistan, however following the attacks The Predator was used for targeted killings.³⁸ The first attempts of the United States to use The Predator for targeted killings post-9/11 had been disastrous - a man in Khost,

³⁰ Ibid.

³¹ “Psychological Harm.” *Women’s International League for Peace and Freedom*. <https://reliefweb.int/sites/reliefweb.int/files/resources/humanitarian-impact-of-drones.pdf>.

³² Ibid.

³³ Ibid.

³⁴ “History of U.S. Drones.” *Understanding Empire: Technology, Power, Politics*. <https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/>.

³⁵ Ibid.

³⁶ Ibid.

³⁷ “Understanding Drones.” *Friends Committee on National Legislation*. <https://www.fcnl.org/updates/understanding-drones-43>.

³⁸ “History of U.S. Drones.” *Understanding Empire: Technology, Power, Politics*. <https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/>.

Afghanistan was misidentified as Osama bin Laden, and a number of innocent civilians were killed while picking up scrap metal.³⁹ Pakistan became a major site of American aerial surveillance and targeted killing, particularly in the Federally Administered Tribal Areas. The US worked alongside Pakistan's Inter-Service Intelligence (ISI), with strikes primarily targeting officials from the Taliban, al-Qaeda, and Haqqani.⁴⁰

Generally, drone use by the CIA is confidential. The Obama administration worked to “transfer all authority for the US drone program to the Department of Defense, [but] the Trump administration is...expanding CIA drone use and...establishing a new CIA drone base in Niger.”⁴¹ In 2017 and 2018, the United States conducted drone strikes in “Afghanistan, Pakistan, Libya, Somalia, Iraq, and Syria.”⁴² More specifically, in the first two years of the Trump administration, the U.S. conducted 238 strikes in Yemen, Somalia, and Pakistan.⁴³ Additionally, Trump repealed an executive order from the Obama administration that required reporting on the amount of civilians and combatants killed outside of war zones.

One of the major sites of drone strikes conducted by the US in recent decades in Yemen. The first targeted killing operation the US conducted in Yemen in 2002 was directed at Qaed Salim Sinan Al-Harithi, an alleged coordinator for the 2000 terrorist attack on the USS Cole that killed 17 Americans and wounded 39.⁴⁴ Since 2002, the US has killed over 1000 people in various counterterrorism missions in Yemen, of which, most were conducted by drone.⁴⁵ The US drone program was essentially paused in Yemen until 2009—when the Obama Administration came into power. Under the Obama Administration, drones in Yemen targeted several militant leaders from 2011-2014 most notably, beginning with the death of Anwar al-Awlaki, who was the first American citizen targeted and killed by the U.S. government since the Civil War.⁴⁶ During the Trump administration, as previously addressed, officials worked to “loosen the battlefield restrictions of Obama-era drone wars, raising the risk of civilian casualties, such as the reported dozens incurred in the first ground raid Trump authorized as President.”⁴⁷ In 2017 alone, the United States military conducted 131 drone strikes in Yemen.



While drones allow the United States to avoid deploying soldiers to countries, the use of drones in conflict can also be ineffective, helping spur and generate anger towards the United States. In response to drone strikes, “revenge is targeted at those within the easy range of the insurgents and militias,” while “terrorists and ordinary people are drawn closer to each other out of sympathy.”⁴⁸ This sympathy can be used to fuel public outrage and even empower terrorist organizations. In Pakistan, for example, many believe that “drone strikes tend to motivate Al Qaeda and the Pakistani Taliban to conduct terrorist attacks

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ “Understanding Drones.” *Friends Committee on National Legislation*. <https://www.fcnl.org/updates/understanding-drones-43>.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ “America's Counterterrorism Wars.” *New America*. <https://www.newamerica.org/international-security/reports/americas-counterterrorism-wars/the-war-in-yemen/>.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ “How Drones Create More Terrorists.” *The Atlantic*. <https://www.theatlantic.com/international/archive/2013/08/how-drones-create-more-terrorists/278743/>.

that target Pakistan's security forces as well as civilians.⁴⁹ Thus, drone strikes have the potential to bring about both violence and anti-U.S. sentiment.

Case Study #2: Armenia and Azerbaijan

Conflict erupted in Nagorno-Karabakh, an Armenian enclave internationally recognized as belonging to Azerbaijan, but ruled by an Armenia-backed separatist government, after years of calm. The conflict, referred to by Armenians as Artsakh, dates back to World War I, but escalated during the Cold War. In September 2020, conflict broke out along the border, which has resulted in the death of over 1000 soldiers and hundreds wounded.

An increase in global oil prices since the early 2000s has increased Azerbaijan's defense spending, which includes "tens of billions of dollars spent on Russian, Israeli, and other foreign high-tech arms."⁵⁰ Between 2011 and 2019, Azerbaijan spent over \$19 billion on weapons, while Armenia spent \$4.8 billion.⁵¹ Armenia's reliance on Russia as its primary supplier means that its UAV capabilities are relatively lacking, because Moscow has not focused its defense development on drones.⁵²

Other foreign actors have worked to fuel the conflict in Nagorno-Karabakh. For example, Turkey sent Bayraktar drones to Azerbaijan, which "launched a broad ground and air offensive [in September], using drones to destroy at least a dozen Armenian air defense systems in the early hours of the conflict."⁵³ Drones obtained by Azerbaijani forces have been seen destroying Armenian tanks and artillery systems, and resupply and reinforcement convoys.⁵⁴



The Bayraktar drone deployed by Azerbaijani forces has proven to be highly lethal, combining "the remote control and long endurance attributes of a drone with the deadly strike capabilities of a guided missile."⁵⁵ While these technologies are considered to be cheaper they are still relatively exclusive to nations with high defense spending, leaving nations like Armenia unable to defend themselves against the swarms of drones.

In November 2020, Armenia and Azerbaijan reached a deal in which "Azerbaijan will retain control of the territory it has seized in the fighting...The region is recognized as Azerbaijan under international law, but has been ruled by ethnic Armenians since 1994."⁵⁶ Russia, a regional power involved in the peace deal between Armenia and Azerbaijan, will have 2000 peacekeepers

⁴⁹ Ibid.

⁵⁰ "A New Weapon Complicates an Old War in Nagorno-Karabakh." *Los Angeles Times*. <https://www.latimes.com/world-nation/story/2020-10-15/drones-complicates-war-armenia-azerbaijan-nagorno-karabakh>.

⁵¹ Ibid.

⁵² Ibid.

⁵³ "Cheap Drones from China, Turkey and Israel Are Fueling Conflicts like Armenia and Azerbaijan's." *NBC*. <https://www.nbcnews.com/think/opinion/cheap-drones-china-turkey-israel-are-fueling-conflicts-armenia-azerbaijan-nca1243246>.

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ "The Surprising Armenia-Azerbaijan Peace Deal over Nagorno-Karabakh, Explained." *Vox*. <https://www.vox.com/2020/11/10/21558428/armenia-azerbaijan-war-nagorno-karabakh-russia-turkey>.

along the Lachin Corridor, which connects Nagorno-Karabakh.⁵⁷ Much of the success obtained by the Azerbaijanis has been due to the effectiveness of their drone fleet. Azerbaijan - “hardly a major power or a near-peer- [was able to] field a significant arsenal of modern drones capable of wreaking large-scale destruction.⁵⁸” As witnessed in this conflict, the size and unregulated nature of the drone market give a ‘weaker’ country like Azerbaijan the ability to have more devastating war fighting capabilities. This potentially prolongs conflicts and is much deadlier for the people (usually innocent civilians) living on the ground.

Questions to Consider

1. Are international standards regarding the development and use of drones and UAVs necessary? How should nations go about this?
2. Should nations and companies be able to use drones and UAVs for purposes like humanitarian aid delivery?
3. How can the negative environmental and psychological impacts of drones be remedied?
4. What measures should be implemented to limit non-state actors like the Houthis and Islamic State from obtaining this technology?

⁵⁷ Ibid.

⁵⁸ “The ‘Magic Bullet’ Drones Behind Azerbaijan’s Victory Over Armenia.” *Forbes*.
<https://www.forbes.com/sites/davidhambling/2020/11/10/the-magic-bullet-drones-behind--azerbajians-victory-over-armenia/?sh=5a0f9fbf5e57>.