Autonomous Drone Impact on the 2023 Israel-Hamas Conflict

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Kendall Moore

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Advisor

Joshua Earle, Department of Engineering and Society

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Introduction

Amidst the evolution of modern warfare, a silent revolution unfolds in the skies: autonomous drones, poised at the intersection of technology and conflict, redefine the dynamics of warfare, posing profound ethical, strategic, and humanitarian challenges. In this paper, I will be focusing on autonomous drone usage in the 2023 Israel-Hamas conflict. One ethical dilemma that is introduced here is the capability of autonomous drones to take the lives of innocents by means of bombing or shooting. I will be touching on the ethics of sending drones, which have questionable abilities to make good judgments, to kill thousands, as well as an alternate view, which delves into the precision and accuracy of drones as opposed to a human soldier. There have been terrible tragedies of soldiers shooting and killing unarmed civilians, which may be avoidable with the use of a drone. Drones are also extremely effective at destroying whatever they are sent to destroy and much more effective than RPGs (rocket-propelled grenades), which are daunting. I will also detail the companies supplying drones in the 2023 Israel-Hamas conflict and whether the companies truly have the freedom to turn down Israel, Hamas, or either of their allies.

To analyze the ethicality of the usage of autonomous drones in the 2023 Israel-Hamas conflict, I will delve into the brief history of Hamas and Israel, the impacts of military vs. recreational drones in warfare, and the usage of this technology by Hamas, Israel, and others who engage in the war. To further this study, laws and policies regarding drone usage and civilian safety will be researched for all involved parties. Delving into both history and public policies is necessary to conduct a fully informed study of the ethicality of drone usage in this particular conflict because the history will show more of who is involved and where; whereas, the laws and

policies set in place currently will show exactly what has been done in order to set standards for drone usage in warfare. The history of the Israel and Hamas conflict will only be used as the starting point of the history of autonomous drone usage between the two and the ethicality of it. The United States is also a player in this conflict, so their part involving autonomous drones will be explored and evaluated. Autonomous drone history and evolution is a major component of this research because of how advanced both military and non-military drones have become, and specifically how Hamas has started to use recreational drones (or cheaper drones) as armed weapons. This touches on public policy as well since Hamas is using recreational drones to do their bidding; therefore, it is hard to make laws against using them in war because doing so would also affect civilian usage of drones.

The framework SCOT (social construction of technology) will be used in this paper. This framework is based on the thought that humans influence technology, not the other way around. Creation of new technology is essentially driven by human needs or wants, so it only makes sense that the creator's ideas are then essentially applied to the technology they have created or advanced. This framework essentially personifies technology in the sense that the technology is now a miniature version of the person who programmed it. Now transfer this idea to autonomous drones—especially artificial intelligence (AI) drones. These are self-flying drones that are sent on planned missions. The flight path programmed into the drone will invariably have unexpected obstacles or setbacks along the way, but the drone is equipped to make decisions on how to continue onward and finish the mission successfully. The path the drone chooses to take to get back on track varies depending on the situation and could be unwanted by the user. Furthermore, imagine the mission of the drone is to target and kill a specific person. What if the drone cannot find the person to shoot once it arrives at the location where this person is supposed to be? These

are questions people should be asking because the moral standards of the drone itself need to be 100% solid when people are not directly involved in the firing of missiles, shots, or other weapons. The programmers and companies who develop the drones used in the 2023 Israel-Hamas conflict will be evaluated based on how they program their drones and whether these companies have the ability to refuse to create this technology for their customers. My research question is as follows: "How does the usage of both militarized and recreational autonomous drones impact the 2023 Israel-Hamas conflict, and how do policies and programmers influence the technology behind drones?"

Hamas and Israel

To begin, Israel's relationship with Palestine and their conquering of the Gaza Strip will be covered. In 1948, Jewish forces conquered large parts of Palestine, which is when Palestine began to be considered a part of Israel (Svirsky & Bignall, 2012). This was against the Palestinians' will but so is much of what Israel has done to the Gaza Strip and Palestinians themselves. In 1949, Israel and Egypt signed an agreement that allowed for the Egyptian rule of the Gaza Strip—again, without any consent from Palestine (Svirsky & Bignall, 2012). Gaza became a sort of safe space for Palestinians running from the malevolence of the Jewish forces, which is why so many Palestinians reside in the Strip today (Svirsky & Bignall, 2012). The Sinai War broke out between Palestine and Egypt vs. Israel in 1956 (Svirsky & Bignall, 2012). The Palestinians started this war with Israel because of the financial rape that Israel had them under for years (Svirsky & Bignall, 2012). Unfortunately, Israel used this opportunity to launch extremely harsh "retaliations" against Palestine in order to conquer the Sinai Peninsula (Svirsky & Bignall, 2012). Israel seems to be known for their "retaliations." Palestine has been under Israel ever since this war occurred. All of this has resulted in the mistreatment of a group of

people. "The condition of Palestinians in the Gaza Strip is a direct consequence of their imprisonment within the giant pen that Israel has erected for them (with Egypt's cooperation)" (Svirsky & Bignall, 2012, p. 182). It is extremely unfortunate to see what Israel has done to a group of people and the terrorist group that emerged because of Israel's disregard for human life.

Hamas was founded in 1987 as a Palestinian nationalist group seeking the destruction of Israel (Samman, 2020). In 2006, Hamas candidates won the majority of the Palestinian Legislative Council, with the minority being Fatah (Svirsky & Bignall, 2012). Hamas launched a war against Fatah and won the sole control of the Gaza Strip (Svirsky & Bignall, 2012). There has never been an election since. It is important to realize that even though the people of Palestine elected Hamas candidates to the Palestinian Legislative Council, this does not mean that they wanted to have Palestine turn into an autocracy with Hamas at the helm. These people also have no control over changing the authority of the state since there has not been an election since 2006. However, when the Palestinians elected Hamas, they were striving for a change because of Israel's continuous cruelty toward them. It is understandable that Palestinians felt that they had no other escape from the wrath of Israel but to elect a terrorist organization to lead them out from under Israel's thumb. Hamas' allies include Iran, Iraq, Syria, Russia, and more—this will become important when we investigate the aid given by each of these countries to Hamas in the form of drones and what their policies are on drones and autonomy/AI in general.

The 2023 Israel-Hamas conflict occurred after Israel and allies, such as Egypt, were draining Palestine of resources and Hamas brutally retaliated (Zanotti & Sharp, 2023). Hamas invaded the Israeli territory surrounding the Gaza Strip and killed about 1,200 Israelis (Dostri, 2023). Israel is now retaliating back, having killed at least 4.5 times as many people of Palestine (both members of Hamas and civilians) than Hamas killed in Israel (Zanotti & Sharp, 2024). As

is routine of Israel, their "retaliation" is quite brutal and uncalled for. This does not excuse the brutality of Hamas's attack on Israeli citizens, but Israel is striking back in such an extreme way that it is hard to consider this retaliation as a defensive rather than an offensive. Allies of Israel who are directly aiding them in this conflict include Egypt, Jordan, and the United States.

Military vs. Recreational Drones

Drones became a crucial part of the United States' military during the Obama administration (2008-2016). The Bush administration utilized U.S. MQ-1 Predator drones for 48 strikes, but the Obama administration reportedly utilized this drone for 302 drone strikes (McCrisken, 2013). Meaning, Obama used drones over six times more than Bush did—a substantial increase in drone usage. Upon election, Obama promised to "fight terrorism with greater effectiveness and moral rectitude" than Bush (McCrisken, 2013, p. 97). It is questionable whether using military-grade drones, ones which are extremely difficult to combat, is ethical. However, Obama was correct in thinking that military-grade drones would prove to be more effective than previous measures taken, which include more direct involvement of soldiers. Using drones as a means to lessen the number of soldiers being physically present in the warzone is both a good and bad thing. Less soldiers being present at offensive measures saves lives; however, this also allows for countries with military-grade drones to take more offensive strikes than they would have if their soldiers were directly involved.

The most advanced United States's drone involved in the 2023 Israel-Hamas conflict is the U.S. MQ-9 Reaper, which has been circling Gazan skies since the beginning of the conflict in mid-October (Reuters, 2023). The United States is involved in this conflict because of the aforementioned reasons of being allied with Israel and being keen on fighting the war against terror as well as not previously mentioned reasons such as at least 10 Americans being held

captive by Hamas from the October 7th raid (Reuters, 2023). The Reaper can be armed with highly dangerous weapons, but the United States has said that their Reapers flying above Gaza are not equipped with weapons and are only being used for surveillance (Reuters, 2023). It is unfortunate for the citizens of Palestine to have to watch high-grade military drones such as the Reaper circle their skies and just hope the United States is keeping their word when they say their drones are unarmed. It is terribly frightening for Palestinians to know that military-grade drones are lingering nearby, ready to attack. Even if the United States is not currently armed, the Israeli drones are definitely armed, and they have been attacking Gazan cities. Israel uses military-grade drones made by Elbit Systems, an Israeli company. Specifically, the Hermes 450 was being used against Hamas in the 2023 Israel-Hamas conflict (Frantzman, 2023).

Before drones became as prevalent as they are today in the military environment, Hamas equipped themselves with short-range, unguided Qassam rockets, which cost roughly $1,000 each (Samaan, 2020). Qassam rockets are rockets fired from the ground and loaded with TNT and were developed by Hamas (Zucker & Kaplan, 2014). From 2001-2010, the Qassam rockets fired by Hamas have only gathered 10 fatalities, which makes them seem like they are used more for psychological warfare rather than tactical efforts (Zucker & Kaplan, 2014). With so few aerial offensive and defensive mechanisms, Hamas had the need to add more advanced technology to their military—drones. Although Hamas still uses the infamously inaccurate Qassam rockets, they have since graduated from solely using tactics such as those to using Chinese-made Da Jiang Innovation (DJI) drones repurposed as suicide, or kamikaze, drones.

DJI drones are recreational drones which people around the world use for purposes such as aerial photography and videography, education, social media content creation, personal projects, racing, and more. DJI drones are also extremely affordable depending on the model,

starting at $499—much less than the $1,000 Qassam rockets (Yousef et al., 2020). Having a higher arsenal of capabilities and being less expensive than the unguided, inaccurate Qassam rockets makes these DJI drones seem like the ideal option for Hamas or really any terrorist group focused on killing others. The DJI drones are also exponentially cheaper than American-made military-grade drones, such as the Reaper and its predecessor, the Predator. The Hermes 450 used by the IDF costs around $25 million; much like the American-made drones, these are exponentially more costly than DJI drones. Drone technology is becoming more easily accessible and advanced, which poses a risk because the sheer range of capabilities that drones have is unmatched compared to any other way of waging war. This technology being widely accessible—both in military and non-military drones—makes it extremely easy for anyone to get their hands on some very powerful and potentially dangerous hardware. Also, Hamas clearly leans towards more primitive means of attack, which could be another reason why they are using recreational drones equipped with bombs (Mendelboim & Antebi, 2019).

Same Technology, Different Application

Autonomous drones have really gained their footing on the battlefield ever since the war on terror ensued (Gilli, 2022). As seen in other wars, most recently, the Russia-Ukraine war beginning in 2022, Chinese-made DJI quadcopter drones made for recreational use have been used by Russia against Ukraine as a means of causing more destruction in a cheaper way—and now Hamas is following suit. Drones may not be the x-factor needed to end all wars, but they will "further increase the lethality of the battlefield" (Gilli, 2022, p. 5). It is worth noting that war is ugly every time, but it is important for morals to still be in place as much as possible. Increasing the lethality of the battlefield may be effective in the short term for the country

developing the technology first, but think of the bigger picture. Once these new, more capable drones are developed in one country, this new technology will spread like wildfire.

The expansion of technology is particularly frightening when it comes to war because now, terrorist organizations such as Hamas can spend next to no money on fairly advanced drones which are not military-grade but can always be repurposed. For any country or group in power, spending less money on the weapons does not mean that their budget is smaller now than it was before. Spending less on drone fleets enables these countries or groups of people to buy more of these drones and cause even more destruction. This approach even leaves room in the budget for Hamas to create more Qassam rockets for more psychological warfare as well as the ability to hire more brilliant minds for more tactical planning. In warfare, having cheaper technology leads to more money being available to be spent on even more devices which will cause greater destruction.

Hamas has tortured and massacred many people, but as mentioned before, the Gazan people have no choice but to submit and comply. Using drones against the Gazan people by the IDF specifically is not the best approach because of how many civilian lives could be lost and are being lost relative to how many terrorist lives are being lost. It is difficult to determine where to draw the line of morality on conflicts like these and whether the use of weapons of mass destruction is needed as a means of "solving" the problem. Hamas using drones to kill thousands of Israelis is unquestionably unethical, but it is even less ethical to kill an entire region of people because they are being governed by terrorists—like Israel has chosen to do.

Hamas and Israel both use completely different types of drones but for the same purpose. The world-wide political status as well as the capital each party in this conflict has plays a major role in what each group's military looks like. Israel has more capital than Hamas and is able to

invest in military-grade drones, such as the Elbit Systems Hermes 450, while Hamas has to stick to investing in much simpler drones, such as DJI. While the Hermes 450 has many more features and capabilities than the DJI quadcopter, it is important to note that DJI drones are made to be reliable. All Hamas needs is a quadcopter ensuring reliable flight, and then their team of engineers can craft the autonomy and thrust capabilities needed to take specific bombs to specific locations. Achieving autonomy with a drone that is built reliably is much easier than starting from scratch. With drones such as DJI being so inexpensive, why wouldn't Hamas take that opportunity?

Programmer and Developer Influence

Let's turn to focusing on what autonomy means for drones for a minute. An autonomous drone is not intelligent (unlike AI) and is given a specific goal with a specific path to follow to reach that goal. Many sensors are onboard these drones to redirect the drone if the given path is obstructed and to resume its course after the obstacle has been passed. This operation consists of a series of decision-making steps determined by the drone's coding—which is essentially a series of for, while, and if loops. For example, a drone can be given the planned route to take off, reach an altitude of 1 meter, travel straight for 3 meters, loiter, and then land. The programmer will also input code for the drone to make decisions if there is an obstacle in the way. For example, if there is an obstacle detected by the drone's sensors, the drone may be programmed to move to the left or right until the sensor can no longer detect the obstruction, and then continue forward. As seen with this example, the drone is carrying out exactly what the perpetrator wants and is doing exactly what the perpetrator would want it to do whenever the plan cannot be carried out to an exact degree.

DJI is a key player in the 2023 Israel-Hamas conflict because of Hamas's use of these recreational drones as suicide drones. DJI has four stakeholders, and as the company was only recently founded in 2005, the original founder of DJI is still the leader (Xu & Muneyoshi, 2017). Sequoia Capital and Accel Partners have both invested quite significant amounts of money into the company, giving each company a bit of a say in what goes on at DJI (Xu & Muneyoshi, 2017). Hamas's military strategies are top-tier, and they clearly have some great minds aboard their operation. However, even with these advantages, it is extremely difficult to handcraft a cheap, reliable drone. This is why companies like DJI exist—because they have figured out the most cost-effective way to keep drone flight stable and make these drones compatible with autonomy and other advanced programs. It is pertinent that Hamas, or anyone trying to use recreational drones, buys from a reputable company such as DJI.

DJI has not only created drones that are easy to fly manually, but they have also made these drones able to fly autonomously and in fleets. The software DJI encourages users to use is DJI Assistant, which includes many customizable flight modes such as waypoint navigation, follow-me mode, orbit mode, and autonomous flight (Malinowski, 2023). All of these products and features by DJI have advanced drone research and the acceptance of drones in society—all good things. However, having all of these capabilities attracts not only civilians with pure intentions, but also terrorist groups like Hamas or communist countries such as Russia—both of which have malicious motives.

Drones combined with AI are not yet prominent in today's warfare, but they are coming quickly. The development of AI will strongly impact drones because drones are nearly intelligent as they are. Autonomous drones of today are equipped with extremely in-depth coding that allows drones to go through a very long series of loops in order to make the best call. Having a

script of code with many decisions in it makes the drone capable of making many decisions in many different scenarios. It is arguable that autonomous drones are scarier than AI drones because autonomous drones are quite literally an extension of the programmer. The programmer can input as many parameters as possible in order for the drone to make the same decision as he or she would have made if controlling the drone manually.

Drone and Civilian Protection Policies

DJI, the maker of the drones that Hamas is repurposing as suicide drones, holds a strong position against any militarization of their drones. "Our distributors, resellers, and other business partners…agree not to sell DJI products to customers who clearly plan to use them for military purposes, or help modify our products for military use, and they understand we will terminate our business relationship with them if they cannot adhere to this commitment" (DJI, 2022). When Russia invaded Ukraine and started repurposing these recreational drones to be military drones, DJI ceased all shipments of their products to Russia and Ukraine (Hollister, 2022). Ukraine's shipments were halted because they began to mimic Russia's repurposing of the drones. As mentioned before, Hamas emulated Russia by weaponizing the best and most affordable non-military drones on the market. It can be understood that DJI heavily frowns upon Hamas using their seemingly harmless, innocent drones for purposes for which the drone was not intended—more dreadful purposes. Hamas is allied with Iran, so it is possible that Iran could buy the drones for Hamas and lend them the drones if DJI ever decided to cut off Israel from their market. It would not hurt DJI to cut off these Middle Eastern countries because most of their revenue comes from North America, Europe, and Asia (Xu & Muneyoshi, 2017). The black market is also an option for Hamas to retrieve these drones, as well.

DJI's policies against the militarization of their drones are ethical but not extremely feasible. It is also questionable whether DJI has this statement, yet turns a blind eye to Hamas, Ukraine, and Russia's usage of their drones. In today's world with the internet and many different technologies within reach, it is nearly impossible to keep certain products out of certain people's hands—especially if those people are in power and have strong allies, and Hamas definitely falls into the "powerful and has strong allies" category. Policies being unmanageable are not exclusive to the drone industry. This issue extends to many different areas of life where policies and laws do almost nothing to protect people. It takes a long time for a social issue to migrate its way up the chain for a law to be made about it. It takes so long for most laws to be passed for technology, that by the time they are passed, they are already outdated. Very few laws have been passed about the usage of drones other than a permit is needed to fly them in the United States's skies as a civilian (a reminder the government governs the skies). Autonomy and AI face the same issue—there are very few restrictions on these technologies, which is relevant to the topic of drones because this technology paired with drones is very common in today's recreational and military-grade drones. The growth of technology is far too rapid for lawmakers to keep up with the system that is currently in place. There are pros and cons to the lawmaking process being so lengthy and tedious—pros being that extreme policies take a long time to get passed if they even make it to that point. Cons are situations like this where laws need to be passed quickly in order to protect people.

In war in general, there are not many policies against drones at all other than the standard, "Do not…take other unnecessary actions that could harm civilians" (Department of the Army, 2019, p. 110). In other words, drones are roped into any type of weapon or warlike activity and do not really have any specific regulations tied to them. Having little to no regulations on drones

in war is extremely dangerous because of how capable drones are and how expendable they are, considering there is no soldier inside that needs to be protected. Drones can fly into any complex situation and lead autonomous missions all by themselves. AI is not greatly integrated into military drones yet because of the newness of AI. However, AI is growing at an extremely fast pace, which for drones means that it will not take long for drones to be intelligent and make their own decisions while on missions. This development needs to be regulated because, as with any AI robot, having its own mind makes it unpredictable. AI robots do not have emotions and, at least in this lifetime, will never have emotions. Therefore, AI drones could choose to do anything for "the cause"—whatever that drone's cause may be. AI is a neural network with many tiny decisions behind the scenes being made in order to produce one, final decision. The decision made highly depends on what smaller decisions the drone is making behind the larger decision, as explained earlier. Programmers themselves need to be regulated by more than a simple code of ethics, which can be bent and allow responsibility to be tossed from one person to the next.

Another idea for consideration is the fact that IDF gets all of their drones used in the 2023 Israel-Hamas conflict from Elbit Systems, an Israel-based company. As previously mentioned, the drone the IDF uses from Elbit Systems is the Hermes 450, which is an advanced military drone—much more effective than the suicide drones hand-crafted by Hamas (repurposed DJI drones). It is possible that Elbit Systems cannot say no to Israel's business because they are under their governance. Elbit Systems gets most of its revenue from the IDF (Elbit Systems, 2018). The maker and distributor being so connected with their buyer is suspicious and could lead to personal relationships, which are always dangerous in any industry.

Conclusion

In conclusion, drones are indeed dangerous, even drones made specifically for recreational use. However, the limiting of the usage of such dangerous weapons and the creation of policies regulating this technology is not the answer to the problem of drone danger in this conflict. There are no technical solutions to a social problem. The technical problem being that people are being killed by weapons that are extremely difficult to defend themselves against. The underlying social issue is the decades of mistreatment laid out by the Israelis to the Palestinians. Israel's actions of wiping the Gaza Strip of any Hamas supporters results in a genocide of the Palestinians. Israel is creating the next "Hamas" by continuing their mistreatment of the Palestinians. There is no solution achieved by the military here. Only a ceasefire or agreement along those lines will end the Palestinians' suffering.

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