

ORIGINAL ARTICLE

Israeli Military Artificial Intelligence, Its Possible Use in the War in Gaza

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Abstract

This paper is focused on examining selected Israeli technologies operating based on artificial intelligence and the possible use of these technologies by the Israeli Defense Forces in the war in Gaza. These technologies include the Besorah system, an AI technology for identifying and recommending targets suitable for aerial bombardment, as well as other forms of attacks carried out from a distance. The SMASH system is an automatic targeting and firing system for small arms. The Goshawk system is a fully autonomous UAV used for aerial protection. The IRIS robot can be used for the initial investigation of tunnels ahead of assaults. The alleged use of these technologies in the war in Gaza cannot be verified by independent sources, mainly due to the ongoing conflict. The paper strives to present a general theoretical assessment of these technologies and weapons from the perspective of international law and armed conflicts.

Keywords

Artificial Intelligence; Israeli Defense Forces; Gaza War; the Besorah System; the SMASH System; the Goshawk system; the IRIS Robot.

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Introduction

Like existing items such as printed books, aeroplanes, vaccines, or nuclear weapons, new technologies have not fundamentally transformed international law, but they have shaped it and exerted influence on it, giving rise to new branches of international law and new discourses. Changes in international law arising from technological innovation have been subtle, gradual, and noticeable over decades, intertwined with geopolitical changes. Some areas of international law, such as the international law of armed conflicts, rely on the collection, search, storage, analysis, management, and interpretation of information and data. Work in this area has undergone a major transformation. It involves data transfers and artificial intelligence capable of generating (not genuine but realistically appearing) evidence. The sharing of fake news and deep fake information on social media has a strong impact on international relations (as seen, for example, in the case of the war in Gaza). In this context, technology might not be seen as a neutral force. Technologies amplify human capabilities for both constructive and destructive purposes (as seen in systems that enhance the accuracy of weapons, allowing ordinary soldiers to use weapons with the same precision as elite snipers). This raises many questions, such as what ethical limits should govern the use of these technologies, and whether there should be limits to the power wielded by technology. Addressing these issues requires not only deep technological knowledge but also forward-thinking and a strong ethical foundation. On one hand, regulating the use of technology is viewed as limiting or prohibiting; on the other hand, it can be seen as empowering and enabling. Striking the right balance is crucial. Effective international regulation can foster innovation, protect human rights, and prevent the misuse of technology (Martinkute 2024, 11-12).

Regarding the area of international law of armed conflicts, it might be noted that, on one hand, new technologies (e.g., drones, satellite imagery) have improved the monitoring and enforcement of the law because they enable better protection of civilians in conflict zones. These technologies also facilitate the rapid dissemination of information, which can benefit people who urgently need assistance during humanitarian crises. On the other hand, the deployment of highly sophisticated weapons may lead to breaches of international law. Another issue is that the current legal mechanisms, such as the Geneva Conventions and other relevant treaties, were not originally designed to anticipate the rapid advancement of military technologies. This fact may justify the opinion to regulate or limit the use of these technologies; otherwise, the effectiveness of the international law of armed conflicts might diminish (Tymofeyeva 2024, 13).

This paper aims to examine various military technologies and weapons operating based on artificial intelligence (AI) from the perspective of the international law of armed conflicts. The paper focuses as much as possible on practical use. Therefore, its aim is not to present various academic and doctrinal opinions on this matter. The paper strives to adhere to generally accepted mainstream legal opinions in the examined area. Its aim is not to examine the ethical issues of using these technologies; the research is conducted solely from a legal perspective.

Regarding the methodology used, the author employed analysis, synthesis, and comparison. Analysis was primarily used to explain the potential uses of the examined technologies based on information

provided by the technology producers and reports of alleged use. Synthesis was used to apply current rules of international law to these technologies and to formulate opinions on whether and how they should be employed to ensure compliance with state obligations under international law of armed conflicts. A comparison was utilised to examine both similarities and differences between the examined technologies and older technologies and means of warfare.

The examined technologies were reportedly used in the Gaza war, though due to insufficient and independently verifiable evidence of their use by the Israeli Defense Forces (IDF), this topic is addressed in a general and theoretical manner. The objective of this paper is to introduce these Israeli technologies and examine whether their use conforms to the international law of armed conflict. To this end, the research question formulated is: "*In what way should these technologies be used in military operations to avoid violations of international law?*"

This paper is structured into 5 chapters. The first chapter provides an overview of the examined technologies and explains that there are no specific rules in international law regulating the use of military AI technologies. Therefore, it is necessary to assess the use of these technologies per existing and applicable sources of international law of armed conflict. The following four chapters are dedicated to the four examined technologies. Each chapter begins with a basic description of the technology, its intended purpose, and its method of use. This is followed by an explanation of the legal areas impacted by these technologies and guidelines on how they should be employed to prevent legal violations. The conclusion, aside from addressing the research question, also includes final reflections and evaluations. The research methodology involved studying available information on these technologies, examining reports on the progress of military operations in Gaza (acknowledging that the authenticity of these reports cannot be independently verified), and applying sources of valid international law of armed conflicts.

Overview of the Examined Military AI Technologies and Weapons

The IDF categorizes AI technologies into two main groups. The first category includes technologies that replace "hard workers," such as systems for automatic decoding, automatic translation, and other tasks that are extremely time-consuming. The second category includes systems that assist humans in making decisions. In some cases, these systems are capable of making decisions about tasks autonomously to a certain degree. Autonomous decisions can be made after the weapon is activated by a human operator. These technologies are also capable of planning and forecasting (Antebi 2021, 47-48).

The examined technologies in this paper are structured according to their purpose and potential advantages in warfare. The first part focuses on AI technologies for *identifying and recommending targets* suitable for aerial bombardment or other forms of distant attacks (the Besorah system)². The second part examines *AI technologies used in ground military operations*, specifically the automatic targeting and firing system SMASH for small arms by Smartshooter. The third part

² This falls into the first category of technologies replacing the "hard workers" based on the above mentioned IDF distinction. These technologies complete tasks which are impossible for human being to be done in the comparable time.

discusses *AI technologies used for aerial protection*, exemplified by the Goshawk system developed by Robotican³. The fourth part addresses *robotic systems capable of conducting initial investigations of tunnels before assaults*, illustrated by the small IRIS robot by Roboteam.

All of these military technologies, operating based on artificial intelligence, share one legal characteristic: their use is not regulated by any specific international convention. However, this does not imply that their use in warfare is unrestricted or permissible under international law. Existing rules and norms of international law, including international customary law and legal principles, can be applied to these technologies, despite these norms having been established before the advent of such systems and weapons. The development and deployment of these technologies, and thus their potential use in warfare, outpace the creation of specialized legal regulations governing their use (cf. Hua 2020).

This reality does not exempt the parties to armed conflicts from their obligation to respect the peremptory norms (*ius cogens*) of international law (cf. Shaw 2008, 1167). Therefore, it is possible to apply the general principles of international humanitarian law to the alleged use of these technologies in the Gaza war. These principles include military necessity, humanity, distinction, and proportionality, which are further elaborated in specific international conventions. Many provisions within these treaties also hold the status of peremptory norms.

New and unforeseen situations may arise on the battlefield, not anticipated by existing international conventions or peremptory norms. Such situations may arise due to technological advancements or other factors. The Martens Clause was formulated precisely to address unpredictable situations that may occur in warfare. The modern articulation of this concept can be found in Article 1(2) of Additional Protocol I of 1977, which stipulates that:

“In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.” (Additional Protocol I of 1977)

The Besorah System⁴, AI Target Creation Platform

The Besorah system combines machine learning and advanced computing to serve as an accelerated production of targets. It analyzes vast amounts of data more effectively than any human. The main sources of this data are drone footage, intercepted communication, surveillance data, movement monitoring, and behaviour patterns of individuals and large groups, as well as the localization of places from which rockets were launched. Part of this data also comes from a system called Alchemist, used

³ These fall into the second category of technologies based on the IDF distinction, these technologies have certain degree of autonomy and can be helpful in forecasting the future movement of the target and planning the attack.

⁴ The original Hebrew title is transliterated as Ha Besora. The English-speaking authors called it “Gospel” (Davies, McKernan, Sabbagh 2023). The Czech authors called it “Evangelium” (Ryšánek 2023). In the author’s opinion, neither one of these translations is correct. The author prefers to use the transliterated Hebrew original mainly because this term itself has more variants of how it can be translated into English (“Ha” is the Hebrew equivalent to “the” and “Besorah” can be translated as “news, good tidings or the prophetic word of God”).

for monitoring the borders of Gaza. This database includes between 30 to 40 thousand suspected terrorist militants. The Besorah system is used for rapid identification of targets and for generating suggestions for target attacks. This system ranks proposed targets according to their priority. The results of the Besorah system's suggestions include private homes of individuals suspected of having ties with Hamas or Palestinian Islamic Jihad operatives. This database can generate up to 100 targets per day. In the Gaza war, the Besorah system allegedly allowed the IDF to locate and attack a large pool of relatively junior terrorist operatives, while senior officials hid in tunnels. The system uses an algorithm to evaluate how many civilians remain in a building shortly before a strike. This database signals like traffic lights (red, yellow, and green). The decision about whether to strike the target is always made by human commanders (Noah 2024).

The use of the Besorah system in the ongoing Gaza war has been challenged due to the uncertain degree of its compliance with international humanitarian law. In some opinions, the Besorah system was set up in the 2023 war (as opposed to the 2021 operation in Gaza) to focus on the quantity rather than the quality of targets. Allegedly, it aimed to cause massive damage in Gaza and create pressure on Hamas (Abraham 2023). There is little empirical evidence of the Besorah system's compliance with international humanitarian law. On the other hand, there are various (unverified) sources reporting civilian casualties, which allows for a general assessment of these issues.

Some Legal Insights on the Besorah System

Several areas of international law of armed conflict can be applied to the Besorah system. The author selected two areas which, in her opinion, can be considered as essential foundations for all potential further considerations. These are the principles of military necessity and the principle of proportionality. These two areas were chosen because, in the author's opinion, they are closely related to the way the Besorah system operates.

The principle of military necessity can be characterized as permission to use military force of the degree and kind necessary to achieve the purpose of the operation, within the shortest possible time, with the smallest possible impact on human life and material resources.

Prof. Dinstein noted that:

“Military necessity permits a belligerent, subject to the laws of war, to apply any amount and kind of force to compel the complete submission of the enemy with the least possible expenditure of time, life, and money.” (Dinstein 2004, 18)

The warring parties can only use measures that are necessary to force the enemy to capitulate. The failure to adhere to this principle may result in unnecessary casualties and disproportionate damage, constituting a war crime. For this reason, it is not possible to justify the principle of military necessity as a reason for disregarding the laws of armed conflict (The Joint Service Manual of the Law of Armed Conflict, 21-23). This principle reflects the military objective of warfare and distinguishes between lawful and unlawful conduct. It can also be understood as setting the limit of legality (Ondřej et al. 2010, 201-202).

Hague Convention (II) with Respect to the Laws and Customs of the War on Land of 1899 in the art. 23 g) prohibits:

“to destroy or seize the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war.” (Hague Convention II 1899)

It is an urgent factual circumstance that allows a warring party to depart from the prohibitions of international law. Therefore, military necessity justifies the use of measures that are unavoidable for achieving victory over the enemy. The doctrine of military necessity can be invoked whenever wartime conditions necessitate it, regardless of place or time. The responsible commander makes decisions in each combat situation. Based on the circumstances, the commander decides whether the intended destruction or seizure is necessary to achieve the military operation's objective, or whether there are alternatives that would cause less damage while still achieving an equivalent outcome.

This doctrine allows for taking the lives of armed enemies or other persons for reasons of military necessity. It permits the capture of armed enemies but does not justify the killing of innocent civilians for purposes of revenge (The Manual of the Law of Armed Conflict 2005, 22). Military necessity cannot be used as an excuse for disregarding the rules of war to avoid defeat, escape imminent danger, or achieve war aims (Ibidem, 23). Therefore, there must be a reasonable connection between the destruction of enemy property and achieving victory over the enemy. In conclusion, it can be stated that the prohibition arising from the laws of war supersedes military requirements, unless an urgent circumstance, which is an exception to the stated prohibition, allows for contrary behaviour (De Preux 1987, 395).

Based on the summary above of the characteristics of the principle of military necessity, it is evident that determining the *threshold* between lawful acts and war crimes can be highly challenging. It is also clear that the interpretation of this doctrine by IDF military commanders may differ from interpretations by international criminal tribunals. Furthermore, there will likely be varying and conflicting legal opinions on the assessment of this issue in the future. Until the International Criminal Court adopts a final decision, an advisory opinion is accepted by the International Court of Justice, or the UN Security Council adopts a resolution on these matters, it is both possible and reasonable to approach these questions at a theoretical or academic level.

How can the use of the Besorah system be perceived in the context of the principle of military necessity? The Besorah system allegedly suggested targets suitable for aerial bombardment and ground military operations. According to the above-mentioned sources, it identified the presence of Hamas operatives as well as remaining civilians. Noncombatants were warned by the IDF to evacuate before the attack. This has been a long-term practice of the IDF (IDF 2014; cf. Embassy of Israel 2009).

The doctrine of military necessity emphasizes the *efficiency* of military operations in terms of *duration* (time efficiency). Combat operations should be as short as possible. The State of Israel had a significant interest in the liberation or release of hostages kidnapped by terrorists on October 7, 2023. During the first four months of the ongoing war in Gaza, it was estimated that there were about 100

hostages still alive, while approximately 30 hostages were reported deceased during their captivity (and 112 hostages were previously released). It cannot be ruled out that some of the female hostages became pregnant as a result of rape. The terrorists neither allowed ICRC workers to access the hostages to provide basic medical care nor permitted the delivery of medication for the hostages (British Red Cross 2023).

Therefore, it might have been necessary for Israel to secure the liberation or release of all hostages in the shortest possible time. Finally, the attack on October 7, 2023, was the largest outbreak against Jewish people since World War II. This fact cannot be ignored. Because of the high brutality and scale of the October 7 attack, Israel might have had a substantial interest in neutralizing Hamas's power in a very short timeframe (some background available at Berkowitz 2012, 51-81).

It is possible to speculate that Israel might have considered it necessary to program the Besorah system in a way that it suggested targets based on the shortest possible duration of operations. The destruction of the Gaza Strip can be seen as almost complete devastation of the territory. Therefore, Israel should be prepared to explain whether and why it was necessary to destroy most of the residential buildings. Israel should be able to prove, based on their information potentially stemming from the Besorah system, why these buildings were chosen as targets for aerial bombardment or ground military operations. This should include detailed reasoning, such as the presence of terrorist operatives, weapon warehouses, tunnel entrances, etc. The reasons provided, as well as detailed explanations of the operations, might be examined by judicial authorities under the principle of military necessity.

There might hypothetically be a view that the first phase of the war in Gaza (aerial bombardment) was a necessary measure to prepare for the second phase (ground operation). The aim of the first phase could have been to weaken Hamas's military advantage, which includes knowledge of the local environment and military infrastructure, including tunnels. If Israel had completely avoided the first phase and directly deployed IDF infantry, military vehicles, artillery, and engineers into Gaza, it might be estimated that the loss of material resources, soldiers' lives, and precious time would have been much greater. Therefore, it is possible that the IDF's aim, which was the liberation or release of hostages and the elimination of Hamas's power, would not have been achievable with the same effectiveness.

The *principle of proportionality* means that the losses and damage caused by a military operation cannot be disproportionate to the results achieved by the operation. The military advantage must outweigh the damage caused (Neuman, 2004, 105). This principle does not mean that civilian objects are unconditionally protected. On the contrary, it means that military operations should not be conducted in a manner "*which would be excessive concerning the concrete and direct military advantage anticipated*" (art. 51 (5) b) Additional Protocol I of 1977).

This principle reflects the prohibition of reprisals, which are prohibited acts of warfare, as illustrated in the *Nauliaa* case of 1928 where the conduct was "*altogether out of proportion with the act which prompted them*" (Nauliaa, 1928). According to this principle, the target of the attack must be a military object, and its destruction or neutralization should have a direct military effect

that outweighs any undesired effects. The indirect effects, such as loss of civilian life or destruction of civilian property, should not be the primary intention or goal of the military operation (Ondřej et al. 2010, 230-231).

For example, the Prosecutor's report on the NATO bombing campaign noted that the aerial bombardment aimed at destroying a munition storage facility located in a field was considered sufficiently proportionate to the unintended loss of life of a peasant ploughing the field. In areas with high concentrations of military objects, bombing towns, villages, dwellings, and buildings may be legitimate. However, the attacker must consider the risk to the civilian population (Ondřej et al. 2010, 231).

The principle of proportionality aims to prevent excessive behaviour by the belligerent party. It prohibits causing indirect damage that is excessive in relation to the achieved military advantage (Ibidem, 232).

The disproportionality of an attack means that there is an obvious imbalance between the anticipated specific and direct military advantage and the expected loss of civilian life and property (Dinstein, 2004, 120). Disproportionality would occur if, due to the aimed destruction of a machine gun nest located in a church tower, a larger part of the village was bombarded and destroyed. The attack should be focused solely on the church tower. In such a case, the damage to nearby civilian houses would likely be less than if a full-scale attack had been conducted against a certain part of the village (Ondřej et al. 2010, 231).

The principle of proportionality aims to find a *balance between the immediate military advantage and the indirect side effects* arising from the military operation. If there is only one bridge serving both military and civilian purposes, its destruction might be considered proportionate, even if it results in a greater number of random civilian casualties. This is because the bridge holds significant military importance (Ibidem, 232). A military commander may face a situation where they must choose between two or more military objectives that yield approximately equal military advantage. According to Article 57 (3) of Additional Protocol I, the commander should prioritize targeting the objective with the fewest anticipated civilian casualties. If targeting the objective with lower anticipated civilian casualties poses significantly greater risks to soldiers, the interpretation of the principle of proportionality may not definitively dictate the choice of military targets.

The law of armed conflicts does not impose an obligation on commanders to prioritize combat methods that pose high risks to their fellow combatants. Criminal legal assessment typically follows the facts. *The line between proportionality and disproportionality is often unclear* and can depend on the outcome of the military operation and a cumulative evaluation of all circumstances (Ibidem, 236). Any assessment of the principle of proportionality can be questioned in practice. Ambiguities in its interpretation may lead to significant legal uncertainty (Ibidem, 237).

Based on the brief characteristics of the principle of proportionality mentioned above, the following summary can be noted: If a commander has several options for how a target could be attacked, they should prioritize the means or methods that are estimated to cause the fewest civilian casualties.

The commander is not obligated to prioritize means and methods of operation against a target that would pose a significantly greater danger to soldiers.

In the author's opinion, the greater the "indirect damage," including civilian casualties, caused by the war in Gaza, the more challenging it would be for IDF commanders to justify their tactics. Israel's position is already very difficult due to significant political pressure from many states and international actors. For example, mention can be made of the UN Commissioner for Human Rights, Volker Türk (France 24, 2023), and the UN Secretary-General António Guterres (United Nations, 2024).

The Besorah system, in the way it allegedly works, might be, in the author's opinion, a very useful tool in connection with decision-making per the principle of proportionality. It could be considered a valuable "impartial opinion" that could assist IDF commanders in planning attacks. While soldiers naturally perceive the enemy as the party they are fighting against, AI might hypothetically be more impartial in this regard. The Besorah system allegedly displays "traffic light colours" for every suggested target. This could be exceptionally beneficial in minimizing disproportionate damages, allowing attacks only when the colour displayed is green. However, if the Besorah system suggests a target based on which the commander decides to carry out the attack (because it showed green), the commander would still be held responsible, not the creators or programmers of the Besorah system. This is because the current rules of international law of armed conflicts do not establish responsibility for artificial intelligence, its owners, and its developers.

Another hypothetical consideration might be the case when the Besorah system showed yellow or red, but the commander, regardless of it, gave the order to launch the attack. It can be assumed that in such a case, the commander would have to be able to present the evidence based on which he would justify why this target was so important, and therefore the attack was carried out in his opinion per the principle of proportionality. Hypothetically speaking, perhaps if the target was one of the senior commanders of Hamas or Palestinian Islamic Jihad, there might be some probability that certain civilian casualties could be considered legitimate. Subsequent and final legal assessment of the proportionality of the attack, which might also be a matter of consideration of criminal responsibility, would be up to the prosecutor and judges of the Israeli military courts or the International Criminal Court (unless a specialized tribunal would be established).

The SMASH System, an Automatic and Targeting Firing System for Small Arms

The Israeli company Smart Shooter developed the Smash system technology, which significantly improves soldiers' skills by helping them compensate for physical exertion, fatigue, stress, and mental pressure. This technology guarantees a successful hit on the target with the first strike and neutralizes the enemy efficiently. The technology is very precise, aiming to eliminate collateral damage. There are two main categories of variants of these systems. The first category includes handheld-operated systems like the "extension," which can be integrated into any assault rifle, and several variants of "full" Smash rifles that already have these systems built in. Several models fall into this category:

- Smash 2000 is the “extension” system which can be installed on many types of rifles which use various ammunition types (Smash 2000, 2023).
- Smash 2000L/3000 is the newest model for the “full” system. Its main advantages are the weight and size reduction (Smash 3000 2023).
- Smash 2000 Plus has kinetic advantages. It is very suitable for shooting at drones and small UAVs, it has got advanced tracking algorithm which allows the proprietary target acquisition (Smash 2000 Plus 2023).
- Smash X4 has greater magnifying optics for a longer distance range (Smash X4 2023).
- Smash AD has integrated laser fire and therefore it can display targets from external sensors (Smash AD 2023).

The other category are systems which are remotely controlled, and which are either static or installed into drones. There are two models which are in this category:

- Smash Hooper is a lightweight remote control weapon station which stands on a tripod. It can be either installed on any surface (so the human operator can control the system from a safe distance through a remote controller). It can be even installed on a vehicle, and it can be used while the vehicle is running (the human operator can be inside or outside the vehicle) (Smash Hooper 2023).
- Smash Dragon is a system which can be installed on UAVs. It supports various weapons (such as 5.56- and 7.62-mm small arms as well as 40 mm grenade launchers). It is operated by a remote controller (Smash Dragon 2023).

All these systems operate under the same concept: they have “*lock and track capabilities*”. These systems locate the suggested target, and the soldier operating the system can choose to “lock” the target. Once locked, the target is enclosed in parentheses on the display and remains tracked. The system predicts the target's future movements, considering environmental factors like wind or humidity. After the target is locked, the system only fires when there is a guarantee that the target will be neutralized. Once the target is locked by the human operator, the system autonomously decides when to shoot at the target. This system is designed to increase both the accuracy and lethality of the weapon (Smartshooter 2023).

Some Legal Insights on the SMASH System

Similarly to the previous assessment of the Besorah system, several areas of international law of armed conflict can be applied to the SMASH system. The author also focused on two areas: the principle of humanity (where *the necessities of war ought to yield to the requirements of humanity*), which is relevant to the Martens Clause. These two areas were chosen because, in the author's opinion, they are closely related to the way the SMASH system works.

The principle of humanity reflects several areas of prohibited conduct. In connection with the SMASH systems, the focus was narrowed to the *prohibition of using weapons that cause superfluous injury or unnecessary suffering to soldiers*. There is a list of prohibited weapons in this context in IHL databases, listed under Rule 70, which stipulates Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering. In the author's understanding, the SMASH systems do not directly fall into any of the categories of prohibited weapons. Nevertheless, it is possible to debate the interpretation of certain legal instruments, primarily those related to prohibited weapons, which could hypothetically be applied to SMASH systems.

The St. Petersburg Declaration of 1868 contains a legal principle that can be *broadly* understood. The core idea of this principle is the prohibition of means whose use causes unnecessary suffering or the *inevitable death* of combatants without bringing a *military advantage*. This aspect of the legal principle is closely linked to the concept of military necessity. These principles often conflict with each other (Hobza 1946, 19).

While international law of armed conflict does not prohibit killing soldiers participating in combat, there are opinions suggesting that to *achieve the war's purpose*, it might suffice to disable a necessary number of soldiers from combat rather than *causing their unnecessary deaths*. This should be accomplished using means that do not cause disproportionate injuries. Adequately weakening the enemy's combat capability by disabling most soldiers from combat might be sufficient to achieve the military objective,⁵ such as victory over the enemy (cf. Fleck 2008, 137). Such reasoning could theoretically, though not necessarily practically, be influenced by a moral imperative of public conscience, as stipulated in the *Martens Clause*.

Indirect support for these opinions can be inferred from several international legal principles derived from the principle of humanity, which aims to protect soldiers removed from combat. These rules are articulated in the First and Third Geneva Conventions of 1949. These laws prohibit attacking soldiers who surrender, issuing orders to take no prisoners of war (POWs), and specifying rules for the treatment of POWs. They also include prohibitions against attacking military medical facilities, etc. (ICRC, Rule 28).

For this reason, there arises a question of whether the Smash systems, due to their alleged high lethality,⁶ comply with interpretations of the prohibitions stemming from international law of armed conflict. There are no independently verifiable sources available regarding whether and to what extent the IDF uses SMASH systems in Gaza. Due to the lack of information about the circumstances of the alleged use of SMASH weapons, it is possible to consider a hypothetical example.

In nearly every armed conflict, mistakes and unfortunate incidents occur, including cases of friendly fire or civilian casualties. During the Gaza war, there were reports of such incidents where three hostages were killed (Staff 2023) and later one (Staff 2024). It is unclear whether these incidents

⁵ They would be either healing their injuries, or they were prisoners of war captured by the enemy, or their status would be in a different matter changed to non-combatants.

⁶ These systems are allegedly constructed in the way, they hit the target at the first attempt.

involved the use of the SMASH system or if the Besorah system mistakenly identified these Israeli men as targets for attack.

Many questions could be raised, which might be best answered by the producers or users of these technologies. One such question could be: if a mistake was caused by a soldier's misjudgment (e.g., due to physical and mental exhaustion), and the soldier did not use any AI systems, would an AI evaluating the situation have made the same mistake? If hypothetically, AI systems were capable of significantly better discernment than a human soldier, it might be entirely reasonable to use these systems in combat. They could propose targets, and soldiers could then decide to accept or reject these AI suggestions.

The international law of armed conflict permits the killing of enemy combatants unless they have surrendered. In contrast, spies do not enjoy protection under international law. If AI technology were capable of distinguishing between a suspicious person who is not an enemy combatant or spy (cf. ICRC Rule 107 Spies), it could be highly beneficial to use such technologies in combat. Soldiers could consider the suggestions provided by these technologies. From this perspective, AI systems could be seen as facilitating the implementation of the purposes outlined in these legal rules on the battlefield.

Another hypothetical consideration in connection with the SMASH systems could be as follows: if AI technologies were developed and used to disable the enemy from combat instead of killing them, it might avoid the loss of human lives. However, military experts might dismiss this as irrelevant. One reason for this assumption could stem from historical military strategies, such as those used in World War I and II, and the Vietnam War. During these conflicts, deliberately injuring a soldier (but not killing them) often prompted their comrades to rush to their aid. This response could be exploited by the enemy to ambush and attack the exposed soldiers, causing greater casualties overall (cf. ICRC, Treacherous attempt upon the life of an enemy). Therefore, it is plausible to assume that in the reality of combat, it would be difficult to prevent weapons that are perceived as "more humanitarian" from being misused in ways that undermine their intended humanitarian purpose.

The Goshawk System, an Autonomous UAV with the Capability to Catch a Hostile Drone

Goshawk is an autonomous UAV equipped with an advanced interception management system. Its autonomous capabilities include target detection during flight. The technology is designed to prevent collateral damage during the interception phase and to capture hostile drones. It operates both day and night, tracking, seeking, capturing, and locking onto targets. The system features a smart nest for launching and charging the drone (Goshawk system, 2023).

Some Legal Insights on the Goshawk System

Unlike the rules governing drones in civil aviation, there are no specific regulations for their use in armed conflict. Therefore, the Goshawk system must be assessed under the general provisions of international law of armed conflict and aerial warfare. Among the main principles relevant to the Goshawk system are *prohibitions on aerial bombing intended to terrorize civilian populations or to destroy private property not used for military purposes, as well as the prohibition on bombing undefended locations* (Gómez 1998).

It is generally known that not only during the war in Gaza but also in other situations, Hamas, Palestinian Islamic Jihad, as well as Lebanese Hezbollah, send drones with attached explosives or incendiary devices to the territory of Israel (Newman 2023). It is a relatively cheap and effective way to cause material damage to enemy territory or to strike Israeli civilians. Flying drones over the fence around Gaza and the wall around the West Bank is relatively uncomplicated.

Based on the information available about the Goshawk system, the author believes that it might be considered a legal means of an air defence system. It could be comparable to a special manoeuvre called "wing tipping" mastered by the R.A.F. in WW2. The Spitfire would approach the German V1, which carried explosives, and subsequently poke the hostile plane through a wing. This caused the V1 to deflect from its flight path and crash to the ground (Forces Net 2019). Any destruction of a hostile drone violating the airspace of a foreign state can be seen as legitimate, because it may not be certain in advance whether the drone is carrying explosives or aims to cause other damage.

The great benefit of the Goshawk system might be the prevention of collateral damage, which is protected by international law of armed conflicts. Although Goshawk is fully autonomous, it is programmed only to catch drones.

Hypothetically speaking, if the fully autonomous Goshawk had an integrated firearm (similar to the Smash Dragon), the author's conclusions would be entirely different. There are no specific legal provisions regarding the use of fully autonomous weapons. Among other issues, the question of criminal responsibility would be unclear in the deployment of fully autonomous weapons in warfare.

In the current stage of international law, in the author's opinion, all AI-based weapon systems used in the military should always remain under the control of a human operator. The soldier should always decide on activating their weapon and should also have the ability to deactivate the weapon at any time.

Smash Dragon features an integrated firearm, but it operates under the control of a human soldier using a remote controller. In contrast, Goshawk does not have an integrated weapon and is limited to catching drones. Therefore, the main legal issue regarding the use of Goshawk would likely fall under the responsibility for damages, such as if a Goshawk were to collide with something, cause damage to foreign property, or mistakenly capture something that is not a hostile drone. These issues would primarily be addressed by Israeli domestic courts, based on their jurisdiction over the operator of this technology.

The IRIS Robot, the "Eyes and Ears" on the Ground and Under It

The IRIS robot by Roboteam, based in Tel Aviv, is a small throwable robot particularly suitable for exploring the "Gaza metro," which is a nickname for the underground complex of tunnels built by Hamas. This network comprises approximately 1300 tunnels with a total length of 500 km. This estimation is based on measurements made by ground-penetrating radars and gravity detectors used to map the spiderweb of tunnels beneath Gaza (France 24, 2024). The IRIS robot can inspect tunnels before human soldiers and attack dogs enter and assault them (Harding 2023). It can detect

humans, objects, and traps, and it captures pictures and videos. The robot is operated by a remote controller (Iris 2023).

It is somewhat similar to a technology developed in 2005 and used by the US Marines called Gladiator. It was an unmanned tactical ground vehicle, much larger than Iris (it cannot be thrown). Gladiator had similar tracking abilities to Iris but was designed for performing surveillance, reconnaissance, assault, and breaching missions within its basic technical configuration. Its armour enabled Gladiator to remain operational even after being assaulted with ammunition up to 7.62mm rounds (Gladiator TUGV 2005).

Some Legal Insights on the IRIS Robot

There are no specific rules in international law governing the military use of this type of robot. The theoretical consideration regarding its **purpose** focuses on data collection (taking photos and videos) in hostile environments. This robot is beneficial for the IDF due to its technological advantages. It eliminates the need to risk the lives of soldiers who would otherwise need to enter hostile environments as scouts. The tunnels built under Gaza are extremely dangerous, likely containing various traps and snares.

However, this robot can be deployed anywhere, not only in the tunnels. Depending on its deployment environment, there could be a hypothetical consideration of violating international law. If the IDF were to deploy these robots in UNRWA facilities, refugee camps, hospitals, or other civilian-concentrated areas to gather data on the presence of infiltrated terrorists, it could be argued that using the IRIS robot would contravene the protection of civilians' rights, including their right to privacy. Depending on the extent of its deployment, there could also be a risk of causing hardships to the civilian population. The presence of these robots could induce stress and anxiety⁷ (cf. Shaughnessey 2024).

In the case of IRIS robots, it is less likely that the IDF would use them in this manner because they are easily detectable and accessible to anyone. If the IRIS robot hypothetically had an integrated firearm, similar to the Gladiator, then its operation should be strictly limited to the battlefield, and it should not be deployed in civilian-concentrated areas.

Conclusion

This paper addressed some of the legal issues surrounding the AI-based technologies reportedly utilized by the IDF during the Gaza conflict. It explored hypothetical scenarios where the use of these technologies could align with the laws of armed conflict, while also hinting at potential theoretical situations that could pose challenges.

The research question "*In what way should these technologies be used in military operations to avoid violations of international law?*" might be answered as follows: The Besorah system should serve as an aid suggesting targets, but the decision to attack should always rest with the responsible human commander. This system can provide data to substantiate why a target was attacked, but the IDF

⁷ Similarly, if there was a constant deployment of swarms of UAVs monitoring the area, it could cause psychological hardship and stress to the civilians.

should independently collect and verify this data apart from the AI systems. The Smash system is partially under human control, up to the point where soldiers decide to lock the suggested target. After that, the system shoots automatically when deemed most suitable by the algorithm. A prerequisite for considering this system compliant with the laws of armed conflict could be a high standard of data quality from its sources. In my opinion, this system warrants deeper examination by experts who have detailed usage results to assess its advertised accuracy. The Goshawk system, primarily a protective tool aimed at catching hostile drones, does not pose problems from the perspective of international law of armed conflict, in my view. However, in case of casualties, the IDF should be held responsible as the deploying authority. Regarding the IRIS robot, if used primarily in tunnels, I do not find it contrary to international laws of armed conflict. However, its use in different environments or to a greater extent might pose legal issues.

As a final remark, it can be noted that one of the most pressing aspects for the IDF in the war in Gaza is the high number of civilian casualties. According to IDF reports, Hamas terrorists often infiltrate among civilians, including women and sometimes even young boys. The IDF has reported multiple instances of Hamas placing targets in hospitals, schools, UNRWA facilities, and even cemeteries, making planning military operations extremely difficult. The evidence from official sources will be crucial for the subsequent comprehensive legal assessment by prosecutors and courts. There is a significant reason for the IDF to collect evidence supporting the compliance of their operations with international law. It can be anticipated that another potential problem stemming from the use of AI is the difficulty in evaluating evidence afterwards. Technological capabilities might allow for the modification of evidence, making it challenging to discern genuine evidence and its extent. This could complicate the court's decision on whether military operations were conducted within legal limits or exceeded them.

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