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Unmanned Aerial Vehicles and the changes in the warfare: an approach to recent events

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Orientador: José Alberto Azeredo Lopes

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To my grandma,

You are my star, wherever you are.

"*Every morning the gazelle wakes up knowing she must run faster than the lion or it will be killed.*
Every morning the lion wakes up knowing he must run faster than the gazelle or he will starve.
It doesn't matter if you are a lion or a gazelle: when the sun rises you better start running."

MIA COUTO[1]

[1] Translation from the original text by the author. COUTO, Mia – "A Confissão da Leoa", *Companhia das Letras*, São Paulo (2016).

Acknowledgments

To my husband, Diogo. For you tireless patience, for you daily support, but, most importantly, for always being by my side no matter what. You believed in me when I didn't. You are the love of my life.

To my beloved sister, Bibica. Even far away I feel your presence in my everyday life, and everything only makes sense knowing that you are by my side. I love you with all my heart and I miss you every single day.

To my parents. There are not enough words to express how grateful I am for everything you have done for me. I am who I am because of you. Being far away is not easy, and I always count the days to have you by my side. I love you both so much.

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TIME OF WAR AND TIME IN WAR
UNMANNED AERIAL VEHICLES AND THE CHANGES IN THE WARFARE: AN APPROACH TO RECENT EVENTS

Abstract: In recent years, the use of UAV's on the battlefield has gained great prominence, changing the guidelines of International Law and posing new challenges that cannot be ignored. Recent conflicts — Russia and Ukraine, Israel and Hamas, and the Houthi in the Red Sea against the United States and the United Kingdom — are practical examples of how the exacerbated use of drones is changing the world order in relation to modern military operations. New guidelines began to be considered: it's more advantageous to keep soldiers off the battlefield, while cheaper weapons become the main actors within the conflict. At the same time, in a negative way, the use of drones facilitates the escalation of a conflict into a humanitarian crisis — as the emotion and compassion of soldiers are also retracted from the scene. Furthermore, a single drone attack is not capable of authorizing the exercise of the right of self-defense, and an accumulation of events must be characterized for this purpose — which can make it difficult to defend against this type of attack, often done in isolation. The challenges are many, technological advances — such as artificial intelligence — are rapid, and it is up to International Law to find a way to deal with this new element that, apparently, is here to stay.

Keywords: Unmanned Aerial Vehicles; Autonomous Weapon Systems; Drones; Artificial Intelligence; Warfare; Conflict; Russia and Ukraine; Israel and Hamas; The Houthis and the U.S. and U.K.

TIME OF WAR AND TIME IN WAR
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Resumo: Nos últimos anos, o uso de veículos aéreos não tripulados no campo de batalha vem ganhando grande destaque, alterando as diretrizes do Direito Internacional e colocando em cena novos desafios que não podem ser ignorados. Recentes conflitos — Rússia e Ucrânia, Israel e Hamas, e os Houthi no Mar Vermelho contra os Estados Unidos e o Reino Unido — são exemplos práticos de como o exacerbados uso de drones vem alterando a ordem mundial em relação às operações militares modernas. Novas diretrizes passaram a ser consideradas: torna-se mais vantajoso manter os soldados fora do campo de batalha, enquanto que armas de baixo valor passam a ser os principais atores dentro do conflito. Ao mesmo tempo, de forma negativa, o uso de drones facilita a escalada do conflito para uma crise humanitária — já que a emoção e compaixão dos soldados também é retirada de cena. Ainda nessa perspectiva, um único ataque de drone não é capaz de autorizar o exercício do direito de legítima defesa, devendo estar caracterizada uma acumulação de eventos para tanto — o que pode dificultar a defesa contra este tipo de ataque, muitas vezes feito de forma isolada. Os desafios são muitos, os avanços tecnológicos — como a inteligência artificial — são rápidos, e cabe ao Direito Internacional encontrar maneiras de lidar com este novo elemento que, aparentemente, veio para ficar.

Palavras-Chave: Veículos Aéreos Não Tripulados; Sistemas de Armas Autônomas; Drones; Inteligência Artificial; Guerra; Conflito; Rússia e Ucrânia; Israel e Hamas; os Houthis e os Estados Unidos e Reino Unido.

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Previous Note

Before start, is import to point out the fact that this work analyzed three ongoing conflicts, which are susceptible to fluctuations and major daily changes. It is relevant for the reader to keep in mind that all the information presented here was collected until April/2024.

Acronyms and Abbreviations

AI – Artificial Intelligence

AWS – Autonomous Weapon System

EU – European Union

IHL – International Humanitarian Law

IAC – International Armed Conflict

ICJ – International Court of Justice

ICTY – International Criminal Tribunal for the former Yugoslavia

NIAC – Non-International Armed Conflict

UAV – Unmanned Aerial Vehicle

U.K. – United Kingdom

U.N. – United Nations

U.S. – United States of America

Preface

In recent years, technological advances have had considerable influence on the battlefield, stealing the spotlight from global newspapers. In my perspective, the rampant use of drones is the main element that has gained prominence in the most recent conflicts, and the curiosity about this new machinery has made me look to its practical effects inside a war with other eyes.

The interest began in 2022, with the unfolding of the war between Russia and Ukraine: a very peculiar conflict that has demonstrated how the use of UAV's can completely change the course of history. The advances achieved by Ukraine with the help of this type of weaponry, in addition to arousing a curiosity in practical terms, raised a warning about how far man can go with the help of machines. From my point of view, it seems technology can indeed present itself as a great ally on the battlefield.

As if that weren't enough, in recent months, two new relevant conflicts have highlighted the use of drones in the warfare: Israel and Hamas, and the Houthis in the Red Sea, against the U.S. and the U.K. In both cases, drones not only gained a prominent place in international media, but proved to be absolutely indispensable for the actors involved. The actions on the battlefield, in both situations, seem to be inseparable from the usage of UAV's.

The combination of all these factors made me think that, perhaps, there would no longer be war without technology and drones, and that maybe the use of artificial intelligence — the next inevitable step — would be a path with no return. These facts even make me think — and probably conclude — that, even though the scenario is unstable and brings an alert, the effects seems to be irreversible.

The purpose of this study arises exactly from this: the curiosity to understand how the massive and unrestrained use of drones has changed the *modus operandi* on the battlefield, whether it really is a path of no return, and what perspectives the world can expect in the near future.

1. Introduction

In the last few years, the world has been witnessing different armed conflicts, which are directly influencing global guidelines. One of the main segments that has been mostly affected by these conflicts is the warfare, where new technologies are changing how the main global actors should think and proceed. In this scenario, the usage of the unmanned aerial vehicles ("UAV's") — more specifically the usage of autonomous weapon systems ("AWS") — is gaining more space, forcing an almost immediate adaptation of agents involved in these current armed conflicts.

From the war between Russia and Ukraine, passing through Israel and Hamas, to the recent conflict in the Red Sea against the Houthis, this work will try to understand how the usage of UAV's and AWS — precisely focusing on the use of drones — are being crucial to change the directions of how to think and align war strategies, and what are the main challenges related to this usage.

At the first moment, the idea will be to understand exactly what are the UAV's, what's the difference between them and autonomous weapon systems, and how to identify this weapon for military purposes. Also, the idea is to bring to the reader's knowledge that new technologies, like the artificial intelligence, are being developed and gaining more space in the military field, directly influencing the usage of UAV's.

From this knowledge, the purpose will be to identify if these innovations will be determinant to drastically change the warfare and if some of the world powers — like the U.S. and the European Union — are already rethink its own strategies for the next years. At the same time, it will be possible to previously identify the main challenges arising from the use of new technologies on the battlefield, already pointing out the main problems related to these innovative weapons.

With the combination of all this information, the next step will be to characterize the AWS which are being used in the recent conflicts already mentioned. After these preliminary points, the analysis will focus on each of these recent conflicts, in which the author will center on the details of these wars that are directly related to the use of UAV's, and most specifically in the unrestricted usage of drones.

Regarding Russia and Ukraine, maybe considered the most important conflict in the last decades, this study will try to understand how the use of UAV's came as the Ukrainian

salvation. Brought as a turning point for the war, this work will try to see how the autonomous weapons presented themselves as the best procedure to fight this war, making Ukraine change not only their strategies on the battlefield, but also the direction of new investments that have been made behind the scenes.

The next moment will be dedicated to analyze the conflict between Israel and Hamas, which has made the world's population hold their breath in recent months. Here, the center point of the study will be to understand the main consequences, within the battlefield, of the use of drones in such a peculiar terrain as the Gaza Strip. Based on this premise, the intention of the study will be to answer whether the use of drones has been decisive in the (possible) committing of war crimes by the Israeli army.

Last, but not least, the third conflict under the eyes of this study will be the recent attacks at the Red Sea, which was designed by the Houthis and their peculiar drones. The idea here is to understand the real implications of the usage of drones in this kind of conflict, and if these recent attacks to international vessels can be qualified as an armed attack under Article 51 of the U.N. Charter — authorizing, in these circumstances, the exercise of the right of self-defense by some States.

As is going to be shown in the next few pages, the main objective behind this work is to understand the main positive and negative points regarding the usage of UAV's for military purposes, and how the increasing use of drones has a decisive impact on recent war strategies. This study will try to identify what are the main consequences of a massive use of UAV's on the battlefield, and the thorough analyzes of these three recent conflicts will be determinant for this main purpose.

2. A Theorical Approach of Unmanned Aerial Vehicles

As mentioned before, the main idea behind this study is to understand how the massive and unrestricted usage of UAV's are (positively and negatively) impacting the warfare and the modern military operations. To achieve this goal, it's important to previously understand what are the UAV's from a theorical point of view, bringing to light a necessary legal dimension of this weaponry.

As is going to be shown through the next pages, the characterization and consequently evolution of UAV's are crucial elements not only to help identify the new challenges arising from this type of weapon, but also to conclude how the world is planning to deal with these new scenarios in the future.

Going through the characterization of drones, the technological evolution of this type of weaponry, and reaching the present day, the first part of this study will try to bring the necessary knowledge of a legal dimension behind these weapons, and immediately map the main challenges inherent to their unrestricted use in last years.

2.1. From Unmanned Aerial Vehicles to Autonomous Weapon Systems

Since World War I[2], the unmanned aerial vehicles has been gaining more and more space on the battlefield, in a way of taking the direct action out of the soldiers' hands. The real turning point happened in 2001, after 9/11. From that moment, the United States began to invest increasingly in the development and use of UAV's, especially drones, undertaking the first strike in Afghanistan, as part of the Operation Enduring Freedom[3]. Since then, "drones have become one of the most effective killers of insurgents, terrorists and enemy combatants in a war"[4–5].

The UAV's are, from its own name, weapons unmanned, meaning that they are weapons without the immediate interference of a human being. In most cases, the control is indirectly and remotely, bringing a human performance at a distance.

From the U.S. point of view, UAV's are presented as "an effort to reach remote territory and targets, save American blood and treasure, achieve optimal accuracy and efficiency in targeting operations"[6]. As can be seen, not only the direct human action was taken out of the field, but the precision from the use of drones made this kind of weapon more attractive for a State involved in a war. At the same time you could prevent the bloodshed of your own soldiers, you could hit your enemy accurately[7].

If the possibility of using UAV's already frightened the characters of the battlefield, in the last few years this scenario has been increasingly confirmed. The development of new weapons with new technologies was always considered inevitable, and with the UAV's it was no different. Great powers, undoubtedly led by the United States[8], began to direct their efforts and invest more and more in UAV's, trying to find a way to make them "even better" — at least from the warfare point of view.

The evolution was a mere consequence. From these investments, urged the so-called autonomous weapon systems. The AWS is "a weapon system designed and programmed for a

[2] "A Brief History of Drones" (*s.d.*). Accessed 04 April 2024.
[3] CHAMAYOU, Grégoire. "Drone theory", *Penguin*, London (2015) *apud*. BROOKMAN-BYRNE, Max (2017), p. 4.
[4] WILLIAMS, Brian Glyn (2015), p. 65.
[5] According to Ryan J. Vogel, while in 2001 the U.S. only had 10 Predator UAV, by 2007 that number multiplied to 180, showing how the usage of drones became increasable important in the battlefield (VOGEL, Ryan J. (2011), p. 104).
[6] VOGEL, Ryan J. (2011), p. 102.
[7] VOGEL, Ryan J. (2011), p. 102.
[8] VOGEL, Ryan J. (2011), p. 103.

mission, to be adaptive, and to identify, select and engage military targets without human intervention"[9]. The implementation of the AWS brought the possibility of, after activating it, targeting without a specific human involvement, completely taking out of the battle the personification of a human action[10]. Regarding this affirmation, it must be emphasized that, despite the belief human actions are completely out of the scenario in the use of AWS, "this can only be said to refer to the moment after the system is activated"[11]. Thus, the system activation is necessary, and only after this moment no more human intervention is necessary, putting the "autonomous" criterion into perspective.

According to Afonso Seixas-Nunes[12], the characterization of AWS must present three requirements: (i) it must be seen as a weapon system, and not as a new agent in the battlefield, bringing the idea of a machinery action: (ii) the AWS are developed and designed by humans, and they will obey a specific military order, showing a bit of a human intervention, even indirectly and in a small measure; and (iii) the AWS must be precisely designed for a specific military mission, putting away the idea of uncertainty and generality.

Regarding the military mission, it specification is not as simples as it seems, and involves a complex machine-learning algorithms. These algorithms, with a collected data, make it possible to predict the expected scenarios, but also to consider the complications arising from any battlefield. The AWS is capable of learning from the ground, and it can change its route according to each situation it has to deal with, adapting from different circumstances to finally reach its main target[13]. This fact confirms, once and for all, the minimal human intervention when targeting with AWS.

It's important to recognize that all AWS are considered an UAV, but not all UAV will always be characterized as AWS. That's because not all the UAV's will target without a human intervention after its activation — only based in machine-learning algorithms. Some of them may need the human action from the first moment until the end, taking away the "autonomous" criterion.

In the last few years the AWS has become the center of attention regarding military strategies. Not only the possibility of taking the human action out of the battlefield — protecting

[9] SEIXAS-NUNES, Afonso (2021), p. 425.
[10] LEYS, Nathan (2020), p. 378.
[11] SEIXAS-NUNES, Afonso (2021), p. 428.
[12] SEIXAS-NUNES, Afonso (2021), pp. 428-429.
[13] SEIXAS-NUNES, Afonso (2021), pp. 435-437.

soldiers from the volatility of war —, but also the costs implied and the ability of taking faster decisions made this type of weaponry increasingly attractive to major military powers.

From the strategic and military point of view, drones can be put in use in three different scenarios[14]. The first one is as an agent in the battlefield, actively participating in the war with missiles and bombs. The second usage is from a distance, trying to bring security implementing a sky patrol system. The third scenario is related to "target killing", when a drone is put in use with a specific mission of killing a terrorist suspect — exactly what happened recently with the al-Qaeda leader, Ayman al-Zawahiri[15].

With the increasing implementation of this type of weapon, it's possible to recognize that human action is losing its space and starting to be seen as a mere supporting role on the battlefield. After just pressing a button, there is no longer any need to engage in the acts performed.

[14] SAURA, Jaume (*s.d.*). Accessed 04 April 2024.
[15] GARAMONE, Jim (2022).

2.2. The Technological Evolution and its Implications for UAV's

Developments can always go further. The main actors within a war are (mostly powerful) States, which feels free to put their economic and military strategies ahead of any other right. Based on this assumption, and given that investments in drones are achieving more space inside relevant debates and war strategies, a new concept has appeared: the use of artificial intelligence ("AI") as a war partner. The AI is the simulation of human intelligence by machines, where robots could replace the human's mind in some actions and decisions. But it's necessary to understand how this could influence the warfare.

As mentioned before, in the last few years the UAV's evolved, making space for the AWS, which is a more autonomous weapon, with way less human intervention. The AI could make this automation go further. Combining machine learning with recent advances of hardware, human agents would become, at most, "supervisors" of how AWS perform on the battlefield"[16].

For now, the idea behind the UAV's is that they are designed for a specific military mission, or even are directed by the operator to achieve a specific target. With AI, the scenario could completely change. The robotic evolution could enable adaptation from the AWS itself, not only responding for the reality in the battlefield, but also "thinking" on how things should be done and which steps should be taken. The evolution brings the possibility for autonomous weapons acting unilaterally, as it opens the opportunity "to adapt to changing and unpredictable environments"[17].

According to Professor Afonso Seixas-Nunes, "new advances in artificial intelligence allow roboticists to envisage scenarios in which the mission entrusted to an AWS can be performed exclusively by the system"[18]. From this affirmative, it's possible to conclude that the system would be capable of completely substitute the human mind in making important decisions.

Bringing a recent example about the use of AI on the battlefield, there's a shocking case that happened in 2021, where military drones attacked fleeing soldiers without being instructed to do it[19]. According to the U.N. Report, "the lethal autonomous weapons systems were

[16] SEIXAS-NUNES, Afonso (2021), p. 425.
[17] ANDERSON, Kenneth and Matthew C. Waxman (2023), p. 6.
[18] SEIXAS-NUNES, Afonso (2021), p. 431.
[19] SANKARAN, Vishwam (2021).

programmed to attack targets without requiring data connectivity between the operator and the munition"[20], confirming that lethal actions were implemented by these drones without a human command behind it.

For most of people, this kind of event would be a fighting script, but not for world powers. It's important to understand that the greed for power is directly reflected in military advances, and whoever is ahead in this segment is already winning. Based on this premise, ensure more technological advances in military defenses are crucial, and, led by the U.S., western countries are absorbing these lessons and already implementing the knowledge in their future perspectives[21].

Focusing on this idea, on September, 2023, the U.S. announced the Replicator initiative, which focuses mainly in increasing the usage of AI on the battlefield — confirming the usage of autonomous weapon being able to identify, track and attack targets without any human intervention[22]. The objective is to develop thousands of autonomous weapons in only 18/24 months, pressing other countries to join this military race. Some even say that "AI is indispensable to the United States' future security"[23], showing how relevant this evolution can be to a powerful international actor such as the U.S. and that AI can be a crucial element to support military operations.

The European Union is right behind, but the goals are more timid. For now, EU hasn't present specific investments that involves artificial intelligence and AWS. However, we can conclude is a matter of time, since AI, big data, quantum technologies, cyber and space capabilities are already on their radar[24]. The "2023 EU Capability Development Priorities"[25], from the European Defence Agency, already shows how defense priorities have changed in recent years, highlighting the need for investment in the UAV's department, focusing on drones and their operational applications. It's a matter of urgence to "significantly ramp up the incorporation of drones and counter-drone technology into its numerous defense documents and initiatives"[26].

[20] U.N. Security Council. *Letter from the Panel of Experts on Libya established pursuant to resolution 1973 (2011) addressed to the President of the Security Council* (2021).
[21] "Killer drones pioneered in Ukraine are the weapons of the future" (2024).
[22] ROSEN, Brianna (2023).
[23] FLOURNOY, Michèle A. (2023), pp. 61 and 66.
[24] BORSARI, Federico and Gordon B. Davis Jr. (2023).
[25] "The 2023 EU Capability Development Priorities" (2023).
[26] BORSARI, Federico and Gordon B. Davis Jr. (2023).

The development and advancement of the world's warfare is quickly moving forward. From the transformation of UAV's, passing through the AWS and the recent usage of AI for military purposes, it's possible to affirm that the technological evolution brought new scenarios, but also new consequences and new challenges that are consequently forcing the International Law community to deal with it.

2.3. New Challenges Arising

The increasing implementation of (autonomous) drones warfare are gaining more and more space in the worldwide scenario. New drone technologies are permitting the reduction of war costs while increasing the precision of hitting military targets, causing enormous damage — sometimes irreversible — to the opponent.

As is going to be thoroughly explored in this work, these new drones can be light, small and practically invisible to the opponent's eyes, while, at the same time, they are extremely precise and destructive. Furthermore, the investments are reduced, since a drone can cost less than a tenth of the price of conventional missiles. Despite being extremely cheap, a small drone can, for example, sink a ship or destroy a refinery, causing millions of dollars damages or even inestimable losses.

Also, in situations where human material is practically non-existent — with a shortage of soldiers capable of going to the field —, fighting a war outside the battlefield presents itself as an excellent strategic solution, guaranteeing security for soldiers at the same time as it allows the optimization of battle strategies. This idea is a result from the fact that "unlike humans, AWS do not have a need to protect themselves"[27]. So not only the use of drones can help prevent bloodshed, these machines don't present sentiments, making action on the battlefield more strategic and less emotional: they don't feel tired and hungry, or have fear, angry and hate, they are emotionless[28], transforming their action in purely strategic and mathematically calculated operations.

All these considerations brings new challenges which are already on the radar of many international actors. Considering the positive points of using UAV's on the battlefield, the main international agents already face daily challenges in improving and investing more in the development of these weapons. The intention is to increasingly improve performance on the battlefield, bringing safety and precision to action, while it reduces inevitable costs spent on a conflict. From this point of view, is possible to affirm that "the idea of autonomous systems, which depend exclusively on their embedded algorithms and do not require human intervention, has caught the imagination and excitement of many"[29].

[27] WAGNER, Markus (2014), p. 1.412.
[28] WAGNER, Markus (2014), p. 1.412.
[29] SEIXAS-NUNES, Afonso (2021), p. 424.

However, this increasingly usage of UAV's can also presents the other side of the coin, raising important questions inside the international community, such as how to control and how to stop an automatic weapon with no human behind its control, or who would be responsible for humanitarian crises when no operator is behind a drone strike.

From the *jus in bellum* point of view, some authors already points out the complexity of saving civilians in a war mostly directed by computers, where, in the middle of the midst of a war, the differentiation between soldiers and civilians becomes very difficult, if not impossible[30]. Some scholars even affirm that "a substantial number of life-or-death decisions in the next generation of warfighting will be made by computers, not humans"[31], which can increases the level of humanitarian crises that the world is already dealing with.

According to ICJ, "States must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets"[32]. This understanding corroborates how unstable and (probably) dangerous the unbridled use of AWS can be. These systems are unpredictable, and the data collection from the battlefield in real time only increases this instability, since "the optical outcome is not based on human judgment, but on probabilities"[33]. At the same time, International Humanitarian Law needs a certain level of compassion, which is practically impossible to achieve with UAV's[34].

But, for the International Law community, this is not the only challenge related to the usage of AWS. The *jus ad bellum* perspective also brings different concerns regarding new technologies on the battlefield, making the main actors of a possible war rethink about new limits and requirements when starting a conflict. For instance, it's relevant to establish and understand if the "use of force by an AWS alters the legality of another party's self-defence"[35].

Some ideas directs in the way of defending that "autonomous weapons system's actions cannot be attributed to the State at all"[36]. This premise would lead to the conclusion that an attack committed with the usage of a AWS would not authorize the right of self-defence of a State, since no violation of *jus ad bellum* would be characterized.

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[30] LEYS, Nathan (2020), p. 379.
[31] SCHARRE, Paul. "Army of None: Autonomous Weapons and the Future of War" (2018) *apud*. LEYS, Nathan (2020), p. 384.
[32] ICJ. *Legality of the Threat or Use of Nuclear Weapons* (1996). p. 35, § 78.
[33] SEIXAS-NUNES, Afonso (2021), pp. 451/452.
[34] ARKIN, Ronald C. "Governing Lethal Behavior in Autonomous Robots" (2009) *apud*. WAGNER, Markus (2014), p. 1.412.
[35] LEYS, Nathan (2020), p. 380.
[36] LEYS, Nathan (2020), p. 399.

This understanding could help in avoiding dangerous escalation for simpler situations, such as a single and small explosion committed by a drone not being recognized as an armed attack to legitimize the use of force (under Article 51 of the U.N. Charter). Nevertheless, on the other hand, if States or other war actors are not responsible for situations related to AWS attacks, this conclusion would affect the State responsibility for atrocities identified under *jus in bellum*[37], such as the confusion between civilians and military targets — an idea that the International Humanitarian Law community would never accept.

Given this entire narrative, it is possible to identify how sensitive this discussion is, and how complex it can be to find a balance related to the use of UAV's on the battlefield and the preservation of *jus ad bellum* and *jus in bellum*. While it's important to identify responsibility regarding humanitarian crisis related to the unrestricted usage of drones, some boundaries must be established regarding the legitimate use of force, since not any kind of single attack can be able to authorize an action.

New technologies came to stay, and they are already putting into perspective how it can affect the nowadays warfare. The use of AI on the battlefield is just an example on how new technologies are able to affect a conflict. The International Law community is already having some difficulties when dealing with regular AWS, and the adoption of AI can increase the complexities in these legal scenarios.

For now, one thing is possible to affirm: "Autonomous Weapon Systems will affect how and whether crises escalate. This is especially true for the most dangerous kinds of crises, involving two or more powerful and technologically advanced States"[38]. And this type of situation is exactly what's happening nowadays, bringing several new challenges related to the use of UAV's, as we'll see below and from now on.

[37] LEYS, Nathan (2020), p. 400.
[38] LEYS, Nathan (2020), p. 384.

3. UAV's and the Modern Military Operations

As pointed previously, the evolution of UAV's is bringing to light extremely relevant discussions related to warfare and modern military operations, creating several daily implications but also legal uncertainty arising from the unrestricted usage of drones on the battlefield. From a theorical point of view, is possible to affirm that the nowadays world scenario shows these facts, as is going to be pointed in this work.

From 2022 to 2024, the world have been experiencing several different kinds of conflicts, maintaining the globe in a constant state of alert. Despite all these adversities, and regarding the purpose of this work — related to the unrestrained use of UAV's on the battlefield — the idea will be to analyze, from this perspective, three of these major recent conflicts, which are: (i) Russia x Ukraine: (ii) Israel x Hamas; and (iii) U.K. and U.S. x the Houthis at the Red Sea.

While some facts presents positive points coming from the usage of drones, such as keeping the soldiers away from the battlefield, or increasingly reducing the war costs, others show how dangerous this unrestricted implementation can be to the society, where civilians are becoming the biggest victims. Additionally, from the military point of view, the analyzes will also consider if a drone attack is sufficient to legitimize the right of self-defence under the Article 51 of the U.N. Charter.

As is going to be seen, each one of these conflict brought different reflections on the (unrestricted) use of AWS, presenting several discussions not only why so many countries are inclined to invest and use this kind of weapon, but also which are the real implications for the International Law, and what it's plausible to expect for the near future.

3.1. A (Low Cost) War Remotely Operated

The main consequences regarding the unrestricted usage of drones is related to not only maintaining the soldiers away from the battlefield, but also reducing the costs of an expensive war. To illustrate how far it is possible to go in relation to these consequences, the conflict between Russia and Ukraine characterizes as a perfect example, presenting itself as a low cost war remotely operated.

In February 2022, the whole world stopped. All eyes were turned to Eastern Europe, specially the border which separates Russia and Ukraine. The invasion of Ukraine — or, as Moscow calls it, the "special military operation" — started more than 2 years ago, and is already seen as a worldwide new historical milestone. For the purpose of this study, the Russia and Ukraine war is considered as a turning point when talking about new military strategies and, specifically, the use of UAV's into the battlefield.

Remembering the beginning of the war in 2022 — when the world though Ukraine wouldn't resist against the Russian army —, it's possible to affirm that the use of drones came as a solution for the Ukrainian forces. Since day one, AWS was presented as a way to stop the planned advances by the Russians, creating difficulties but, primarily, making it possible to fight the war. An the question remains on how are they doing it.

At the beginning, the strategy was focusing on the use of larger drones, like the Turkish TB2 Bayraktar[39] — which presents a range of up to 300 kilometers and can cost from 1 million to 5 million dollars[40]. Later, with the war progress and with the evolution of Russian's air defense taking the TB2 Bayraktar easily down[41], the Ukrainian forces had to change their path. That was the moment when they started using smaller drones, which completely changed how to fight the war. Smaller drones gives "better battlespace awareness and more capability to hit targets"[42].

Completely deviating from conventional rules, Ukraine started investing in common drones, like the ones used by civilians (for example, the first-person view, also known as "FPV"). Most military forces would never agree with the implementation of commercial aerial

[39] KAHN, Lauren (2022).
[40] "Romania wants to buy 18 Turkish Bayraktar TB2 UCAVs for $300M" (2022).
[41] KUNERTOVA, Dominika (2023), p. 583.
[42] THOMPSON, Kristen D. (2024).

vehicles. According to some scholars, these type of drones require a proximity from its operator, requesting agility "to detect and destroy targets before the enemy triangulates their locations"[43].

However, this issue is not being considered by the Ukrainian army. Truly, this type of drone is much cheaper — around a thousand dollars per unit —, and it can help Ukraine achieve an important objective: strike fixed targets at relatively low cost[44]. Since the beginning of war, the funds allocated to military costs were scarce, and Ukraine directly depends on aid from other States — which is known to probably not last forever. That's the reason why reducing expenses is not only a primary objective, but it's necessary for the Ukrainian survival. Replacing million-dollar drones with simpler equipment presented itself as the best solution, and this is how the war has been fight since then. They starer fighting in a "low cost" method.

So if at a first moment most equipment were more expensive and bigger — easier to be target by the enemy —, now, civilian drones are stealing the thunder. They present simpler systems to be navigated and are more sneaky in the eyes of the opponent, also showing how "very inexpensive drones can damage or destroy very expensive military equipment"[45]. Since they are not developed to act on the battlefield, its lifespan ends up being short. However, their low cost justifies the risks.

So, if on the one hand it is possible to automate the process with the usage of commercial drones, keeping soldiers off the battlefield and severely reducing military costs, on the other hand some of the risks still remain: the soldiers are not as far as they could be, which not only puts human material at risk, but could also ends up exposing Ukrainian defense strategies on the battlefield. Nevertheless, with the increasing usage of drones, it seems Ukraine is willing to take this risk. At least they were for now.

The Ukrainian President, Mr. Volodymyr Zelenskyy, already pointed out how the own production of UAV's is essential, and the Ukrainian manufacturing should focuses on drones with different ranges and different purposes[46]. The proximity of the operator is a concern, and the objective is to put them far as they can. With a production on the backyard, not only they can improve the drone's range, but the costs would drop even more, confirming that the usage of drones can be the battlefield's strategy for this next generation.

[43] CHÁVEZ Kerry and Ori Swed (2023), p. 597.
[44] THOMPSON, Kristen D. (2024).
[45] SHYIAN, Anatolii (2023), p. 1.
[46] ELLYATT, Holly (2023).

Another crucial point is to recognize that these kind of drones are more sneaky, being harder for the opponent to identity it in their aerial space. This is exactly what we are seeing in the Russia and Ukraine war. In the last few months, the Ukrainian army was able to reach Moscow, presenting a symbolic movement and a very high risk for the Russian capital. Countless drones have been intercepted in the Russian city — and even some attacks have been carried out successfully[47_48_49].

Recently, on March 12th, 2024, dozens of Ukrainian drones have hit an important Russian oil facility, causing production's disruption and chaos inside Mr. Vladimir Putin's country, just a few days before the next presidential elections[50_51]. This proves that the smaller the drones, easier they can advance into opponent's territory, since they can "appear invisible on air-defense radar systems because of their altitude and speed"[52].

But there's more. These massive attacks operated against the Russian oil and gas industry appears to be made by "drones with longer ranges and more advanced capabilities, some of which have even begun to integrate a basic form of artificial intelligence to help them navigate and avoid being jammed"[53]. According to the Royal United Services Institute — a UK's security think tank —, these drones are fully autonomous, not requiring any communication with satellites, which shows how far Ukraine intends to go in relation to investment and development of new autonomous weapons[54].

The positive points of using drones are being intensively explored by Ukraine, especially in the last few months. As commonly known, the Ukrainian counteroffensive — which was supposed to happen in the middle of 2023, with lots of investments coming from western countries — was a big failure, and Ukraine wasn't able of achieving none of their targets, including getting back some important cities.

The use of drones came once again as a solution, an attempt to counterbalance this collapse. On February 14th, 2024[55], an important strike happened, and the Ukrainian military

[47] "Drone attack hits building in central Moscow" (2023).
[48] DENISOVA, Kateryna (2024).
[49] "Russia Says Ukrainian Drone Attack Killed 2 on Border" (2024).
[50] ROTH, Andrew (2024).
[51] FAULCONBRIDGE, Guy and Lidia Kelly (2024).
[52] KUNERTOVA, Dominika (2023), p. 582.
[53] COTOVIO, Vasco *et al.* (2024).
[54] COTOVIO, Vasco *et al.* (2024).
[55] NOVIKOV, Illia (2024).

forces sank a Russian landing ship in the Black Sea. The assault was made with the usage of high-tech naval drones, and represented a huge success for the Ukrainian army.

Less than a month later it happened again and, on March 6th, 2024[56], another Russian warship was sank. Now, a sea drone — called Magura V5, specifically developed by Ukraine — was the chosen one. This sea drone has a range of up to 800 kilometers, 60 hours of battery life, and present GPS and video cameras[57].

The negative point is that sea drones are not as cheap as civilian drones, such as FPV. The Magura V5 costs around 250 thousand dollars, while the Sea Baby — a new type of sea drone recently developed by Ukraine — costs around 220 thousand dollars. In any case, these equipment are capable of sinking ships worth millions or billions of dollars, which ends up justifying all the investment made by the Ukrainians[58].

As can be see, "Ukraine has already demonstrated that its naval drone capabilities can push Russian vessels away from its coast"[59]. The usage of sea drones in the Black Sea was crucial and these strikes have lifted Ukrainian's morale[60]. After sinking some Russian ships, Ukraine was finally able to restart its grain exports to pre-war parameters, not only boosting their economy, but also ensuring supplies for the entire world. And one thing is for sure: without sea drones — the new character in this war — this victory would never be possible.

But these are not the only strengths related to the use of this kind of UAV's. In a huge battle as this one — maybe the most important since World War II — drones are also playing another important role on the backstage, bringing transparency regarding the potential war crimes committed by Russia inside the Ukrainian territory.

For this kind of monitoring, the U.S. donated a few autonomous camera drones, developed by Skydio, an American enterprise which is specialized in this kind of equipment. The Skydio 2+ drones have high resolution cameras, being able to "take photo and video content to document war crimes"[61]. The expectations are to document the destruction of civilian facilities and also several human rights abuses committed by the Russian forces. Maybe one day, with these evidences, Russia will finally answer for its barbaric acts. For now, it's possible

[56] VLASOVA, Svitlana and Brad Lendon (2024).
[57] HATTON, Barry (2024).
[58] HATTON, Barry (2024).
[59] KUNERTOVA, Dominika (2023), p. 587.
[60] HATTON, Barry (2024).
[61] "USAID Delivers Skydio Autonomous Camera Drones to Ukraine to Document War Crimes" (2023).

to recognize that "obtaining information about the enemy provides an indirect benefit" from this kind of equipment[62].

One thing is for sure: the UAV's completely changed the fate of the conflict and all these positive points are in aware. In the last months, the former Ukrainian army chief, Mr. Valerii Zaluzhnyi, have been focusing on the importance of technology development for the military field, which is crucial for the continuation of the war against Russia. For him, "in a society possibly reluctant to put large numbers of young men and women directly in harm's way, remote-controlled drones provide a more acceptable type of combat operation" [63].

In a letter addressed for CNN on February 1st, 2024, Mr. Zaluzhnyi was categorical in describing not only the importance of investments in technology, but also in pointing out that the use of UAV's may represents the main salvation for Ukraine:

> The main reason for the change in the strategy, forms and methods of employment of forces, of course, is the development of weapons and equipment, especially unmanned systems, the use of which has become widespread and allows to perform a wide range of tasks, which is constantly growing. Therefore, unmanned systems, along with other advanced types of weapons, are almost the only tool for withdrawing from military operations of a positional form, which are not beneficial in terms of time for Ukraine for a set of reasons.
> […]
> In view of the mentioned above, as well as in accordance with the conditions of war today, perhaps the main option for gaining an advantage is to master the entire arsenal of relatively cheap, modern and extremely effective assets that are rapidly developing. It is the attempt to take advantage of the progress in the development of new technologies that will allow to win the scientific, technical, technological and tactical battle and will lead not only to the unconditional Victory, but also to savings and conservation of resources both by Ukraine and our partners.
> […]
> In addition, I would like to note that in addition to improving the effectiveness of combat operations, unmanned and other advanced technological systems are able to solve a number of key problems in the organization and conduct of combat operations of the Defence Forces of Ukraine.
> […]
> Therefore, it is extremely necessary to take advantage of the opportunities provided by the new conditions of war to maximize the accumulation of the latest combat capabilities, which will allow less resources to inflict maximum damage on the enemy, stop his aggression and protect Ukraine from it in the future.[64]

[62] SHYIAN, Anatolii (2023), p. 3.
[63] CAREY, Andrew (2024).
[64] ZALUZHNYI, Valerii (2024).

The importance of investing in new technologies are not only an Ukrainian concern. The western countries, especially the U.S., have been closely watching the development of the conflict between Russia and Ukraine, and the worries are increasingly growing. Learning from the difficulties of stopping smaller drones, the U.S. Department of Defense is already developing the Anvil-M anti-drone system, which is a device that comes from the ground focusing on the destruction of these type of enemies drones[65_66].

As can be see, investing in technology can open important paths inside the battlefield, and, in this specific conflict, can be decisive for the fate of both sides. For the former Ukrainian army chief, "innovation in drones, electronic warfare, anti-artillery capabilities and demining equipment, as well as in the use of robotics"[67] are urgent, since these weapons are becoming the main core for fighting this battle. Some already say this conflict "has become a laboratory for new military technology"[68], and Ukraine is becoming the main actor, seizing the opportunity to develop a domestic industrial base of UAV's.

So if at first the expectation was to see an Ukrainian defeat in a few months, the use of drones not only gave them the possibility to fight, but also transformed this conflict in a war of attrition, where everything is possible. Now, with both parties mostly away from the battlefield, whoever lasts the longest wins. It's plausible to affirm that the possibility of winning is on the side of who lasts the longest — and with all these several investments in UAV's, Ukraine has transformed itself from an underdog to a potential actor who remains in the "game".

In the current moment, Ukraine is losing 10,000 drones per month, which only let the world imagine how many UAV's are actually on the battlefield. One thing is for sure: "Never before have so many drones been used in a military confrontation"[69]. And following the idea presented by the former Ukrainian army chief, Mr. Valerii Zaluzhnyi, this is just the biggening.

The unrestricted usage of drones, with new technologies or even after some improvisations — as the usage of FPV with duct tape and bombs[70] — came to completely change the balance of power, giving Ukraine a true chance to fight this battle. With a bit of creativity and innovation, Ukraine has been showing the world "how savvy technological adaptation can change twenty-first century warfare and could tip the balance of power in favor

[65] DEMAREST, Colin (2023).
[66] SHYIAN, Anatolii (2023), p. 7.
[67] "Ukraine's commander-in-chief on the breakthrough he needs to beat Russia" (2023).
[68] HATTON, Barry (2024).
[69] FRANKE, Ulrike (2023).
[70] KULLAB, Samya (2023).

of the force that is more innovative"[71]. The usage of UAV's presented themselves as a breath of hope in the midst of chaos.

Confirming this idea, it's a mere consequence to recognize that "the decreased human cost of war, especially in respect of the soldiers physical and psychological health; better situational for ground forces and a faster response to strike back enemy forces; fewer financial costs for States; the increased ability to take faster and more accurate decisions, compared to human capability"[72] are considered strong arguments to defend the use of AWS.

As can be see, all these arguments — also combined with indirect benefits from the usage of UAV's, such as high-resolution cameras and how sneaky these weapons can be into the opponents' eyes and their air defence — are truly reaffirmed as the war between Russia and Ukraine progresses, confirming that (probably) drone strikes came to potentially transform the global order[73].

[71] THOMPSON, Kristen D. (2024).
[72] SEIXAS-NUNES, Afonso (2021), pp. 429/430.
[73] KUNERTOVA, Dominika (2023), p. 580.

3.2. The Dehumanization of War

The problems with the massive use of drones are not limited to war strategies, costs, and remote military operations. The unrestricted use of UAV's carries a very heavy burden related to humanitarian rights, and the very recent conflict between Israel and Hamas[74] is capable of demonstrating these facts.

On October 7th, 2023, a massive and cruel attack spread inside Israel. The Hamas group[75] planned and carried out an unprecedented terrorist attack, not only killing Israelis and foreigners, but also taking more than 100 people into captivity. The thirst for revenge was immediate. Israel's response wouldn't be different, and now the cruel acts have changed sides. By squeezing the population within the Gaza Strip, the Israeli army seeks, at the same time, free its hostages and extinguish once and for all those considered enemies — the Hamas. To achieve this target, they are not putting the humanitarian perspective in the balance.

First of all, it's necessary to point out that the Gaza Strip — an urban area where the conflict is taking place — is not an easy territory. The irregularities of the terrain, with narrow streets and buildings packed with civilians, make the Israeli army's task much more difficult. Putting soldiers on the street is the same as sending them to an (almost) uncertain destination, and they are not totally willing to do that.

The way found to avoid this type of instability and reduce the risk for the soldiers is exactly using drones, now placed on the front lines of this conflict. Trying to deviate from the difficulties faced, "Israel is […] deploying smaller drones that can get much closer to the action"[76].

One of drones used by Israel is the Xtender, a small one suitable for tunnel and the irregularity presented in Gaza. Regarding this kind of drone, the way they work demonstrates the type of technological evolution that is already affecting weapons:

> The drone has shrouded rotors to prevent damage from contact with walls and its software allows it to recognise objects and avoid collisions. It can attach a charge strong enough to

[74] Please note that, for the main purpose of this work, we'll not present our opinion on who might be right or wrong in this conflict, but we'll analyze the legal perspectives regarding the use of AWS and, specifically, how this unrestricted use is transforming the scenario in a dehumanization war.
[75] The Hamas — an acronym of the Arabic phrase "Islamic Resistance Movement" — is considered a terrorist group by some countries, such as Israel, the United States and the European Union ("What is the Palestinian group Hamas?" – 2024).
[76] "How Israel is using drones in Gaza" (2023).

> break down a door, back away before it is detonated and then proceed. Xtender can also carry a small explosive warhead, weighing up to 150 grams.
> […]
> Xtenders can work in a chain to connect an operator with a unit which would otherwise be out of reach. These drones can also operate semi-autonomously, continuing with a mission without human input or returning to a place where they can connect via radio. That they can function autonomously also makes these drones easier for operators to use, enabling them to focus on important updates, such as whether the drone has found people or weapons.[77]

These information brings the algorithms method — mentioned in the second chapter — to the scene, showing how the drones used by Israel are autonomous and how the human action is practically out of the scope. After pressing the button, the drone is programmed to achieve its target no matter what. Nevertheless, is important to understand how this affects the conflict itself and how this can be interpretated by the International Law community.

For the International Law, one of the main questions regarding the Israeli offensive is related to understand if the Israeli forces[78] are committing war crimes with their actions. As commonly known, a war crime, stated in Article 8 of the Rome Statute, can be classified as a serious violation of International Humanitarian Law[79] in an armed conflict. To avoid this kind of crime, the military forces involved in an armed conflict must respect two main principles when fighting a war, which are the principle of distinction and the principle of proportionality.

According to Professor Doulgas Guilfoyle[80–81], the principle of distinction is intimately related to differ military targets from civilians, in a way to guarantee protection for the civilian population which is somehow involved in the consequences of the armed conflict. From this idea, it's mandatory to direct the operation only to military targets and objectives. Otherwise, one of the requirements for committing a war crime would be fulfilled.

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[77] "How Israel is using drones in Gaza" (2023).
[78] It's important to understand that "a war crime gives rise to individual criminal responsibility, not state responsibility" (LEWIS, Dustin A. (2023), p. 6). This affirmation means, in this case, that we are only analyzing individuals responsibility, related to the person who gives an order to the Israeli forces (which can be, for e.g., any commander; Mr. Yoav Galant – Israeli Ministry of Defence; or even Mr. Benjamin Netanyahu – Israel's Prime Minister).
[79] LEWIS, Dustin A. (2023), p. 2.
[80] GUILFOYLE, Doulgas (2016), pp. 201/202.
[81] U.N. *Protocol I* (1997). Article 48 – Basic Rule: "*In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives*".

On the other hand, the principle of proportionality[82]–[83] is still related the principle of distinction, since it maintains the idea to protect the civilian population. For the matter of this principle, even military targets should not be aimed if the side effects of the attack can somehow reach civilian life disproportionately. This means side effects are plausible, but these must not be in excess when compared to the concrete military advantage expected from the action.

Also, before analyzing if we are facing a war crime, it's important to identify if this conflict is considered an international armed conflict (IAC) or a non-international armed conflict (NIAC), since each one of them brings different implications by the Rome Statute and the type of war crime committed.

In 1995, the ICTY[84] established the criterion to identify IAC and NIAC. According to ICTY, an IAC is only considered when the armed conflict happens between two States. The NIAC appears when the conflict is between governmental authorities and organized armed groups, or even between these groups and a State — exactly what we are currently experiencing between Israel and the Hamas. In that opportunity, the ICTY defined that "International Humanitarian Law applies from the initiation of such armed conflicts and extends beyond the cessation of hostilities until a general conclusion of peace is reached"[85]. This confirms that war crimes can be seen not only in IAC, but also in NIAC.

Considering the conflict between Israel and the Hamas as a NIAC, it's possible to identify the type of war crime that could be committed by order of the perpetrator with the use unrestricted use of AWS. The Rome Statue[86] brings several different situations that could fit the latest acts carried out by Israeli forces, but the main three would be Articles 8(2)(c)(i), 8(2)(e)(i) and 8(2)(e)(ii), as seen below:

> Article 8(2)(c)(i), Rome Statute: In the case of an armed conflict not of an international character, serious violations of article 3 common to the four Geneva Conventions of 12 August 1949, namely, any of the following acts committed against persons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed hors de combat by sickness, wounds, detention or any other cause: (i)

[82] GUILFOYLE, Doulgas (2016), pp. 201/202.
[83] U.N. *Protocol I* (1997). Article 57, 2, III – Precautions in attack: "*With respect to attacks, the following precautions shall be taken: a) those who plan or decide upon an attack shall: (...) III. refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated*".
[84] ICTY. *The Prosecutor v. Dusko Tadic*, Decision on the defence motion for interlocutory appeal on jurisdiction, October 2nd, 1995, p. 37, § 70.
[85] ICTY. *The Prosecutor v. Dusko Tadic* (1995), p. 37, § 70.
[86] ICC. *Rome Statute* (1998).

> Violence to life and person, in particular murder of all kinds, mutilation, cruel treatment and torture;
>
> Article 8(2)(e)(i) and (ii), Rome Statute: Other serious violations of the laws and customs applicable in armed conflicts not of an international character, within the established framework of international law, namely, any of the following acts:
> (i) Intentionally directing attacks against the civilian population as such or against individual civilians not taking direct part in hostilities;
> (ii) Intentionally directing attacks against buildings, material, medical units and transport, and personnel using the distinctive emblems of the Geneva Conventions in conformity with international law;

In the first situation, the attacks perpetrated must result in civilians' murder, taking their life away. The second and the third situations are slightly different, since they are related to directing the attack — designedly — to the civilian population or even to medical units. In the second and in the third scenario, a civilian murder is not necessary to qualify the war crime.

Already pointed out what types of war crimes could be committed in this conflict, the next step would be to fulfill the mental element — which is necessary to characterize any kind of war crime, including the ones mentioned before. The mental element presents the intent and knowledge related to the action[87]–[88]. As such, it's necessary to point out that the "intention" behind the military action must be truly present, confirming the fact that the perpetrator knows the factual circumstances of committing the prohibited act.

In the conflict hereby analyzed, the idea is to identify if the Israeli forces — personified by an order from a commander —, while using AWS, are respecting or not the core principles of war crimes (distinction and proportionality), and if all the other requirements for the characterization of this kind of crime are fulfilled.

Regarding the use of AWS in the battlefield, and its relation with the principles of distinction and proportionality, some scholars defends that these weapons came to guarantee the comply with both principles. For these scholars, "drones, however, arguably have the potential to allow armed forces to target individuals very precisely and actually minimize the risk to nearby civilians in such situations"[89], minimizing the civilian risks and disproportional damages into the battlefield.

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[87] GUILFOYLE, Doulgas (2016), p. 214.
[88] ICC. *Rome Statute* (1998). Article 30: "*Unless otherwise provided, a person shall be criminally responsible and liable for punishment for a crime within the jurisdiction of the Court only if the material elements are committed with intent and knowledge*".
[89] LEWIS, Michael and Emily Crawford. "Drones and Distinction: How HIL Encouraged the Rise of Drones", *Georgetown Journal of International Law* (2013) *apud*. GUILFOYLE, Doulgas (2016), p. 204.

Although we understand this line of thought, it does not seem very feasible with the reality now experienced. According to Professor Doulgas Guilfoyle, the use of unmanned weapons can bring risky situations, since "fatal errors through not exercising sufficient care in deciding a suspicious person or vehicle identified by a drone is actually a military target which can be attacked with lethal force"[90].

But not only that. It seems easier to order an attack from inside an office, away from the dangers of the battlefield, with practically no emotional charge. In these situations, thinking about consequences, unfortunately, is no longer a priority. This scenario is exactly what the world is being forced to see in this conflict.

Since the beginning of the war, countless drone attacks have been ordered by Israeli forces, which confirms how easy it is to push a button. At the same time, the number of civilians who have been affected by these attacks is uncertain, demonstrating once again how fallible (or inconsequential) the use of AWS might be.

Some may ask regarding the requirement of the mental element — since the situation involves a weapon that, after pressing a button, no more human interaction is necessary. Nevertheless, the importance here is to recognize the intention behind the act, and also the risks involved in each situation. As mentioned before, the Israel x the Hamas conflict is taking place in the Gaza Strip, a territory which presents irregularities and narrow streets, making the possibility of targeting civilians pretty easy. In such situation, the use of drones presents a huge threat for the civilian population. From this idea, it's easy to affirm that achieve a military target, without dealing with bad consequences for the Palestinian population, is almost rare — if not impossible.

In the last few months and weeks, the international community has been forced to watch some attacks committed by drones that tend to be classified as war crimes — where the prosecutor ignored the principles of distinction and proportionality, and knew exactly what would be the consequences of their acts. Here are some examples:

(i) 18 November 2023 – Israeli drone strike in West Bank[91]: 5 Palestinians killed during a strike that was supposed to reach the headquarters of Fatah group in Balata refugee camp east of the city of Nablus.

[90] GUILFOYLE, Doulgas (2016), p. 204.
[91] "5 Palestinians killed in Israeli drone strike in West Bank" (2023).

(ii) 20 December 2023 – Israeli drone strike in Gaza as dead child pulled from rubble[92]: No evidence to justify why the area was attacked by the drone.

(iii) 24 December 2023 – Israel's deadly attack on a Gaza refugee camp[93]: More than 70 people, including 12 women and seven children. The strike made by the Israeli drone devastated an overcrowded residential area, burying entire families under tons of rubble.

(iv) 27 December 2023 – Israeli strike on refugee camp in occupied West Bank again[94]: At least 6 Palestinians were killed. The victims were reportedly young men between the ages of 16 and 29. This attack was the second strike only in 24 hours.

(v) 19 January 2024 – Israeli drones and the attack to a hospital in southern Gaza[95]: 142 Palestinians killed and 278 injured in Gaza in 24 hours.

(vi) 2nd March 2024: A drone strike hits a tent camp in Rafah[96]: The attack happened next to Al-Helal Al-Emirati Maternity Hospital in southern Gaza and killed 11 people, leaving more than 50 injured.

(vii) 1st April 2024: An aid convoy was hit in a Israeli strike[97]: 7 aid workers, from the World Central Kitchen, were killed. Since the beginning of the conflict, 196 aid workers were killed in Gaza, which contributes to the conclusion that this attack was not an isolated one.

As can be see, most of the attacks planned by the Israeli forces not only killed civilians, but targeted residential neighborhoods, refugee camps and even hospital. All these elements makes impossible to achieve, somehow, the principles of distinction and proportionally. *In contrarium*, these acts may configures war crimes, under Articles 8(2)(c)(i), 8(2)(e)(i) and 8(2)(e)(ii) of the Rome Statute. The actions are categorically disproportionate, and do not present any thought about the distinction between military and civilian targets.

From this point of view, it's possible to conclude that maintaining a distance from the battlefield makes it seems simpler to fight a war. This means that, "as distance increases, it becomes psychologically easier for individuals to commit acts that they would often otherwise be more reluctant to carry out"[98]. It's more comfortable to (not) think when you don't have to look in the eyes of your target.

Also, the automatization of weapons brings the idea that, once the button was pushed, nothing else can be done. Mistakes can happen and, without human discernment, a step taken

[92] "Sky News witnesses chaos of Israeli drone strike in Gaza as dead child pulled from rubble" (2023).
[93] TELLO, Anan (2024).
[94] "Six killed in Israeli strike on refugee camp in occupied West Bank" (2023).
[95] "Israeli drones attack hospital in southern Gaza, Palestinian Red Crescent says" (2024).
[96] "At least 11 Palestinians killed after Israel hits tent camp in Rafah" (2024).
[97] RASGON, Adam and Aaron Boxerman (2024).
[98] GROSSMAN, Dave. "On Killing: The Psychological Cost of Learning to Kill in War and Society", 1st Edition (1995) *apud*. WAGNER, Markus (2014), p. 1.410.

may not be reversed. The truth is that "the judgment, reasoning, and discretion exercised by a human cannot be performed by a machine"[99].

But without any big surprises, things can get worse. As mentioned in the second chapter of this study, the development of AWS are moving faster, and now it's plausible to already consider the influence of AI on the battlefield. If the world is already dealing with severe humanitarian consequences from the unrestricted usage of drones, the implementation of AI, completely taking away the human presence on making decisions, can make thinks get (apparently) out of control.

The development of this type of weapon with artificial intelligence is so complex that is possible to think about witnessing weapons acting without any type of human intervention. At first, when talking of this scenario, it could seem somewhat absurd no human behind a weapon, but these new technological advances allow us to consider these apparently unrealistic, but palpable, scenarios. The concerns are tangible, and unfortunately this is already happening in the conflict between Israel and the Hamas.

Since December, 2023, Israel is using AI to select bombing targets in Gaza, making this technology responsible for deciding which target to achieve, resulting in a "targeting choices with life-and-death consequences"[100]. For now, there are no answers regarding this situation. Nevertheless, the usage of AI in this specific conflict is bringing up several concerns, since it's not clear if all the civilian "causalities" mentioned before have some relation to the AI targeting. The activist are demanding more transparency, but Israel prefers to remain in silence[101].

So if in one side it's evident the positive influence of using AWS — as it endangers fewer soldiers, prevent loss of life[102], and can also be more precise in hitting its targets —, at the same time, the use of drones presents a very unstable scenario, with a refinement of cruelty, considering that it becomes easier to advance on the battlefield without distinguishing targets and civilians.

When talking about regular AWS, some scholars already affirm that "the use of autonomous weapons is becoming one of the most significant threats to humanity in today's society"[103]. If this type of thinking already finds space within some scholars regarding conventional AWS, the use of artificial intelligence increases the concern even further.

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[99] ULGEN, Ozlem (2016), p. 12.
[100] DAVIES, Harry, *et al.* (2023).
[101] GEDEON, Joseph and Maggie Miller (2024).
[102] WAGNER, Markus (2014), p. 1.412.
[103] GUNAWAN, Yordan *et al*. (2022), p. 1.

As can be conclude, one of the main problems regarding the unbridled use of AWS are related not only to the possibility of this kind of weapon distinguish civilians from soldiers[104], but also to how simple can be the use of it. The rebound effect is immediate: while most of Israeli soldiers are saved, countless Palestinian civilians find themselves in a degrading situation, putting their lives at risk on a daily basis.

The direct result is what we are seeing today: until now, more than 33 thousand[105] Palestinian civilians already died in this conflict — where more than 13,800 are children —, a number that increases day by day. At the end of the day, the world can (unfortunately) expect the scenario we are already familiarized to see, which is another possible war crime "un-investigated or, at the very least, unpunished"[106]. Therefore, the belief is to hope that, eventually, even in a not so distant future, the International Humanitarian Law will be able to protect those who unfairly end up being targets of the indiscriminate use of drones.

[104] LEYS, Nathan (2020), p. 379.
[105] MOTAMEDI, Maziar and Alia Chughtai (2024).
[106] LEWIS, Dustin A. (2023), p. 3.

3.3. The Configuration of an Armed Attack

After presenting different sides and consequences from the usage of drones, another perspective from this study will be to comprehend if a drone attack can be qualified as an armed attack under the Article 51 of the U.N. Charter, consequently authorizing the exercise of the inherent right of self-defence.

Recently, the conflict between the Houthi and the U.S. and the U.K., which is taking place at the Red Sea, raised some questions regarding this topic, pointing out nuances that cannot be ignored when analyzed from the perspective of the right to self-defense, as it's going to be shown in the next few pages.

The Red Sea is considered a strategic point of connection between Asia and Europe (connecting the Indian Ocean and the Mediterranean Sea through the Bab El-Mandab Strait and the Suez Canal), being essential for the development of the global economy. Nowadays, 12 per cent of global trade and 30 per cent of global container traffic traverses the Red Sea[107], which includes the traffic of crude oil, condensate and refined petroleum products. Without this pathway, the only route would be passing under the African continent, which adds days to the journey taken by international cargo ships. Precisely because of the relevance of the Red Sea, many countries have permanent military bases around the region, in a way of guaranteeing a constant protection to the area[108].

On November 19th, 2023, the Houthi — an armed group based in Yemen[109], which is strategically positioned at the Red Sea —, started to attack several cargo ships in the area, in a way of showing support to the Palestinians in the conflict against Israel. Most of the attacks were made by UAV's, which, as already mentioned, are capable of reaching specific targets (here recognized as the vessels themselves) without much effort and almost no human interaction.

The Houthi's weaponry is made of the junction of medium and long-range drones, such as the Samad-2 (range between 1.200 km-1.500 km), Samad-3 (range between 1.300 km-1.700 km,) and Samad-4 (range of 2.000 km), and the Wa'id (range of 2.500 km)[110]. From this perspective, is already possible to conclude that the Houthi are truly prepared to achieve

[107] FUARY-WAGNER, Ingrid, *et al.* (2024).
[108] FUARY-WAGNER, Ingrid, *et al.* (2024).
[109] "Who are the Houthis? A simple guide to the Yemeni group" (2024).
[110] JALAL, Ibrahim (2023).

medium and long distance targets, being possible to maintain their forces far away from the conflict itself.

At the first moment, only Israeli vessels or the ones on route to Israel were the target. The first cargo ship attacked was the Galaxy Leader, owned by a British company, but also by an Israelian citizen[111]. Later, the criterion was gone, and any cargo vessel passing through the Red Sea could be a target. This was enough to cause chaos in the region, making several countries to rethink their vessels' route. The global economic crisis began: the attack threatened freedom of navigation of the seas, and stability of global oil prices[112].

Concerned with continuously flow of their own cargo ships, the U.S. announced a maritime force to protect their vessels. For the U.S. government, "maintaining the flow of oil through major throughways around the world is a national security concern"[113].

Nevertheless, this maritime force was not enough, and the strikes ordered by the Houthi continued to happen. Worried about the tensions in the region, on January 10th, 2024, the U.N. Security Council adopted the Resolution 2722[114], reaffirming navigational rights and also demanding the Houthi to immediately cease all the attacks — without expressly authorizing the use of force. As can be imagined, the Resolution had no practical effects. The instability was still persisted.

Then, just one day after the adoption of Resolution 2722, the U.S. and the U.K. launched missiles against the Houthis, more specifically in the controlled region of Yemen[115]. They had more than 60 targets, focusing on the capital city of Sana'a, but also in other cities, such as Saada and Dhamar. With these strikes, came a message. The Representative of the U.S. to the U.N., Mrs. Linda Thomas-Greenfield, addressed a letter to the Security Council claiming the use of force under their right of self-defence, according to Article 51 of the Charter of the United Nations[116–117].

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[111] SCHARF, Avi (2024).
[112] SHAMASH, Saul (2017), p. 1.
[113] SHAMASH, Saul (2017), p. 5.
[114] U.N. Security Council. *Resolution N. 2722* (2024).
[115] SABBAGH, Dan and Julian Borger (2024).
[116] U.N. *U.N. Charter* (1945). Article 51: "*Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security*".
[117] U.N. Security Council. *Letter from the Permanent Representative of the United States of America to the United Nations addressed to the President of the Security Council* (2024).

So in this specific conflict, despite the fact that the Resolution 2722 doesn't expressly authorizes the use of force, the U.S. concluded that "the resolution took note of the right of Member States, in accordance with international law, to defend their vessels from attack"[118] — which would, under the American understanding, indirectly authorizes the use of force. This knowledge is rejected by some scholars (such as Russell Buchan and Marko Svicevic)[119–120], who defends that the Resolution 2722 does not authorizes the use of force against the Houthis. Nevertheless, these scholars also support that the exercise of the inherent right of self-defence must be judged not by the (non)authorization by the Security Council, but if the actions taken by the U.S. and the U.K. respect the requirements of proportionality and necessity, and if they are taken against an armed attack.

As per Article 51, a State may justify the use of force claiming the right of self-defence if an armed attack occurs against the State itself. The proof of an armed attack was implemented to narrow the possibility of an unilateral use of force, in a way of restring possible abuses by States[121].

In this specific case, most of the Houthi's attacks are done isolated, and each of the drones are directed to one single ship. From this point, one shot results in one attack. Regarding all these considerations, the most important question inherent the right of self-defence claimed by the U.S. and the U.K. is to understand if an AWS strike can be considered an armed attack for the purpose of Article 51, if a single attack be qualified as an armed attack under the jurisdiction of Article 51, and if an armed attack can be done by a machine, without (almost) no human intervention.

The legislation itself was not specific in defining, in its text, what exactly an armed attack would be, leaving the concept completely open to interpretations. In 1986, the ICJ elucidated what an armed attack is, pointing that it should be considered "the most grave form of the use of force (those constituting an armed attack)"[122]. Thus, this concept is not enough. An act may be considered a grave form of the use of force, but sometimes it would be almost impossible to

[118] U.N. Security Council. *Letter from the Permanent Representative of the United States of America to the United Nations addressed to the President of the Security Council* (2024).
[119] BUCHAN, Russell (2024).
[120] SVICEVIC, Marko (2024).
[121] STAHN, Carsten (2003), p. 37.
[122] ICJ. *Nicaragua v. United States of America* (1986). p. 101, § 191.

justify the usage of self-defence — since, according to ICJ, and as a matter of customary law, this right must rely in necessity and proportionality[123].

Regarding these requirements, it is very curious to see the choice of words, very accurate, used by the U.S. in its letter, mentioning more than once how the strikes made by the U.S. army were necessary and proportionate, consistent with the right of self-defence authorized by the U.N. Charter:

> In response to these attacks and the continuing threat of future attacks, on 11 January, the United States, as part of a multinational operation, alongside the United Kingdom and with support from Australia, Bahrain, Canada and the Netherlands, conducted discrete strikes against Houthi facilities in Yemen that facilitate Houthi attacks in the Red Sea region, including air and coastal surveillance radar sites, as well as unmanned aerial system and missile facilities and launch sites. These necessary and proportionate strikes were taken after non-military options proved inadequate to address the threat.
> […]
> The United States took this necessary and proportionate action consistent with international law and in the exercise of the United States' inherent right of self-defence as reflected in Article 51 of the Charter of the United Nations. The United States will take further action against the Houthis as may be necessary in the exercise of its inherent right of self-defence to respond to future attacks or threats of attacks against the United States.[124]

So it's not only necessary to respond with proportionality and necessity, but the configuration of an armed attack must be truly present. But, in this specific conflict, the question is how to justify a single attack (made by a single drone) as an armed attack. In similar situations like this, the legal way found by the International Law to justify the use of force under the right to self-defense consists on the application of the theory of "accumulation of events", where "a series of minor incidents, taken together, can be said to reach the threshold of an armed attack"[125].

Despite being a little controversial, nowadays this doctrine is already being accepted by some scholars and even for the ICJ. When judging the "Oil Platforms" case, the ICJ pointed out that "even taken cumulatively, […], these incidents do not seem to the Court to constitute an armed attack on the United State"[126], bringing the conclusion that cumulative events may constitute an armed attack.

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[123] ICJ. *Nicaragua v. United States of America* (1986). p. 103, § 194.
[124] U.N. Security Council. *Letter from the Permanent Representative of the United States of America to the United Nations addressed to the President of the Security Council* (2024).
[125] TAMS, Christian J. (2009), p. 388.
[126] ICJ. *Oil Platforms (Islamic Republic of Iran v. United States of America)* (2003). p. 192, § 64.

This point can be considered arguable, since only the cumulation of attacks would authorize the exercise of the right of self-defence. Consequently, a single drone attack would not authorize this premise, putting into question that drone attacks are easily done isolated, creating an unstable scenario.

When considering the conflict between the U.S. and the U.K. against the Houthi, the only way to justify an occurrence of an armed attack seems to be the application of the theory of "accumulation of events". One single attack, by a single drone, at one single vessel, probably doesn't configures the "most grave form of the use of force" requirement pointed by the ICJ. Nevertheless, the accumulation of a series of attacks against different vessels in the region — made by several drones, in several different days — does.

In the letter addressed to the Security Council, the Representative of the U.S. is very accurate to mention that the exercise of the right of self-defence is directly related to a series of attacks — not a single one — identified at the Red Sea:

> I wish to report, on behalf of my Government, that the United States, in the exercise of its inherent right of self-defence, as reflected in Article 51 of the Charter of the United Nations, has undertaken discrete strikes against Houthi facilities in Yemen in response to a series of armed attacks by Houthi militants over the last few months, including several attacks against United States Navy ships in the Red Sea.

Confirmed that the compilation of several events can configures an armed attack for the purpose of Article 51, the next step is to understand if these attacks can be originated from a AWS — with (almost) no human interaction.

At the Nicaragua v. United States of America case, the ICJ defined that this most grave form of the use of force must be "not [a] merely action by regular armed forces across an international border, but also "the sending by or on behalf of a State of armed bands, groups, irregulars or mercenaries […]"[127]. Some authors defends that, from this affirmation, we can conclude that an armed attacked must be originated from a human action, since "attacks of humans acting on behalf of a State count"[128]. This same point of view believes that "the use of force still depends on humans"[129].

However, until today, the ICJ did not established very clear if an attack made by a non-human soldier is able to constitute an armed attack for the application of Article 51, nor even

[127] ICJ. *Nicaragua v. United States of America* (1986). p. 103, § 195.
[128] LEYS, Nathan (2020), p. 402.
[129] KUNERTOVA, Dominika (2023), p. 584.

pointed a clear distinction between an attack made by an AWS and the ones originated from missiles or naval mines[130].

Nevertheless, it's important to understand that even an attack made by an AWS was somehow directed by a human order. As mentioned at the second chapter, after activating the system, no more human intervention is necessary — but the order of activation is essential for the usage, and it comes from a directly human action. The conclusion is inevitable: "when the offensive use of an AWS is the result of a human operator's command: […] it would be absurd to suggest that the delegation of targeting and firing functions renders such an action not an "armed attack"."[131].

Also, the eventual non-recognition of the AWS attack as an armed attack harms not only the right to self-defense, but also the application of the rules inherent to International Law as a whole. Recognizing drone attacks as armed attacks guarantees the mains purpose of International Humanitarian Law. After all, "if AWS are "weapons" for the purposes of International Humanitarian Law (which falls under the *jus in bello* umbrella), then shouldn't they also be "weapons" for the purposes of *jus ad bellum*?"[132]. We do think the answer for this question must be "yes".

Considering the (several) drone attacks made by the Houthi as an armed attack, it's a consequence to recognize that the other requirements originated from Article 51, to justify a self-defence action, are fulfilled, confirming the legality of the use of force raised by the U.S. and the U.K. in the Red Sea.

Assuming that these drone attacks can be considered an armed attack under Article 51, it's reasonable to agree with the actions made by the U.S. and the U.K. in this specific case, as they suffered an armed attack — arising from several drone attacks, even at different times and days — and, consequently, could take the necessary and proportionate acts to protect their rights, using the force under the justification of self-defence.

[130] LEYS, Nathan (2020), p. 402 and p. 403.
[131] LEYS, Nathan (2020), pp. 402/403.
[132] LEYS, Nathan (2020), p. 403.

4. Conclusion

As thoroughly analyzed through the three recent conflicts mentioned in the previous chapters, the usage of UAV's is becoming one of the most important elements inside the battlefield. Changing the core of military strategies, these weapons are being able to drastically transform the paths of a war, with a deep impact to the warfare and to modern military operations.

One of the main consequences is related to the power of changing the course of a conflict. The possibility of representing a turning point element is precisely characterized in the war between Ukraine and Russia, since the use of drones came as a game changing for the Ukrainian army. Not only these weaponries are cheaper and more accurate, but they keep the soldier out of action, preserving lives that would probably be on a risk. The configuration of a war of attrition gave to Ukraine a chance of winning the conflict, something that no one could possibly think at the beginning of the war.

Confirming the supposedly benefits of using AWS, the defenders of these kind of weapons say that they "not only provide significant strategic and tactical advantages on the battlefield, but are also morally superior to the use of human combatants"[133]. This affirmation comes from the idea where keeping soldiers out of the ground presents positive results, as pressing a button is much easier than looking into the enemy's eyes.

This confirms the fact that this unrestrained implementation of UAV's reduces the compliance with *jus ad bellum*, since "the political calculus would not have to take into account the number of fallen soldier"[134]. From this idea, is possible to recognize that the usage of AWS makes easier to respond to a crisis with the use of force, where would not be necessary to think twice before taking a huge steps inside a conflict, since the continuity of the escalation would not increase the risks to civilians and soldiers[135].

Nevertheless, this premise brings another side of the coin, showing that the unrestricted implementation of AWS on the battlefield can easily transform a conflict in a bloodshed — as it's happening in the conflict between Israel and Hamas. This war shows that human emotions must be considered a relevant element in decision making, where the ability of empathize is

[133] GUNAWAN, Yordan *et al*. (2022), p. 4.
[134] WAGNER, Markus (2014), p. 1.419.
[135] WAGNER, Markus (2014), p. 1.419.

crucial to "play a constructive and decisive role in determining which option an individual will actually take at a given moment"[136].

So while the usage of AWS can potentialize the action on the battlefield — as seen in the conflict between Russia and Ukraine —, at the same time, it brings a huge concern regarding instability and insecurity, especially to the civilian population, putting the *jus in bellum* on a risk — exactly what's happening inside the Israel and Hamas conflict. It's a consequence to affirm that, in such cases like this second one, "drones have become a powerful platform for use as offensive weapons"[137], representing a real humanitarian risk for the population within a conflict of this magnitude.

Following this knowledge, is necessary to recognize that the exacerbated usage of these offensive weapons must authorize the right as self-defence — as pointed previously, when analyzed the conflict against the Houthis at the Red Sea. The idea is the accumulation of events, and how harm they can be. So if at one hand a single drone attack may not configurate the "most grave form of the use of force" to justify the right of self-defence — which can be tricky, since several drone attacks are done isolated and are capable of causing great destruction —, according to the theory of "accumulation of events", the proliferation of this kind of attack does, in attention to the *jus ad bellum* premises and the Article 51 of the U.N. Charter.

As seen throughout this study, the use of UAV's is still very controversial within International Law, presenting positive and negative points for the ones active on the battlefield, at the same time as it brings to light major challenges that need to be faced. Also, the continued development of this type of weaponry, with the use of artificial intelligence, will most likely make the world scenario even more unstable.

In a way of showing preoccupation regarding this subject, the U.S. Defence Department already issued a specific guideline regarding the usage of autonomous and semiautonomous weapons which are enable by AI, specifically directing the necessity to observe the laws of war and also maintaining the training models operated by the U.S. soldiers[138]. For example, "any AI-enabled weapon must be discriminate, able to distinguish between combatants and noncombatants on the battlefield"[139]. Nevertheless, put all these guidelines in practice doesn't

[136] WAGNER, Markus (2014), p. 1.415.
[137] SHYIAN, Anatolii (2023), p. 3.
[138] FLOURNOY, Michèle A. (2023), p. 67.
[139] FLOURNOY, Michèle A. (2023), p. 67.

seem simple and, despite being redacted in 2020, until today no real implementation was truly done.

Considering all these information — and especially the exacerbated instability —, some authors defends that these kind of military weapons should be limited or even prohibited[140]. For now, more than 25 countries and 100 nongovernmental organizations already called for a pre-emptive ban on the usage of AWS, pointing concerns especially regarding ethics and accountability[141].

But taking into consideration the big influence and perspective regarding the usage of AWS on the battlefield — which was deeply explored in this work —, and that major world powers are increasingly investing in the development and improvement of this type of weaponry in the last few years, it is possible to conclude that any attempt on limitation seems useless.

From this point of view, the conclusion we can take from all these consideration is only one: "drone proliferation across the military and civilian spheres is inevitable and norms can merely moderate drone warfare"[142]. The future is already around the corner, and there's nothing we can do about it.

[140] GUNAWAN, Yordan *et al*. (2022), pp. 4/5.
[141] SEIXAS-NUNES, Afonso (2021), p. 425.
[142] LEYS, Nathan (2020), p. 402.
[142] SCHULZKE, Marcus. "Drone Proliferation and the Challenge of Regulating Dual-Use Technologies", *International Studies Review*, Volume 21, Issue 3, September (2019) *apud*. KUNERTOVA, Dominika (2023), p. 586.

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