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STUDENT OFFICER:	Suhyeon Lee
POSITION:	Head Chair of Disarmament Commission

Introduction

In recent years, Unmanned Aerial Vehicles, or UAVs, have transformed the scope of modern armed conflicts drastically. While the conventional application of UAVs was restricted to a few military superpowers, the rapid technological development and decreased production costs have led both state militaries and private military entities to deploy military drones during combat, highlighting their shifting role from a supplement for intelligence support to key assets capable of precision strikes.



Image 1: Military drone deployment in modern warfare

Particularly, armed conflicts in Eastern Europe and the Middle East have displayed the role of military drone deployment in increasing military operational efficacy and transforming armed strategies. The pervasive deployment of armed drones, simultaneously, has resulted in new humanitarian concerns and issues related to transnational peace and security. Despite the established knowledge of armed drones' capacity for exact targeted attacks, continuous reports on untargeted civilian harm and destruction of public infrastructure highlight a shortage of international regulation and structural protection of civilians from the increasing deployment of armed drones in military confrontations.

Beyond these immediate concerns, the development of advanced drone technology—including the incorporation of artificial intelligence and autonomous functions with military drones—has intensified debates on accountability and regulation of their operations. As such, while acknowledging their military utility and necessity for national security, establishing a cohesive international framework for regulating the deployment of armed drones has become increasingly important. Thus, in order to protect civilians and preserve regional security during periods of conflict, the global community must comprehend the



extent of drone deployment's influence and examine the humanitarian concerns associated with the operations of armed drones.

Background

Unmanned Aerial Vehicles (UAVs) were, rather than for participation in direct combat, primarily designed for the purpose of detailed inspection and data collection without involvement of human resources. Yet, as Precision Guided Munitions (PGM) and telecommunication technologies were incorporated into UAVs in the 21st century, the role of drones during armed conflicts has expanded



Image 2: MQ-1 Predator, an early armed UAV during ground operations

beyond data collection to engagement in armed attacks. Here, the operation of the MQ-1 Predator, a US-developed UAV originally designed for surveillance and reconnaissance but later modified to carry weapons, during counterterrorism operations in Afghanistan in 2001 serves as a primary example of the transition. It has showcased the capacity of UAVs to be equipped with precision-guided weapons for precise military attacks. Since the first involvement of UAVs in practice, armed drones have been increasingly

utilized in several counter-terrorism operations and transnational armed conflicts. Specifically, following Russia's invasion of Ukraine in February 2022, the deployment of armed drones has become more extensive than ever: not only marked by the involvement of long-range attacking drones but also by low-cost First-Person View (FPV) drones and small-sized commercialized drones, the scale of drone production and use of UAVs in military operations has expanded significantly.

Concurrently, the incorporation of advanced technologies, including artificial intelligence, computer vision and automatic target recognition, has highlighted not only evolving drone technologies but also their associated concerns such as accountability, human control, and most importantly, civilian protection. The United Nations Human Rights Monitoring Mission in Ukraine (HRMMU) reported approximately 3000 civilian casualties due to armed drone attacks during the Russo-Ukrainian War, highlighting the expanding operational scale resulting in serious humanitarian issues and threats to civilians. Given that the deployment of UAVs, including armed drones, is likely to continue to accelerate in international armed confrontations, currently reported cases indicate the rapidly emerging necessity of establishing an international normative framework for regulating the military deployment of armed drones to minimize civilian casualties.



Problems Raised

Escalating Civilian Harm in Modern Drone Warfare

Despite initial evaluation of armed drones—primarily for their role in precise surveillance and remote strikes—as a novel medium for strengthening precise civilian protection, their expanded deployment during modern warfare highlighted emerging concerns regarding civilian harms. The majority of drone attacks rely heavily on remote sensors, visual data and information provided by non-human sources to identify targets for attacks; consequently, incomplete or inaccurate intelligence often



Image 3: Residential building damaged by armed drone attack in Ukraine

results in misidentification of military targets.

Furthermore, the proximity of military targets to civilians makes it increasingly challenging to eliminate risks of civilian casualties in highly populated areas, in particular. The Russo-Ukrainian War exemplifies these extended risks of attacks by armed drones, regardless of their intention of civilian harm: The United Nations Human Rights Monitoring Mission in Ukraine (HRMMU) reported that civilian

casualties induced by short-range armed drone attacks in frontline zones of Ukraine have increased 121% from 2024 to 2025, further reinforcing that the technological accuracy of UAVs does not necessarily guarantee civilian protection in practice.

Civilian harms associated with the deployment of armed drones are not solely constrained to civilian casualties. Their attacks on residential areas and critical civilian infrastructure could engender indirect impacts—such as disruptions to power and medical services, limited transportation means and restricted delivery of humanitarian aid—for an extended period. These consequences underscore challenges to comply with principles of distinction, proportionality and precautions in attack, the key pillars established under International Humanitarian Law (IHL). Hence, minimizing both direct and indirect civilian harms from armed drone attacks remains a critical humanitarian challenge for the international community.

Challenges in Regulating Armed Drone Deployment

As deployment of armed drones in military operations continues to expand, there have been structural difficulties in regulating the use of UAVs under uniform international normative frameworks. Varying from long-range military UAVs to low-cost FPV drones, loitering munitions and commercial drones modified for military usage, modern drones significantly differ in their function and forms. In



particular, since a significant number of modern drone technologies have dual-use characteristics—suggesting that developed drones could be utilized for both civilian and military purposes—it is often challenging for the international community to establish a shared standard for classifying the implications and regulations of drone technologies. At the same time, reduced production costs and diversified commercial technologies in the use of drones have expanded the range of actors capable of accessing armed drones. While armed drones were conventionally believed to be operated by a few nations with advanced military strategies and adequate budgets, today, more states and even non-governmental actors are able to acquire armed or modified drones for military purposes. This phenomenon substantially complicates the traditional, state-centric management frameworks, further highlighting the necessity of establishing a unified standard for regulating the extensive use of armed drones.

International Actions

Geneva Conventions and Additional Protocol I

The 1949 Geneva Conventions and 1977 Additional Protocol I have established a core legal foundation of International Humanitarian Law (IHL) for civilian protection in armed conflicts. Although these conventions were not specifically designed to regulate the deployment of armed drones in particular, attacks conducted by armed drones remain subject to compliance with the principles of IHL. In particular, Article 48 of



Image 4: State representatives signing the Geneva Conventions of 1949

Additional Protocol I mentions the principle of distinction, requiring participating parties to distinguish between civilians and combatants and military, as well as civilian and military targets; while Article 51 emphasizes the principle of proportionality, prohibiting attacks expected to cause excessive incidental civilian harm in relation to anticipated military advantage. These principles are applicable to modern armed drone operations and therefore provide an established, crucial standard of civilian protection in modern warfare.

UN Initiatives on Armed UAVs

As a response to growing international concerns regarding expanding production and operation of armed drones in modern warfare, the United Nations Office for Disarmament Affairs (UNODA) published the Study on Armed Unmanned Aerial Vehicles with the support of the UNIDIR. The study



addressed crucial issues, including the distinction between armed and civilian UAVs, transparency and accuracy in targeted strikes, and application of IHL to prevent civilian casualties, in order to provide oversight regarding the use of armed drones in modern conflict zones. Following an initial investigation into the international implications of the usage of UAVs, the UNIDIR published a supplementary study, *Increasing Transparency, Oversight and Accountability of Armed Unmanned Aerial Vehicles*, pointing out the shortage of unified international standards and transparency in drone operations. UNIDIR emphasized that these issues not only hinder the protection of civilians but also suggest a failure to comply with existing international frameworks, which highlights the necessity of strengthening international transparency and oversight of armed drone deployment. Nonetheless, given the fact that it did not result in the establishment of new treaties with immediate legal binding force, these efforts do not conclusively underscore international communities' contribution to elevating the need for establishing a normative regulation framework into a subject of formal discussions.

Key Players

United States

Since the 2000s, the United States has played a pivotal role in the development and operation of modern armed UAVs, particularly in counterterrorism operations. As armed drones became increasingly integrated into US military and counterterrorism missions, international concerns arose regarding issues such as civilian casualties, transparency of strikes and legal basis for their transnational deployment. In response to these concerns, the United States government has been strengthening operational standards based on existing international laws and domestic policies. In 2022, the US government introduced presidential policy guidance managing the use of armed drones against terrorist targets to minimize the risk of civilian casualties. The United States has emphasized the responsible use of armed UAVs under existing international law while actively utilizing armed drones in national military strategies.

Ukraine

Following Russia's full-scale invasion of Ukraine in 2022, Ukraine has emerged as a novel key player in the international discussion of extensive integration of UAVs into modern military operations.





Image 5: Ukrainian forces operating UAVs during the Russo-Ukrainian War

As the war continues for an extended period of time, Ukraine has substantially expanded the role of reconnaissance and attack drones as a key element of military strategy and is recently pursuing a policy to systematically integrate UAVs. At the same time, Ukraine exemplifies states that are most directly affected by civilian casualties from armed drone deployment. The dual challenges faced by the Ukrainian government of maintaining the military

advantages of utilizing UAVs while strengthening civilian protection against their widespread usage mark the intricacy of the issue, further highlighting the necessity of international engagement in alleviating such concerns.

Türkiye

In recent years, Türkiye has emerged as a global producer and exporter of armed drones; the Turkish drones have enabled numerous member states to acquire precision strike and reconnaissance capabilities. Notably, with the deployment of the Bayraktar TB2 and other armed UAVs, the expansion of Türkiye's armed drones has contributed to the growth of its domestic defense industry and strengthened strategic ties with importing nations. The production company of Bayraktar TB2 has generated 1.8 billion USD in exports in 2024, with international sales accounting for 90 percent of its annual revenue. Given the expanding influence of UAVs beyond the producing state, the increased accessibility of armed drones has raised concerns regarding export approval criteria, end-use monitoring, operational transparency and the liability of supplier nations should the exported drones be deployed in conflicts involving civilian areas. Thus, the case of Türkiye highlights the necessity of comprehensive international norms that address not only the deployment of armed drones in conflicting regions but also their cross-border transfer and export processes.

Possible Solutions

Establishing Standardized International Operations for Armed Drone Guidelines

In order to successfully regulate the transnational operation of armed drones, the international community could establish a common standard for the deployment of armed drones in military confrontations. By providing a shared definition and classifying armed UAVs and unmanned military



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means and establishing strict review criteria—assessing factors such as proximity of military targets to residential areas and reliability of targeting information—applied specifically to armed drone operations in densely populated areas, such a standard could ensure more concrete operational procedures for armed drones in compliance with the existing principles of IHL. Concurrently, these international standards could incorporate periodic review mechanisms to align their enforcement with rapidly evolving drone technologies; hence,

Establishing an International Mechanism for Civilian Harm Assessment

Accelerating deployment of armed drones and continuously reported civilian casualties highlights the necessity of strengthening a common standard for civilian protection applicable to drone operations. The international community could establish a civilian harm assessment mechanism, requiring states to assess and record civilian casualties and damage resulting from armed drone attacks. Under this particular framework, consequences of drone strikes could be investigated and reviewed; collected cases could be investigated through periodic national reports and utilized to improve national policies and standards for civilian protection. Here, international organizations such as the UNODA could serve as a pivotal player bridging the gaps between varying civilian harm assessment methods of member states. By continuously monitoring reported casualties and destruction cases, state governments could reexamine or devise additional civilian protection measures, while international organizations could also publish revisions of existing standards and frameworks in order to prevent civilian harm from armed drone operations.

Glossary

Unmanned Aerial Vehicle (UAV)

An unmanned aircraft that can be remotely controlled or operate autonomously through embedded software and onboard sensors

Armed drone

A UAV equipped with weapons and capable of conducting attacks against designated targets

First-Person View (FPV) Drone

A drone operated through a live video feed that allows the operator to control it from the drone's visual perspective

Loitering Munition

A weapon system capable of remaining airborne while searching for a target before striking it once identified

International Humanitarian Law (IHL)



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A body of international norms governing conduct during armed conflict, aimed at protecting civilians and limiting unnecessary harm

Principle of Distinction

An IHL principle requiring parties to distinguish between civilians and combatants, and between civilian objects and military objectives

Principle of Proportionality

An IHL principle prohibiting attacks expected to cause civilian harm excessive in relation to the anticipated concrete and direct military advantage



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