# USE OF DRONES BY NON-STATE ACTORS: A NEW DIMENSION OF TERRORISM UNDER INTERNATIONAL LAW

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*"As technology becomes cheaper and more accessible, the power to cause harm no longer remains limited to states."*

**ABSTRACT**

The proliferation of unmanned aerial vehicle technology to non-state actors represents one of the most significant transformations in the landscape of modern terrorism and international security. This research paper undertakes a comprehensive examination of the use of drones by terrorist organizations, insurgent groups, and transnational criminal networks as an emerging dimension of terrorism under international law. Through doctrinal legal analysis and case study methodology, this paper investigates the operational patterns, technological capabilities, and tactical applications of non-state actor drone programs, including the Islamic State in Iraq and Syria, the Houthi movement in Yemen, and Hamas in the Gaza Strip. The research critically analyzes the existing international legal framework, encompassing international humanitarian law, counter-terrorism instruments, international civil aviation law under the Chicago Convention, and arms control regimes including the Missile Technology Control Regime and the Arms Trade Treaty. The findings reveal critical gaps in the current legal architecture, including the absence of a dedicated treaty addressing drone-enabled terrorism, definitional ambiguities regarding what constitutes a drone for regulatory purposes, complex jurisdictional challenges arising from cross-border operations, accountability deficits for non-state actors operating outside traditional state responsibility frameworks, and the fundamental dual-use dilemma that enables proliferation through commercial markets. The paper further examines state responses to these threats, including counter-drone operations, assertions of extraterritorial jurisdiction, and invocation of self-defense under Article 51 of the UN Charter, evaluating their legal implications and consistency with international law. Based on this analysis, the research proposes comprehensive legal reforms, including the development of a dedicated international instrument, strengthening of export control mechanisms, clarification of self-defense principles, enhancement of international cooperation frameworks, UN Security Council action, and strengthened accountability mechanisms. The paper concludes that without

urgent and coordinated legal reform, the widening gap between technological capabilities and regulatory frameworks will continue to threaten international peace and security, potentially leading to catastrophic consequences as drone technology continues to advance in sophistication and accessibility.

**Keywords:** drones, unmanned aerial vehicles, non-state actors, terrorism, international law, counter-terrorism, international humanitarian law, Chicago Convention, UN Security Council, self-defense, accountability

## Introduction

The twenty-first century has witnessed a profound and unprecedented transformation in the nature of conflict and terrorism, driven largely by the rapid diffusion of advanced technologies beyond the control of traditional state actors. Among these innovations, unmanned aerial vehicles (UAVs), commonly known as drones, have emerged as a pivotal and disruptive tool affecting international security, military strategy, and the global legal order. While drones are often regarded as a modern technological development, the conceptual imagination of aerial vehicles is not entirely new. In the context of ancient Indian knowledge systems, references to aerial transportation can be found in classical Hindu texts such as the Ramayana and the Mahabharata, where the Pushpak Viman is described as a flying chariot capable of traversing vast distances. Although mythological in nature, such references reflect the longstanding human fascination with aerial mobility and flight, which contemporary drone technology has begun to realize in practical terms.

Initially developed for military reconnaissance and precision strike operations by state powers such as the United States, Israel, and the United Kingdom, drone technology has now become increasingly accessible to non-state actors, including terrorist organizations, insurgent groups, and transnational criminal networks. The widespread availability of commercial drones has fundamentally altered the balance of capabilities between states and non-state actors, creating what scholars have termed the "democratization of air power." Platforms produced by manufacturers such as DJI, a Chinese company that dominates the global consumer drone market, are designed for legitimate applications including aerial photography, agriculture, surveying, infrastructure inspection, and recreational use. However, these same platforms can be adapted for hostile purposes with relatively limited technical expertise, often requiring only basic modifications to transform a commercial drone into an effective weapon system. This accessibility has enabled non-state actors to integrate drones into their operational strategies,

thereby enhancing their capacity for surveillance, intelligence gathering, targeted attacks, psychological warfare, and propaganda production.

Recent instances from conflict zones around the world illustrate the operational impact and growing sophistication of drone use by non-state actors. Between 2014 and 2019, the Islamic State of Iraq and Syria (ISIS) deployed specialized drone units, designated as the Unmanned Aircraft of the Mujahideen, which conducted thousands of missions across Iraq and Syria. These operations included reconnaissance to identify coalition force positions, the dropping of improvised explosive devices converted from hand grenades and mortar shells, and the production of high-quality propaganda videos designed to intimidate adversaries and recruit new members. The group also demonstrated organizational sophistication in establishing supply chains for drone components, repair facilities, and comprehensive training programs for operators.

In Yemen, the Houthi movement, officially known as Ansar Allah, has developed one of the most advanced non-state actor drone capabilities in the world, with significant support from Iran. The Houthis have deployed a range of unmanned systems, including the Qasef series, Samad series, and the longer-range Hudhed drones. These platforms have been used to target critical infrastructure in Saudi Arabia and the United Arab Emirates, including the significant attack on Saudi Aramco oil processing facilities at Abqaiq and Khurais in September 2019, which temporarily disrupted approximately five percent of global oil supply. The sophistication of these attacks demonstrated the capacity of non-state actors to conduct strategic strikes with significant economic and geopolitical consequences.

In the Gaza Strip, Hamas and Palestinian Islamic Jihad have developed indigenous drone programs, utilizing both commercial off-the-shelf drones and domestically produced unmanned aircraft for reconnaissance and attack operations. During the May 2021 conflict between Israel and Hamas, the group launched coordinated drone swarm attacks against Israeli targets, representing a tactical innovation with significant operational implications. The groups have demonstrated adaptability, modifying tactics in response to Israeli counter-measures and continuously developing their capabilities despite significant operational constraints.

Despite the growing prevalence and increasing sophistication of drone-enabled terrorism, the existing international legal framework remains insufficiently equipped to address this emerging threat. The current legal architecture comprises multiple overlapping regimes, including

international humanitarian law codified in the Geneva Conventions and their Additional Protocols, international counter-terrorism law consisting of nineteen sectoral conventions and numerous UN Security Council resolutions, international civil aviation law established under the Chicago Convention of 1944, and various arms control regimes such as the Missile Technology Control Regime and the Arms Trade Treaty. None of these instruments were crafted with the specific challenge of non-state actor drone operations in mind, creating significant gaps in regulation, attribution, accountability, and enforcement.

Given these challenges and the rapidly evolving threat landscape, this research paper aims to critically examine the utilization of drones by non-state actors for terrorist purposes, assess the adequacy and limitations of the current international legal framework, evaluate state responses and their legal implications, and propose comprehensive reforms to enhance regulatory effectiveness. By analyzing contemporary developments, existing legal mechanisms, and emerging state practice, the study seeks to contribute to the broader discourse on adapting international law to emerging technological threats in terrorism.

## Conceptual Framework: Defining Drones and Non-State Actors

### Understanding Drone Technology

Unmanned Aerial Vehicles (UAVs), commonly known as drones, are aircraft systems that operate without a human pilot on board and can be remotely controlled by ground-based operators or function autonomously through pre-programmed software and artificial intelligence systems. The term encompasses a wide spectrum of platforms, ranging from small consumer quad copters weighing less than 250 grams to large military systems weighing several tons with intercontinental range capabilities. The defining characteristic of drones is their separation of pilot from platform, which enables operations in environments that may be too dangerous, distant, or prolonged for manned aircraft.

Drones can be broadly categorized into several types based on their design, capabilities, and intended applications. Commercial off-the-shelf drones, manufactured by companies such as DJI, Autel, and Parrot, are widely available in global markets at prices ranging from a few hundred to several thousand dollars. These platforms typically feature sophisticated stabilization systems, GPS navigation, high-definition cameras, and flight times ranging from twenty minutes to over an hour. Their accessibility and ease of operation have made them the

most common type of drone used by non-state actors.

Military-grade drones, in contrast, are highly advanced systems primarily developed and operated by state armed forces. These platforms, such as the American MQ-9 Reaper, the Israeli Heron, and the Turkish Bayraktar TB2, feature long endurance, large payload capacities, satellite communications, and sophisticated sensor suites. While these systems are generally not accessible to non-state actors through legitimate channels, some groups have acquired such capabilities through state sponsorship or battlefield capture.

Modified or weaponized drones represent a category where non-state actors have demonstrated particular innovation. Commercial drones are often modified by attaching explosive payloads, creating release mechanisms, extending flight range through battery modifications, and integrating targeting systems. The Islamic State's drone program exemplified this approach, converting commercial drones into effective weapon systems through relatively simple modifications that required minimal technical expertise. More recently, loitering munitions or "kamikaze drones" have emerged as a significant threat, designed to loiter over an area before crashing into a target with an explosive payload.

Emerging technologies are rapidly expanding the capabilities and potential applications of drone systems. Autonomous drones equipped with artificial intelligence can navigate, identify targets, and make engagement decisions without real-time human control. Swarm technology enables coordinated operations of multiple drones that can overwhelm defensive systems through sheer numbers. These developments raise profound legal and ethical questions about accountability, human control, and compliance with international humanitarian law.

**Understanding Non-State Actors**

Non-state actors refer to individuals or organizations that operate independently of state authority and participate in international relations without representing any recognized state. In the context of terrorism and conflict, this category encompasses terrorist organizations, insurgent groups, transnational criminal networks, and, in some cases, lone actors. These entities pursue political, ideological, religious, or economic objectives through means that may include violence, intimidation, and destabilization of state authority.

Terrorist organizations represent the most prominent category of non-state actors utilizing

drone technology. These groups, such as ISIS, Al-Qaeda, and their various affiliates, are characterized by their use of violence to achieve political or ideological objectives, their organizational structure, and their capacity to sustain operations over extended periods. The integration of drone technology into terrorist operations represents a significant evolution in their capabilities, enabling them to conduct surveillance, deliver attacks, and produce propaganda with unprecedented efficiency.

Insurgent groups, while sometimes overlapping with terrorist organizations, are typically distinguished by their focus on challenging state control within a specific territory and their engagement in armed conflict against state forces. The Houthi movement in Yemen and Hezbollah in Lebanon exemplify insurgent groups that have developed sophisticated drone capabilities, often with external state sponsorship. These groups operate in complex environments where the distinction between armed conflict, terrorism, and political insurgency becomes blurred.

Transnational criminal networks represent a third category of non-state actors that have increasingly adopted drone technology. These organizations, involved in drug trafficking, arms smuggling, human trafficking, and other illicit activities, use drones for surveillance to evade law enforcement, for logistics to transport contraband, and in some cases for violent operations to protect their interests. The convergence of terrorism and organized crime, facilitated by shared drone capabilities, represents a growing security concern.

**The Intersection of Drones and Non-State Actors**

The intersection of drone technology with non-state actor operations has created what scholars describe as a paradigm shift in asymmetric warfare.[18] Drones provide non-state actors with capabilities that were previously the exclusive domain of state militaries, including persistent aerial surveillance, precision targeting, and the ability to strike targets with minimal risk to operators. This transformation has significant implications for the balance of power in conflict zones and the ability of states to maintain security.

The operational advantages of drones for non-state actors are substantial. Remote operation eliminates the risk of capture or death of personnel, which is particularly valuable for groups with limited manpower. The relatively low cost of commercial drones enables acquisition of significant capabilities with limited financial resources. The small size and low altitude

operation of many drones make them difficult to detect and intercept using traditional air defense systems. The ability to loiter over targets for extended periods enables intelligence gathering and opportunistic targeting.

However, the use of drones by non-state actors also presents significant challenges for these groups. Maintaining a drone program requires technical expertise, supply chains for components and spare parts, secure operating locations, and training programs. Counter-drone technologies employed by states, including electronic jamming, kinetic interception, and directed energy weapons, create operational risks. Despite these challenges, the trajectory of non-state actor drone capabilities points toward continued proliferation and increasing sophistication.

## The Phenomenon of Drone-Enabled Terrorism

### Operational Capabilities and Tactical Applications

The integration of drone technology into terrorist activities marks a significant evolution in the operational capabilities of non-state actors. Drones offer strategic advantages that fundamentally alter the nature of asymmetric conflict, including remote operation that eliminates risk to attackers, enhanced precision compared to conventional terrorist tactics such as suicide bombings, and the ability to conduct sustained surveillance operations that inform targeting decisions. These capabilities have made drones an increasingly preferred tool for a wide range of terrorist activities.

Surveillance and Reconnaissance represent the most widespread application of drones by non-state actors. Groups employ drones to monitor military installations, track movement of security forces, identify vulnerabilities in defensive positions, and gather intelligence on potential targets. This capability enables more effective planning of attacks, reduces the risk of ambush, and provides early warning of state counter-operations. The persistent surveillance capability of drones, which can loiter over areas for extended periods, provides a level of situational awareness that was previously unavailable to non-state actors.

Direct Attack Operations represent the most concerning application of drones by non-state actors. Weaponized drones serve as precision attack platforms, delivering explosive payloads against military and civilian targets with varying degrees of accuracy. Attack methodologies

have evolved from simple improvised explosive devices dropped from commercial drones to sophisticated loitering munitions designed specifically for attack missions. The Islamic State conducted thousands of such attacks between 2014 and 2019, while the Houthis have used drones to target critical infrastructure with strategic effect.

Propaganda and Psychological Operations constitute a third significant application of drones by non-state actors. Drones are used to capture high-quality aerial footage of attacks, which is then incorporated into propaganda videos designed to recruit new members, intimidate adversaries, and project an image of sophistication and capability. The Islamic State's sophisticated propaganda productions, which prominently featured drone footage, contributed significantly to its recruitment success and global brand recognition. This application of drones extends the impact of attacks beyond their immediate physical effects.

Smuggling and Logistics represent an emerging application of drones by non-state actors. Drones are utilized to transport weapons, drugs, contraband, and supplies across borders and into restricted areas, including prisons and secure facilities. This application extends beyond terrorist groups to transnational criminal networks, creating overlapping security challenges that require coordinated responses. The ability to conduct logistics operations without exposing personnel to interception or capture provides significant operational advantages.

**Case Study: The Islamic State (ISIS) in Iraq and Syria**

The Islamic State's drone program represents the most documented and operationally significant non-state actor drone operation to date. Between 2014 and 2019, ISIS established a dedicated drone unit, the Unmanned Aircraft of the Mujahideen, which conducted over 2,000 documented missions across Iraq and Syria. The program demonstrated organizational sophistication that surprised military analysts and posed significant challenges to coalition forces.

The organizational structure of the ISIS drone program reflected the group's broader approach to institutionalizing capabilities. Specialized units were established for procurement, modification, training, and operations. Procurement networks acquired drones and components through front companies in multiple countries, taking advantage of the global commercial drone market. Modification workshops converted commercial drones into weapon systems, developed release mechanisms, and extended flight ranges. Training programs developed

skilled operators capable of complex missions, including night operations and coordinated attacks.

The operational impact of the ISIS drone program was substantial. Drone operations provided critical battlefield intelligence that enabled the group to coordinate attacks, avoid coalition airstrikes, and maintain operational effectiveness despite significant territorial losses. The use of drones for direct attacks inflicted casualties on coalition forces and allied local forces, while the propaganda value of drone footage enhanced the group's recruitment capabilities. The program demonstrated how non-state actors could develop significant aerial capabilities despite facing technologically superior state adversaries.

Coalition forces dedicated substantial resources to countering the drone threat, employing electronic warfare to jam control signals, kinetic strikes to destroy drones and infrastructure, and operational security measures to limit intelligence gathering. Despite these efforts, the program remained operationally effective until the group's territorial collapse. The ISIS drone program established precedents and demonstrated capabilities that other non-state actors have since sought to replicate.

**Case Study: The Houthi Movement in Yemen**

The Houthi movement has developed the most advanced non-state actor drone capabilities outside of state-sponsored programs. With significant support from Iran, the Houthis have transformed from a domestic insurgency to a regional threat actor capable of striking targets across the Arabian Peninsula. The Houthi drone program represents a model of capability development that combines indigenous production with external support.

The Houthi drone capability evolved from basic commercial drones to indigenously produced weaponized systems over several years. The Samad series provides long-range strike capabilities capable of reaching targets deep within Saudi Arabia and the United Arab Emirates. The Qasef series offers tactical attack capabilities for shorter-range operations. The longer-range Hudhed drones demonstrate the Houthis' ability to produce increasingly sophisticated systems. This evolution reflects the transfer of technology and expertise from Iran, which has developed its own extensive drone capabilities.

The September 2019 attack on Saudi Aramco oil processing facilities at Abqaiq and Khurais

represented a watershed moment in non-state actor drone operations. The attack involved a coordinated strike by multiple drones that successfully penetrated Saudi air defense systems and struck critical infrastructure, temporarily disrupting approximately five percent of global oil supply. The sophistication of the attack demonstrated the capacity of non-state actors to conduct strategic strikes with significant economic and geopolitical consequences.

The regional implications of Houthi drone operations have been substantial. Gulf states have been compelled to invest heavily in counter-drone capabilities, including integrated air defense systems, electronic warfare capabilities, and directed energy weapons. The attacks have forced a reassessment of vulnerability to non-state actor strikes and have influenced regional security dynamics. The Houthi program has established precedents for non-state actor strategic strike capabilities that other groups may seek to emulate.

**Case Study: Hamas and Palestinian Islamic Jihad in Gaza**

Hamas and Palestinian Islamic Jihad have developed indigenous drone programs in the Gaza Strip, utilizing both commercial off-the-shelf drones and domestically produced systems. Operating under significant constraints, including limited territory, Israeli counter-measures, and restricted access to components, these groups have nonetheless developed persistent drone capabilities.

Drone operations by these groups include surveillance of Israeli military positions, attack operations using explosive-laden drones, and psychological warfare operations targeting Israeli civilian populations. During the May 2021 conflict between Israel and Hamas, the group launched coordinated drone swarm attacks against Israeli targets, representing a tactical innovation with significant operational implications. The groups have demonstrated adaptability, modifying tactics in response to Israeli counter-measures and continuously developing their capabilities.

Technological development claims by Hamas include the production of multiple drone variants domestically, including the Shehab and Ababeel series. While the extent of indigenous production capabilities remains debated, the program demonstrates sustained investment in drone technology and the capacity to maintain capabilities despite significant operational constraints. The program also illustrates the potential for technology transfer from state sponsors, with Iran identified as a source of expertise and components.

## Contemporary Developments: Iran-Israel Drone Conflict

The ongoing tensions involving Iran and Israel provide a significant contemporary example of the expanding use of drone technology in modern conflict. Recent reports indicate that Iran has deployed large numbers of drones, particularly low-cost loitering munitions such as the Shahed series, targeting multiple locations across the Middle East, including the United Arab Emirates, Bahrain, Kuwait, and Qatar. These operations demonstrate the strategic value of drones as tools for power projection and retaliation.

The Shahed series drones, which have also been extensively used in the conflict in Ukraine, represent a class of low-cost loitering munitions that have transformed the economics of warfare. These systems are inexpensive to produce, estimated to cost as little as $20,000 per unit, while the air defense systems required to intercept them cost millions of dollars. This economic asymmetry creates a strategic advantage for actors employing such systems and imposes significant costs on defending states.

In the context of the ongoing Middle East conflict, thousands of drones have been launched across the region, and these systems have been linked to significant casualties among both military personnel and civilians. The use of such drones demonstrates a shift toward cost-effective yet highly lethal warfare, where relatively inexpensive systems are capable of causing loss of life, destruction of infrastructure, and psychological fear among civilian populations. These developments highlight that modern drone warfare is not only a technological challenge but also a humanitarian concern, raising serious implications for international law, particularly in relation to civilian protection, proportionality, and accountability in armed conflict.

## The International Legal Framework

### The Role of the United Nations

The United Nations occupies a central position in the international legal architecture addressing terrorism and emerging security threats. The UN Charter establishes the foundational principles of international law relevant to non-state actor drone use, including the prohibition on the threat or use of force enshrined in Article 2(4), the principle of sovereignty, and the collective security framework established under Chapter VII.

Article 2(4) of the UN Charter prohibits the threat or use of force against the territorial integrity

or political independence of any state. This principle is implicated when non-state actors operating from one state territory conduct drone attacks against another state. While the Charter was designed to regulate state conduct, the principle of sovereignty extends to obligations on states to prevent their territory from being used to launch attacks against other states. The International Court of Justice has affirmed this obligation in various contexts, though its application to non-state actor drone operations remains contested.

Article 51 of the UN Charter preserves the inherent right of individual or collective self-defense in response to an armed attack. The application of this provision to non-state actor drone attacks remains one of the most contested issues in contemporary international law. Traditional interpretations considered armed attacks as state conduct, requiring attribution to a state before self-defense could be invoked. However, contemporary practice, particularly following the September 11, 2001 attacks, has expanded the understanding to encompass attacks by non-state actors where the host state is unable or unwilling to prevent such attacks.

Chapter VII of the UN Charter authorizes the Security Council to take enforcement action to maintain international peace and security. This authority has been exercised through resolutions imposing binding obligations on states regarding counter-terrorism, including measures relevant to non-state actor drones. The Security Council's counter-terrorism architecture, including the Counter-Terrorism Committee and the Counter-Terrorism Executive Directorate, monitors state implementation and facilitates international cooperation.

The UN Global Counter-Terrorism Strategy, adopted by the General Assembly in 2006 and reviewed regularly, provides a comprehensive framework for counter-terrorism action addressing conditions conducive to terrorism, measures to prevent and combat terrorism, capacity-building, and human rights protections. While the Strategy does not specifically address drones, its framework for addressing emerging threats provides a foundation for action. The Strategy emphasizes the importance of compliance with international law and the protection of human rights in counter-terrorism efforts.

**UN Security Council Resolutions**

The UN Security Council has adopted a series of resolutions imposing binding obligations on member states regarding counter-terrorism. These resolutions constitute primary sources of international counter-terrorism law and establish the framework for state action relevant to non-

state actor drones. The evolution of these resolutions reflects the Security Council's growing attention to emerging threats.

Resolution 1373 (2001), adopted under Chapter VII following the September 11 attacks, imposes binding obligations on all states to prevent and suppress terrorist financing, provide early warning, deny safe havens, and cooperate in criminal investigations. The resolution established the Counter-Terrorism Committee to monitor implementation. The broad obligations under Resolution 1373 encompass measures relevant to non-state actor drones, including preventing the acquisition of weapons and technology by terrorist groups.

Resolution 1540 (2004) addresses the proliferation of weapons of mass destruction to non-state actors. It imposes binding obligations on states to establish domestic controls to prevent non-state actor acquisition of nuclear, chemical, and biological weapons and their delivery systems. The resolution's definition of "delivery systems" includes unmanned aerial vehicles, making it directly relevant to drone proliferation. Resolution 1540 established a committee to monitor implementation and has been renewed through subsequent resolutions.

Resolution 2178 (2014), adopted in response to the rise of ISIS, addresses foreign terrorist fighters. It requires states to criminalize travel for terrorist purposes and prevent recruitment and facilitation. The resolution's relevance to drones lies in its provisions regarding technical assistance and capacity-building for states facing terrorist threats. The resolution also addresses the flow of weapons and technology to terrorist groups.

Resolution 2396 (2017) represents the most significant Security Council action directly addressing emerging technologies. The resolution calls upon states to address the threat posed by terrorists using unmanned aerial systems, including through the development of counter-drone capabilities. The resolution urges states to adopt measures to prevent terrorists from exploiting drones for terrorist purposes and to share information regarding drone threats. While the resolution does not impose binding obligations specifically addressing drones, it represents recognition by the Security Council of the threat and the need for action.

Resolution 2462 (2019) strengthens the counter-terrorist financing framework, addressing emerging risks including the use of new technologies. It emphasizes the importance of preventing terrorists from exploiting technological developments for financing purposes. The resolution's provisions on risk assessment and preventive measures have relevance to drone

acquisition and operation.

Resolution 2482 (2019) addresses the linkages between terrorism and organized crime, including the use of emerging technologies. The resolution recognizes that terrorist groups and criminal networks may share technologies and methods, including drones, and calls for enhanced international cooperation to address these overlapping threats.

**International Civil Aviation Law: The Chicago Convention**

The Convention on International Civil Aviation, signed at Chicago in 1944, establishes the foundational framework for international civil aviation regulation. The Convention's relevance to non-state actor drones arises from its regulation of aircraft operations, sovereignty over airspace, and standards for safe operation. However, the Convention was drafted decades before drone technology became prevalent, creating challenges for its application to contemporary threats.

Article 1 of the Chicago Convention affirms that every state has complete and exclusive sovereignty over the airspace above its territory. This principle is fundamental to international aviation law and is implicated when non-state actors operate drones across international borders. Violations of territorial airspace by drones constitute breaches of sovereignty, triggering state responsibility and potential self-defense responses. However, the principle does not provide mechanisms for preventing such violations or holding non-state actors accountable.

Article 8 of the Convention specifically addresses pilotless aircraft, stating: "No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization." This provision directly addresses unmanned aircraft but was designed for early pilotless systems, not contemporary drones. The requirement for "special authorization" creates an obligation on states to regulate unmanned operations within their territory but does not address operations by non-state actors who disregard such authorization.

The International Civil Aviation Organization (ICAO), a specialized agency of the United Nations, develops Standards and Recommended Practices (SARPs) for aviation safety, security, and environmental protection. ICAO has developed SARPs for remotely piloted aircraft systems (RPAS) through its Remotely Piloted Aircraft Systems Panel. These standards

address registration, airworthiness, operator licensing, and operational procedures. However, ICAO standards apply primarily to state-authorized operations and civil aviation. They do not bind non-state actors operating outside legal frameworks.

The limitations of the Chicago Convention framework in addressing non-state actor drone threats are significant. The Convention was designed for manned aviation and does not adequately address the unique characteristics of drones, including their small size, low altitude operations, and potential for weaponization. Implementation relies on state compliance, which cannot be assumed regarding non-state actors operating without state authorization. The Convention does not establish enforcement mechanisms against non-state actors, leaving violations to be addressed through other legal frameworks.

**International Humanitarian Law**

International humanitarian law (IHL), codified in the Geneva Conventions of 1949 and their Additional Protocols of 1977, regulates the conduct of armed conflict. The application of IHL to non-state actor drone operations raises several challenges, though the fundamental principles remain relevant.

The classification of conflicts involving non-state actor drones presents interpretive difficulties. Common Article 3 of the Geneva Conventions applies to non-international armed conflicts, requiring minimum standards of humane treatment. Additional Protocol II provides more detailed regulation but requires organized armed groups under responsible command exercising control over territory. Many non-state actors operating drones meet these criteria, but the classification of specific operations remains contested. The threshold for the existence of a non-international armed conflict requires sustained and organized armed confrontation, which may not characterize all drone operations.

The principles of distinction, proportionality, and precaution apply to drone operations regardless of the platform used. The principle of distinction requires parties to distinguish between civilians and combatants and between civilian and military objectives. The principle of proportionality prohibits attacks where incidental civilian harm would be excessive relative to the military advantage anticipated. The principle of precaution requires constant care to spare civilians and civilian objects. Determining compliance with these principles becomes challenging where non-state actors operate from civilian areas or utilize dual-use infrastructure.

The concept of direct participation in hostilities determines when civilians lose immunity from attack. The operation of weaponized drones by non-state actors clearly constitutes direct participation, but questions arise regarding individuals engaged in drone procurement, modification, and training. The ICRC's interpretive guidance on direct participation provides a framework but does not specifically address drone operations. The temporal and geographical scope of direct participation may be particularly complex in drone operations where operators may be far removed from the battlefield.

## Legal Challenges in Addressing Drone-Enabled Terrorism

### The Absence of Specific Legal Instruments

The most fundamental legal challenge in addressing drone-enabled terrorism is the absence of any international legal instrument specifically addressing this phenomenon. The existing international counter-terrorism framework comprises nineteen sectoral conventions and protocols, each addressing specific modalities of terrorism: aircraft hijacking, hostage-taking, terrorist bombings, nuclear terrorism, and financing of terrorism. None of these instruments were drafted with drone technology in mind, and none specifically address the use of unmanned aerial systems for terrorist purposes.

The International Convention for the Suppression of Terrorist Bombings (1997) is the most relevant existing instrument, criminalizing the delivery of explosive devices with intent to cause death, injury, or destruction. While drone attacks fall within the broad definition of "delivery," the Convention does not specifically address unmanned delivery systems. This creates interpretive ambiguities regarding whether drone attacks were contemplated by the drafters and how the Convention's provisions should apply to the unique characteristics of drone operations, including questions of jurisdiction, evidence, and proof.

The absence of a dedicated instrument has practical consequences for international cooperation. States lack clear legal obligations regarding prevention, investigation, and prosecution of drone-enabled terrorism. International cooperation mechanisms specific to drone threats do not exist. Technical assistance and capacity-building programs lack a treaty framework. Accountability for violations remains fragmented across multiple legal regimes.

### Definitional Ambiguities

Even if states sought to apply existing instruments to drone terrorism, they face significant

definitional challenges. There is no universally accepted definition of what constitutes a "drone" or "unmanned aerial vehicle" for regulatory purposes. This ambiguity creates interpretive uncertainty for states and courts determining whether particular systems fall within treaty provisions, regulatory gaps where systems falling outside definitions escape regulation, and jurisdictional confusion regarding which legal regime applies to specific operations.

The distinction between commercial drones, hobbyist drones, military drones, and weaponized drones becomes increasingly blurred as non-state actors modify civilian platforms for malicious purposes. A drone purchased for legitimate recreational use may be converted into a weapon system within hours, creating challenges for preventive regulation. The rapid pace of technological development further complicates definitional efforts, as new categories of systems with novel capabilities continue to emerge.

**Jurisdictional Challenges**

When drones cross international borders, determining which state has jurisdiction becomes highly complex. The territorial principle of jurisdiction, which grants states jurisdiction over offenses committed within their territory, faces significant challenges in the context of cross-border drone operations. Drones frequently traverse international borders, with operators located in one state, launch sites in another, airspace traversed in multiple states, and targets in yet another. This creates fundamental questions about where the offense occurs for jurisdictional purposes.

Multiple states may claim jurisdiction over the same offense based on different principles: the state where the operator is located may claim territorial jurisdiction, the state where the target is located may claim protective jurisdiction, states whose airspace is traversed may claim jurisdiction based on effects, and states whose nationals are affected may claim passive personality jurisdiction. This creates potential for jurisdictional conflicts, with multiple states seeking to prosecute or none willing to assert jurisdiction. Conversely, states may lack jurisdiction where only the drone's flight path traverses their territory without causing harm.

The "unable or unwilling" doctrine, invoked by some states to justify extraterritorial action against non-state actor threats, remains contested. The doctrine, which holds that a state may take action against non-state actors operating from another state's territory when the host state is unable or unwilling to suppress the threat, has been articulated by the United States and Israel

in various contexts. However, the doctrine has no treaty basis, state practice on its validity diverges significantly, and there is significant risk of abuse.

**Accountability of Non-State Actors**

Traditional international law was designed to regulate state conduct, with states as the primary subjects. Non-state actors, including terrorist organizations, were historically considered objects rather than subjects of international law, bound by international legal obligations only indirectly through state responsibility. This traditional framework creates accountability challenges regarding whether non-state actors bear direct obligations under international law, how non-state actors can be bound by international legal norms without consent, and what mechanisms exist to enforce obligations against non-state actors.

Contemporary international law increasingly recognizes that non-state actors may bear direct obligations under international humanitarian law and international human rights law. Common Article 3 of the Geneva Conventions explicitly binds parties to non-international armed conflicts, including non-state armed groups. However, this recognition remains limited and does not comprehensively address accountability. The applicability of international criminal law to non-state actors, through individual criminal responsibility for war crimes and crimes against humanity, provides a framework but faces significant practical limitations.

The doctrine of command responsibility holds military commanders and civilian superiors accountable for crimes committed by subordinates where they knew or should have known of the crimes and failed to prevent or punish them. Applying this doctrine to non-state actor drone programs raises questions about command structure, which may be less formal than state militaries; knowledge requirements, which may be difficult to prove; and control requirements, which require establishing effective command and control over drone operators.

State responsibility for non-state actor conduct, governed by the International Law Commission's Articles on Responsibility of States for Internationally Wrongful Acts, requires proof that the state exercises effective control over the non-state actor, knowingly acquiesces in the non-state actor's conduct, or adopts the non-state actor's conduct as its own. These high thresholds create accountability gaps, as proving effective control or knowing acquiescence is extremely difficult, states supporting non-state actors may maintain plausible deniability, and non-state actors with significant operational autonomy may not meet control thresholds.

## The Dual-Use Challenge

The most significant technological challenge in regulating non-state actor drones is the dual-use nature of drone technology. The same technology that enables legitimate commercial, agricultural, surveying, and recreational applications can be repurposed for terrorist activities. This dual-use characteristic creates fundamental tensions between promoting innovation, preventing misuse, and protecting economic interests.

The global commercial drone market, valued at approximately $30 billion in 2023, employs hundreds of thousands of people and serves essential functions across multiple sectors. Blanket prohibitions are economically impractical and politically infeasible. Yet targeted regulation faces the challenge of distinguishing legitimate from illegitimate uses. Non-state actors employ various methods to evade existing regulations, including establishing front companies to acquire drones, transshipping through intermediary countries, acquiring components separately to avoid complete system controls, and producing drones locally using available components.

The economic asymmetry created by low-cost kamikaze drones presents particular challenges. These systems are inexpensive to produce, while the air defense systems required to intercept them are significantly more costly. This asymmetry allows non-state actors to impose financial and operational strain on state defense systems, creating strategic advantages for actors employing such systems. The use of swarm tactics involving multiple drones can overwhelm conventional air defense mechanisms, highlighting serious vulnerabilities in existing security frameworks.

## Human Rights Implications

The use of drones by non-state actors raises serious human rights concerns, particularly in relation to civilian safety and the right to privacy. Drone attacks, especially in populated areas, increase the risk of civilian casualties and damage to property, raising questions about compliance with principles such as distinction and proportionality under international humanitarian law. When non-state actors operate drones from civilian areas or target civilian infrastructure, the distinction between combatants and non-combatants becomes blurred, increasing the risk of violations of fundamental humanitarian principles.

At the same time, drones equipped with advanced surveillance capabilities enable continuous

monitoring of individuals without their knowledge or consent. This creates significant privacy concerns, as such technology can be used to track movements, gather sensitive information, and facilitate targeted attacks. The collection of personal data through drone surveillance without legal safeguards constitutes a violation of the right to privacy protected under international human rights law, including Article 12 of the Universal Declaration of Human Rights and Article 17 of the International Covenant on Civil and Political Rights.

Furthermore, the use of drones by non-state actors in conflict zones often results in displacement of civilian populations, disruption of essential services, and long-term psychological trauma. Children, women, and other vulnerable groups are disproportionately affected by such operations. The inability to hold perpetrators accountable under existing legal frameworks further compounds these human rights violations, leaving victims without adequate remedies or redress mechanisms.

**Findings**

Based on the comprehensive analysis presented, the following findings emerge from this research:

Non-state actors have developed significant and increasingly sophisticated drone capabilities across multiple conflict zones, with operational methodologies ranging from modified commercial drones to indigenously produced weaponized systems. The Islamic State, Houthi movement, and Hamas represent distinct models of drone program development, each demonstrating unique capabilities and operational approaches.

The existing international legal framework is fragmented and inadequately equipped to address non-state actor drone use. International humanitarian law provides applicable principles but leaves interpretive ambiguities. International counter-terrorism instruments do not specifically address drone-enabled terrorism. International civil aviation law under the Chicago Convention was designed for manned aviation and does not adequately address unmanned systems operated by non-state actors. Arms control regimes primarily address state-to-state transfers and do not adequately regulate commercial availability.

Critical legal gaps include the absence of a dedicated international treaty addressing drone-enabled terrorism, definitional ambiguities regarding what constitutes a drone for regulatory

purposes, complex jurisdictional challenges arising from cross-border operations, accountability deficits for non-state actors operating outside traditional state responsibility frameworks, and the fundamental dual-use dilemma that enables proliferation through commercial markets.

State responses to non-state actor drones vary significantly, with states employing counter-drone technologies, military force, and domestic legislation. The legal justifications invoked for such responses are contested, reflecting divergent interpretations of existing international law. The invocation of self-defense under Article 51 of the UN Charter to justify extraterritorial action against non-state actor drone threats remains particularly controversial.

The gap between technological capabilities and legal regulation continues to widen, creating dangerous precedents and threatening international peace and security. Without urgent legal reform, non-state actor drone use will continue to pose challenges that the existing framework cannot adequately address, potentially leading to catastrophic consequences as technology continues to advance.

**Recommendations**

Based on the findings of this research, the following recommendations are proposed:

**Development of a Dedicated International Instrument**

States should negotiate a new international convention specifically addressing the use of drones by non-state actors for terrorist purposes. Such an instrument should include a clear definition of drones for regulatory purposes, criminalization of drone-enabled terrorist acts, obligations for prevention, investigation, and prosecution, provisions for international cooperation and mutual legal assistance, and mechanisms for technical assistance to states with limited capacity. The instrument should also address issues of jurisdiction, evidence, and extradition specific to drone-related offenses.

**Strengthening Export Control Mechanisms**

Export control regimes, particularly the Missile Technology Control Regime and the Arms Trade Treaty, should be strengthened to address the commercial availability of drone components that enable non-state actor capabilities. States should adopt measures to prevent

diversion of commercial drones to non-state actors, including enhanced due diligence requirements for manufacturers and distributors, mandatory registration systems, end-user verification mechanisms, and tracking requirements for commercial drone sales.

**Clarification of Self-Defense Principles**

The international community should clarify the application of Article 51 of the UN Charter to non-state actor drone attacks. This could be achieved through a declaratory resolution of the UN General Assembly or an authoritative interpretation by the International Court of Justice. Clarification should address when non-state actor attacks constitute armed attacks triggering self-defense, the permissible scope of responses, the conditions under which action may be taken against non-state actors operating from the territory of another state, and the relationship between self-defense and the "unable or unwilling" doctrine.

**Enhanced International Cooperation Frameworks**

International cooperation should be strengthened through enhanced information sharing regarding non-state actor drone capabilities, joint counter-drone operations in appropriate circumstances, technical assistance for states developing counter-drone capabilities, capacity building for legal frameworks addressing drone-enabled terrorism, and mutual legal assistance agreements specifically addressing drone-related offenses. Regional organizations should develop cooperative frameworks tailored to their specific security contexts.

**UN Security Council Action**

The UN Security Council should adopt a resolution specifically addressing non-state actor drone use for terrorist purposes. Such a resolution should impose binding obligations on states to prevent non-state actor drone acquisition, require states to criminalize drone-enabled terrorist acts, establish reporting and verification mechanisms, authorize appropriate enforcement measures, and strengthen the counter-terrorism architecture's capacity to address emerging technological threats.

**Strengthened Accountability Mechanisms**

Accountability for violations committed through non-state actor drones should be strengthened through inclusion of drone-enabled terrorism in relevant international criminal law

instruments, development of guidance on individual criminal responsibility for drone operations, enhanced domestic prosecution frameworks, potential establishment of a dedicated accountability mechanism for drone-related violations, and support for victims' rights and remedies.

**Human Rights Integration**

Any legal framework addressing drone-enabled terrorism must integrate human rights protections, including safeguards for the right to life, prohibition of arbitrary detention, protection of privacy rights, and access to remedies for victims. Counter-terrorism measures must comply with human rights obligations and avoid creating new sources of violations.

**Conclusion**

The increasing use of drones by non-state actors represents a significant transformation in the nature of modern terrorism and poses a growing threat to international peace and security. As drone technology becomes more advanced, affordable, and accessible, its potential misuse by terrorist organizations and criminal networks is likely to expand in scale and sophistication. Future threats may include long-range attacks capable of reaching targets across continents, swarm operations that overwhelm defensive systems, and the integration of emerging technologies such as artificial intelligence that enable autonomous targeting decisions with potentially devastating consequences.

The recent escalation in drone warfare, exemplified by large-scale deployments in the Middle East and the proliferation of low-cost loitering munitions, demonstrates that drone-enabled conflict has already become a defining feature of contemporary security challenges. The thousands of drones launched across the region, the casualties inflicted, and the infrastructure destroyed represent not only a technological challenge but also a profound humanitarian concern. The economic asymmetry created by low-cost systems imposes unsustainable burdens on state defense systems while enabling non-state actors to project power with minimal risk.

In this context, the existing international legal framework remains insufficient to effectively address these evolving challenges. The absence of a dedicated treaty, jurisdictional ambiguities, accountability gaps, and the dual-use nature of drone technology all contribute to a regulatory vacuum that non-state actors can exploit. While the UN Security Council has

adopted resolutions addressing counter-terrorism, none specifically and comprehensively address drone-enabled terrorism. International aviation law, though providing some foundational principles, was not designed for unmanned systems operated by non-state actors.

There is a clear need for comprehensive legal reforms, including the development of a specific international treaty on drone-enabled terrorism, stronger regulatory mechanisms, and improved enforcement strategies. States must also strengthen domestic legislation to criminalize drone-related terrorist activities and enhance international cooperation in intelligence sharing and counter-drone operations. Furthermore, human rights protections, particularly the right to life and privacy, must be integrated into any regulatory framework to ensure that counter-terrorism measures do not themselves become sources of violations.

Strengthening global cooperation and adapting legal norms to technological advancements will be essential to mitigate future risks and ensure the protection of international security and human rights. The international community must act urgently to close the widening gap between technological capabilities and legal regulation, or risk facing increasingly devastating consequences from drone-enabled terrorism in the years ahead. The time for incremental approaches has passed; what is required is a comprehensive, coordinated, and committed international response to one of the most significant security challenges of the twenty-first century.

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