

# Sovereignty and Jurisdiction Conflicts from High-altitude Balloons under International Law

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*This scholarly investigation delves into the legal complexities arising from the People's Republic of China's high-altitude balloons entering US airspace. By analyzing landmark cases, such as the Lockerbie incident, this study emphasizes the urgent need for clear liability norms in international airspace. The 2023 Montana Incursion served to clarify the self-defense and proportionality principles under international law. This study examines the nature of these balloons to determine whether they fall under international accords such as the Chicago Convention. It also explores military classifications and legal ambiguities surrounding non-combatant operators in armed conflicts. This paper identifies gaps in the principles of privacy and ethics concerning intelligence gathering within sovereign boundaries. It advocates for new multilateral treaties with geofencing standards to regulate high-altitude unmanned aerial vehicles. This author aims to fortify legal frameworks based on technological advances.*

## Keywords

Chicago Convention, High-altitude Balloons, National Airspace  
Sovereignty, Self-defense, US–China Relations

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All the websites cited in this article were last visited on May 10, 2024.

## I. Introduction

With unprecedented transnational integration and rapid technological advancements, high-altitude balloons have become a key factor in reshaping surveillance methodologies. This evolution poses a challenge to the traditional concepts of airspace sovereignty within the realm of international law. The rise of balloon technology compelled to reassess the established norms governing territorial airspace sovereignty and jurisdictional reach under international legal principles.<sup>1</sup>

A key development highlighting this evolving scenario was reported on June 27, 2023. A BBC report disclosed incidents of the People's Republic of China (PRC)'s high-altitude balloons intruding the territorial airspaces of Japan and Taiwan, igniting global concerns about this burgeoning technology and its implications for international security and sovereignty.<sup>2</sup> This revelation marked a pivotal moment underscoring the need for a nuanced understanding of and response to technological advancements in the context of international law.

These concerns were further exacerbated by an incident that occurred on September 18, 2023. General Mark Milley, the Chairman of the US Joint Chiefs of Staff, publicly announced the interception and neutralization of a PRC high-altitude balloon that had transgressed above the US territorial airspace. General Milley emphasized that the balloon neither harvested nor transmitted intelligence data to its country of origin.<sup>3</sup> While the balloon's altitude surpassed traditional airspace boundaries, its connection with a US-based Internet service provider for navigational communication poses novel legal questions. Such incidents provoked deliberations on the adequacy of current international statutes in managing the use of a nation's telecommunications infrastructure with foreign assets in the context of high-altitude aerospace operations. This underscores the imperative for the international legal community to develop comprehensive guidelines that govern the use of transnational communication systems in the context of aerial surveillance, ensuring the clarity and security of global airspace in an era of rapid technological advancement.<sup>4</sup> This

<sup>1</sup> For comprehensive coverage on airspace sovereignty and its evolving challenges, see MALCOLM SHAW, *INTERNATIONAL LAW* 738-40 (2017).

<sup>2</sup> Gordon Corera, *New Images Show Chinese Spy Balloons over Asia*, BBC News (June 26, 2023), <https://www.bbc.com/news/world-65972168>.

<sup>3</sup> David Martin, *The Bizarre Secret behind China's Spy Balloon*, CBS News (Sept. 17, 2023), <https://www.cbsnews.com/news/the-bizarre-secret-behind-chinas-spy-balloon>.

<sup>4</sup> Courtney Kube & Carol Lee, *US Intelligence Officials Determined the Chinese Spy Balloon Used a US Internet Provider to Communicate*, NBS News (Dec. 29, 2023), <https://www.nbcnews.com/news/investigations/us-intelligence-officials->

particular event not only escalated tensions between the US and China, but also posed intricate challenges for the global juridical order: How should the international legal system adapt and regulate such disruptive surveillance modalities that pose clear threats to global security and state sovereignty?

This study aims to scrutinize those incidents meticulously; identify lacunae in existing international legal frameworks; and propose pragmatic policy recommendations. In this research, the author tries to elucidate the legal ramifications of such incidents, even in cases in which intrusive technology failed to execute its purported intelligence-gathering function. I also deliberate on prospective strategies for the governance and oversight of this emergent surveillance modality, especially in an international context that currently lacks unambiguous legal norms. This academic exercise aspires to equip the international community with the essential analytical acumen and practical modalities to address nascent challenges.

## II. The Jurisprudential Status of High-altitude Balloons in International Law

### A. Introduction to the Regulatory Framework

The legal classification of high-altitude balloons presents a complex and uncertain landscape that requires thorough academic exploration and international collaborative efforts. Despite considerable scholarly work illuminating the legal intricacies surrounding high-altitude balloons, the field remains riddled with ambiguities affecting both international and domestic legal frameworks. Scholars such as Straub, Nordlie, and Anderson have been instrumental in advocating a standardized regulatory framework, notably in their pivotal work, “A Need for Operating Standards in the Academic and Research High Altitude Balloon Community.”<sup>5</sup> This highlights the urgent need for cohesive guidelines to mitigate the risks associated with civil aviation.

In a similar context, Thomas Gangale’s exhaustive study, “How High the Sky?: The Definition and Delimitation of Outer Space and Territorial Airspace in International Law,” explores the complex definitions and delineations set by international law

determined-chinese-spy-balloon-used-us-inter-rca131150.

<sup>5</sup> Jeremy Straub et al., *A Need for Operating Standards in the Academic and Research High Altitude Balloon Community* Straub, 12(3) ISSUES AVIATION L. & POL’Y 483-504 (2013).

for “outer space” and “territorial airspace.” Gangale’s interdisciplinary approach contributes to our understanding and paves the way for refined policymaking.<sup>6</sup> Further complicating the issue, Alex S. Li’s innovative study, “Ruling Outer Space: Defining the Boundary and Determining Jurisdictional Authority,” introduces the notion of a “Transitory Outer Space Zone” situated between 80-100 km in altitude. Li suggested that this zone could act as a semi-autonomous space, provided that it respects the sovereignty of the nations below.<sup>7</sup>

## B. The Chicago Convention and its Limitations

Article 8 of the Convention on International Civil Aviation 1944 (Chicago Convention)<sup>8</sup> mandates specific authorizations for operational activities of “unmanned aerial vehicles.” This requirement reflects the Chicago Convention’s broad focus on regulating civil aviation. However, the Convention does not explicitly address the vertical boundaries of national airspace, creating a key gap in its regulatory framework.<sup>9</sup>

This omission has led to complex legal challenges, particularly in the context of emerging technologies, such as high-altitude balloons. The International Civil Aviation Organization (ICAO)’s authority under the Chicago Convention encompasses the control of civil aircraft without clear limits,<sup>10</sup> even as they operate in the upper layers of the Earth’s atmosphere. This extensive jurisdiction not only highlights the Convention’s comprehensive scope, but also points to its shortcomings in addressing the intricate legal aspects of aerospace vehicles, including “suborbital air transport vehicles.” The interpretation of the term “aircraft” in the Chicago Convention has broad implications, influencing both traditional aviation governance and the rapidly evolving sector of commercial space transportation.<sup>11</sup>

The inadequacies of the Convention become particularly apparent when addressing the discrepancies between air and space laws. These inconsistencies pose a risk to the uniformity of international legal frameworks, potentially deterring investments and hindering the growth of commercial space enterprises. Consequently, there is a

<sup>6</sup> THOMAS GANGALE, *HOW HIGH THE SKY?: THE DEFINITION AND DELIMITATION OF OUTER SPACE AND TERRITORIAL AIRSPACE IN INTERNATIONAL LAW* 246-63 & 280-90 (2018).

<sup>7</sup> Alex Li, *Ruling Outer Space: Defining the Boundary and Determining Jurisdictional Authority*, 73(4) OKLA. L. REV. 711-37 (2021).

<sup>8</sup> Convention on International Civil Aviation [hereinafter Chicago Convention] art. 8.

<sup>9</sup> S. Sreejith et al., *The Philosophy of International Aviation Law*, 33(1) IND. INT’L & COMP. L. REV. 169-90 (2023).

<sup>10</sup> UNIDO, International Civil Aviation Organization (ICAO), <https://hub.unido.org/multilateral-agencies/icao>.

<sup>11</sup> UN, UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE 39-56 (2002), <https://www.unoosa.org/pdf/publications/STSPACE11E.pdf>.

pressing need to align the laws governing commercial space transportation with the established regulations related to safety, navigation, security, and liability under air law.<sup>12</sup>

Public safety remains a central concern, both in the context of the Convention and in broader discussions on aerospace vehicle regulation. Expanding our understanding of the Chicago Convention's limitations and ICAO's role is crucial for addressing the legal challenges posed by advancements in aerospace technology. This comprehensive perspective is essential for navigating the complexities of modern aerospace development and ensuring the safety and security of airspace users.<sup>13</sup>

### C. The UN General Assembly's Principles on Remote Sensing

The Principles on Remote Sensing established by the United Nations General Assembly are pivotal in governing activities in outer space.<sup>14</sup> However, their relevance to high-altitude balloons, which operate in an ambiguous zone straddling Earth's atmosphere and outer space, remains unclear. Originally aimed at space-based remote sensing, these principles did not explicitly address the legal status of high-altitude balloons. This gap is more than a theoretical oversight. It signifies a critical void in international legal discourse, necessitating urgent scholarly and legal attention to integrate these technologies within the existing legal framework.<sup>15</sup>

The ethical and legal implications of remote-sensing technologies have evolved substantially since the 20th century. The advent of Earth observation satellites has pierced the veil of national sovereignty, allowing unprecedented transparency across borders.<sup>16</sup> This technological leap has dual implications. While promoting global cooperation and transparency, it also raises the specter of misuse, particularly in the military domain, thereby necessitating a nuanced legal framework.<sup>17</sup>

The UN General Assembly's Principles on Remote Sensing, pivotal in governing outer-space activities, currently fall short of addressing the unique position of

<sup>12</sup> Ram Jakhu, *Independent Review of the Remote Sensing Space Systems Act*, SSRN 1-19 (2017), <https://deliverypdf.ssrn.com/delivery.php?ID=449064097090117092105070008109011018105010039080036071121027097103072080096100120031029001042036049056029093068074005000123023025035039078017067078069078028085110066065086069083066127102112105074088096125016101092112069099114113085015125120065073001&EXT=pdf&INDEX=TRUE>.

<sup>13</sup> Siamak Khorram et al., *International Laws, Charters, and Policies*, in *PRINCIPLES OF APPLIED REMOTE SENSING* 261-75 (Siamak Khorram et al. eds., 2016).

<sup>14</sup> UN, *supra* note 11.

<sup>15</sup> Jakhu, *supra* note 12.

<sup>16</sup> Khorram et al., *supra* note 13.

<sup>17</sup> *Id.*

high-altitude balloons. These balloons traverse the gray area between the Earth's atmosphere and outer space, a domain that is not explicitly covered by existing principles. This oversight highlights a key gap in international law, particularly as the role of remote sensing expands to include both state and non-state actors. Addressing this requires innovative legal approaches such as the Manual on International Law Applicable to Military Uses of Outer Space (MILAMOS) to effectively govern the complexities of outer-space activities, including high-altitude balloons, and ensure comprehensive legal coverage.<sup>18</sup>

Despite its comprehensive nature, the Principles on Remote Sensing fail to address the burgeoning field of high-altitude balloons. This oversight is not an isolated lacuna, but is indicative of a broader systemic issue in international law. As remote-sensing technologies continue to evolve, there is an urgent need for an international legal framework that can be adapted simultaneously. This adaptation should address not only emerging technologies, but also the increasing involvement of various actors in remote-sensing activities, both in outer space and within the Earth's atmosphere.<sup>19</sup>

#### **D. Revisiting the Bogotá Declaration: A Jurisprudential Inquiry into Unmanned Aerial Systems and High-altitude Balloons**

The Bogotá Declaration of 1976 vividly asserts that geostationary orbits do not constitute a part of outer space and that equatorial nations claim sovereign rights over these orbits.<sup>20</sup> This stance challenges the traditional frameworks upheld by technologically advanced spacefaring countries, which are often predicated on the non-appropriation principle established by the Outer Space Treaty of 1967.<sup>21</sup> The Declaration contests the adequacy and satisfaction of existing definitions of outer space, which could otherwise be used to argue that geostationary orbits are indeed a part of outer space. These balloons, capable of operating in stratospheric altitudes proximate to the “Kármán line,” bring forth a new set of legal and ethical challenges that warrant scholarly scrutiny.<sup>22</sup>

<sup>18</sup> Ram Jakhu et al., *Conflicts in Space and the Rule of Law*, SSRN 1-23 (2016), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2722245](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2722245).

<sup>19</sup> Ram Avtar et al., *Remote Sensing for International Peace and Security: Its Role and Implications*, 13(439) REMOTE SENSING 1-29 (2021).

<sup>20</sup> Japanese Space Agency, Declaration of the First Meeting of Equatorial Countries (1976), [https://www.jaxa.jp/library/space\\_law/chapter\\_2/2-2-1-2\\_e.html](https://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html).

<sup>21</sup> UNOOSA, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies [hereinafter Outer Space Treaty], art. 2, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>.

<sup>22</sup> Anna Dubey, *Kármán Line*, ENCYCLOPEDIA BRITANNICA (Nov. 16, 2023), <https://www.britannica.com/science/Karman->

This perspective provides a crucial context for discussing the governance of airspace and near-space, particularly as high-altitude balloons and other unmanned aerial systems increasingly operate at altitudes that blur the boundaries between airspace and outer space.

In the rapidly evolving legal landscape that encompasses unmanned systems, the principles enshrined in the Bogotá Declaration call for a thorough reexamination.<sup>23</sup> Frau's ground-breaking research on the extraterritorial applicability of human rights law in unmanned military systems offers an incisive analytical framework for dissecting the jurisdictional intricacies inherent in this domain.<sup>24</sup> This seminal work challenges conventional legal paradigms and advocates a transformative approach to the legal governance of unmanned systems.<sup>25</sup>

Similarly, Vyshnovetska and Melnyk provide an in-depth exploration of the legal conundrums posed by unmanned spacecraft and drones within the existing framework of space law.<sup>26</sup> Their work not only illuminates the limitations of extant legal doctrines, but also proffers innovative pathways for legal reform, thereby enriching the discourse on the legal ambiguities that envelop high-altitude balloons.<sup>27</sup>

Furthermore, Agama's meticulous analysis of the impact of the Bogotá Declaration on the legal categorization of geostationary orbits serves as a compelling precedent for scrutinizing the legal complexities of suborbital airspace, including zones frequented by high-altitude balloons.<sup>28</sup> Agama's scholarship raises salient questions regarding the adequacy and adaptability of current international legal frameworks in accommodating the challenges brought about by technological advancements.<sup>29</sup>

In summary, although the Bogotá Declaration was initially formulated to address the specific issue of geostationary orbits, its underlying principles can serve as a useful foundation for the evolving legal discussions concerning unmanned aerial systems, such as high-altitude balloons. These principles, centered on the control and

line; Elena Cirkovic, *The Next Generation of International Law: Space, Ice, and the Cosmolegal Proposal*, 22(2) GER. L. J. 147-67 (2021); Renato Borges et al., *Altitude Control of a Remote-sensing Balloon Platform*, 110 AEROSPACE SCI. & TECH. 106500 (2021).

<sup>23</sup> *Id.*

<sup>24</sup> Robert Frau, *Unmanned Military Systems and Extraterritorial Application of Human Rights Law*, 1(1) GRONINGEN J. INT'L L. 1-18 (2013).

<sup>25</sup> *Id.*

<sup>26</sup> Vyshnovetska Svitlana & Volodymyr Melnyk, *Unmanned Spacecrafts and Space Drones as the Challenges for Space Law*, 24 PHIL. & COSMOLOGY 39-47 (2020).

<sup>27</sup> *Id.*

<sup>28</sup> Ferdinand Agama, *Effects of the Bogota Declaration on the Legal Status of Geostationary Orbit in International Space Law*, 8(1) NNAMDI AZIKIWE U. J. INT'L L. 24-34 (2017).

<sup>29</sup> *Id.*

use of natural resources and the assertion of sovereignty, can offer valuable insights into how nations might regulate and manage the deployment and operation of these modern technologies in airspace, which parallels some of the legal challenges initially contemplated for space.<sup>30</sup>

These balloons, operating near the “Kármán line,” present new legal and ethical challenges that extend beyond the Declaration’s original scope. Abovementioned researches by Frau, Vyshnovetska and Melnyk call for transformative legal governance approaches to unmanned systems and urges the integration of these principles into contemporary legal discourse. Thus, the Declaration can serve as a foundational element for developing international regulations that effectively address the nuanced challenges posed by high-altitude balloons and similar technologies.

## E. The Need for a Comprehensive International Legal Framework

The current international legal landscape, marked by outdated agreements such as the 1923 Hague Rules of Air Warfare and the ICAO’s Rules of the Air,<sup>31</sup> inadequately addresses the complexities introduced by high-altitude balloons. This oversight underscores the need for a comprehensive and dynamic legal framework that is tailored to the nuanced requirements of emerging aerospace technologies. Such a framework should ensure that the deployment of these technologies harmonizes with international security and the respect of state sovereignty. It should bridge the legal divide in existing frameworks, including the Chicago Convention and other international instruments, and provide clear guidelines for the operation and governance of advanced unmanned aerial systems in various airspace realms. This endeavor calls for a concerted international initiative, blending rigorous academic research with diplomatic efforts to establish a more cohesive and responsive legal structure for the challenges posed by these technological advancements.

In summary, existing international legal paradigms, including the Chicago Convention, the UN General Assembly’s Principles on Remote Sensing, and the Bogotá Declaration fall short of providing adequate guidance on the legal status of high-altitude balloons, a lacuna that not only demands rigorous academic scrutiny but also poses tangible risks to international security and sovereignty. This warrants not only rigorous academic inquiry but also concerted efforts from the international

<sup>30</sup> Dan John, *The Bogota Declaration and Curious Case of Geostationary Orbit*, DENV. J. INT’L L. & POL’Y (Jan. 31, 2013), <https://djilp.org/the-bogota-declaration-and-the-curious-case-of-geostationary-orbit>.

<sup>31</sup> Heinz Hanke, *The 1923 Hague Rules of Air Warfare - A Contribution to the Development of International Law Protecting Civilians from Air Attack*, 32(292) INT’L REV. RED CROSS 28-40 (1993), <https://international-review.icrc.org/sites/default/files/S0020860400071370a.pdf>.



community to construct a more robust, adaptive, and nuanced legal framework. Through such scholarly and diplomatic endeavors, we can provide a solid theoretical foundation and pragmatic policy recommendations to address this emerging challenge.

### III. Responses to High-altitude Balloons Entering Foreign Airspace: A Legal Perspective

#### A. Case Studies of High-altitude Balloons Intruding into Various Countries

1. The International Court of Justice's (ICJ) Lockerbie Case: Relevance to International Law Governing High-Altitude Balloons International Airspace<sup>32</sup>

Date: December 21, 1988

Distance from Sovereign Airspace: Not Applicable (Over Scottish Territory)

Coordinates: 55.1°N, 3.9°W

Response Measures: Legal proceedings initiated against Libya by the UK and the US.

Legal Actions: Case brought before the ICJ by Libya against the United Kingdom.

Analysis: The Lockerbie case, adjudicated by the ICJ, involved the explosion of Pan Am Flight 103 over Lockerbie, Scotland, which resulted in 270 fatalities.

While the *Lockerbie* case primarily dealt with terrorism and state responsibility, its implications extended to the broader realm of international aviation law. This case highlights the complexities involved in attributing liability and jurisdiction to the incidents occurring in international airspace.<sup>33</sup> This is particularly relevant to the governance of high-altitude balloons, which operate in a similarly complex legal environment in which national and international jurisdictions may overlap or conflict. This case serves as a cautionary tale for the potential legal ramifications of activities conducted in international airspace and emphasizes the need for a comprehensive

<sup>32</sup> Peter Bekker, *Questions of Interpretation and Application of the 1971 Montreal Convention Arising from the Aerial Incident at Lockerbie (Libyan Arab Jamahiriya v. United Kingdom) and (Libyan Arab Jamahiriya v. United States), Preliminary Objections, Judgements*, 92(3) AM. J. INT'L L. 503-8 (1998).

<sup>33</sup> Questions of Interpretation and Application of the 1971 Montreal Convention arising from the Aerial Incident at Lockerbie, Judgment, 1998 I.C.J. (Libya v. U.S.), <https://www.icj-cij.org/case/89/judgments>.

legal framework to address these challenges.

In the *Lockerbie* case, Libya's alleged involvement in the Pan Am Flight 103 explosion over Scotland in 1988 provided a crucial context for exploring the applicability of international aviation law to advanced aerial technologies such as high-altitude balloons. While primarily addressing terrorism and state accountability, the *Lockerbie* case illuminated the legal challenges in ascribing liability to international airspace - a vital consideration in high-altitude balloon governance. The overlap of national and international jurisdictions, as evidenced in the *Lockerbie* case, highlights the necessity for comprehensive international legal frameworks to regulate such technologies. This case is a pivotal reference point, underscoring the need for clear legal guidelines to manage the complex interplay of jurisdictions in incidents involving technologies traversing various sovereign spaces, akin to high-altitude balloons.

Therefore, in the *Lockerbie* case, the ICJ offers valuable insights into the intricacies of international law that could apply to the regulation of high-altitude balloons. It emphasizes the need for a comprehensive legal framework that addresses not only issues of safety and navigation, but also complex questions of jurisdiction and liability in the evolving landscape of aerospace technology.

## 2. The US: Legal and Strategic Implications of High-Altitude Balloons in Airspace

**Date:** February 3, 2023

**Coordinates:** Montana, near Malmstrom Air Force Base

**Response Measures:** Tracked and subsequently downed

**Legal Actions:** Engaged PRC officials through multiple channels

**Analysis:** The unauthorized entry of a PRC high-altitude balloon into US airspace on February 3, 2023, triggered a key re-evaluation of airspace sovereignty norms, underscoring the need to update the 1944 Chicago Convention on International Civil Aviation for contemporary aerospace challenges.<sup>34</sup>

This incident highlighted the intricate dilemma of applying traditional territorial integrity concepts to modern aerial technologies. Moreover, the subsequent US Air Force engagement, premised on counter-espionage,<sup>35</sup> raised critical questions regarding the proportionality and legality of such forceful measures in international law, thereby stirring a nuanced debate on the adequacy of existing legal frameworks

<sup>34</sup> Chicago Convention art. 8.

<sup>35</sup> War Powers Resolution 50 U.S.C. §§ 1541–1548.

for addressing the complexities posed by such technological advancements.<sup>36</sup>

Furthermore, the episode's diplomatic fallout, including the postponed US diplomatic visit to China, illustrates the delicate balance between upholding airspace sovereignty and maintaining international relations. Actually, the potential application of the Outer Space Treaty of 1967<sup>37</sup> and Federal Aviation Administration regulations (14 CFR Part 107) to high-altitude balloons,<sup>38</sup> coupled with national security concerns regarding signal intelligence, as outlined in the Joint Chiefs of Staff's Joint Publication 3-52, underscore the need for comprehensive governance frameworks for such technologies. These aspects collectively demonstrate the intricate interplay between legal, diplomatic,<sup>39</sup> and security considerations in the governance of high-altitude airspace incursions.<sup>40</sup>

### 3. Taiwan: Complexities of High-Altitude Surveillance and Sovereignty

**Date:** Early January 2024

**Coordinates:** Across Taiwan

**Response Measures:** Monitored and analyzed flight paths

**Legal Actions:** Public acknowledgment, surveillance, ongoing diplomatic assessments

**Analysis:** In early January 2024, Taiwan's detection of multiple PRC high-altitude balloons drifting over the Taiwan Strait and near its territory immediately before crucial presidential elections highlighted the intricate dynamics of aerospace surveillance and national sovereignty.

The vigilant approach of the Defense Ministry of Taiwan in tracking these balloons, which were suspected of being used for atmospheric data collection, highlights a nuanced concern regarding their possible dual-use capabilities for intelligence purposes.<sup>41</sup> This incident contributed considerably to the ongoing discourse on aerial

<sup>36</sup> United States v. Causby, 328 U.S. 256 (1946).

<sup>37</sup> Outer Space Treaty art. IV.

<sup>38</sup> Code of Federal Regulations, Part 107-Small Unmanned Aircraft Systems, <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107>.

<sup>39</sup> The US engaged with Chinese officials through diplomatic channels, consistent with Article 33 of the United Nations Charter, which encourages peaceful resolution of disputes; the US State Department also has guidelines for diplomatic engagement under the Foreign Affairs Manual, specifically 2 FAM 130.

<sup>40</sup> US Office of the Secretary of Defense, The National Security Strategy of the United States of America (Dec. 2017), <https://history.defense.gov/Portals/70/Documents/nss/NSS2017.pdf?ver=CnFwURrw09pJ0q5EogFpwg%3d%3d>.

<sup>41</sup> Matt Yu & Joseph Yeh, *Chinese Balloons Cross Over Taiwan for Second Day in a Row: Military*, FOCUS TAIWAN (Jan. 3, 2024), <https://focustaiwan.tw/cross-strait/202401030005>; Dzirhan Mahadzir, *Chinese Balloon Drifts Near Taiwan, Says Ministry of Defense*, USNI News (Dec. 8, 2023), <https://news.usni.org/2023/12/08/chinese-balloon-drifts-near-taiwan->

sovereignty, particularly regarding nonaggressive surveillance tactics and their ramifications under international law. The evolving situation around these balloon sightings raises critical questions about the applicability and adequacy of existing international legal frameworks such as the UN General Assembly's Principles on Remote Sensing and the Chicago Convention. The ambiguity over whether the flight paths of these balloons constituted a violation of Taiwanese airspace illuminates the need for clearer international norms and regulations. The Taiwan Strait, which is a geopolitically sensitive area, has become a focal point for understanding the strategic use of such surveillance technologies and their implications for regional stability and international legal interpretation.<sup>42</sup>

In addition, recent observations by Taiwan's Defense Ministry, as reported by Reuters, indicate that some balloons crossing the median line of the Taiwan Strait intensify these legal and diplomatic challenges. This development not only reflects ongoing strategic tensions, but also underscores the complexity of managing airspace incursions that fall within the gray areas of international law. Thus, the Taiwanese case serves as a crucial example of needing a more explicit and robust legal framework to govern high-altitude surveillance in sensitive geopolitical contexts, and ensure clarity and security in international relations.<sup>43</sup>

## **B. The Conundrum of International Law's Applicability in the Context of High-altitude Balloons: An Interdisciplinary Inquiry**

In 2023, a PRC high-altitude balloon trespassed into the US airspace. It highlighted the acute need for an updated international legal framework. Existing legal instruments, notably the Chicago Convention and the UN General Assembly resolutions,<sup>44</sup> provide foundational guidance, but fall short in addressing the intricate challenges posed by advanced aerial technologies. Emmanuelle Jouannet's work on international law

says-ministry-of-defense.

<sup>42</sup> Dean Chen, *Chinese Spy Balloon Fall-Out Underscores Need of Reassurances for Taiwan*, 8(4) GLOB. TAIWAN BRIEF 3-5 (2023); John Dotson, *China's Balloons over Taiwan Part of a Broader Military Reconnaissance Program*, 8(4) GLOB. TAIWAN BRIEF 5-8 (2023).

<sup>43</sup> *See Taiwan Says It Spotted More Chinese Balloons over Strait, A Day ahead of Vote*, REUTERS (Jan. 12, 2024), <https://www.reuters.com/world/asia-pacific/taiwan-says-it-spotted-more-chinese-balloons-over-strait-day-ahead-vote-2024-01-12>; *Ignoring Taiwan's Complaints, More Chinese Balloons Spotted over Strait*, REUTERS (Jan. 8, 2024), <https://www.reuters.com/world/asia-pacific/ignoring-taiwans-complaints-more-chinese-balloons-spotted-over-strait-2024-01-08>.

<sup>44</sup> The Chicago Convention established the ICAO to regulate international air transport and ensure the safety, security, and efficiency of airspace usage. While it sets standards for traditional aviation, its guidelines on emerging technologies like high-altitude balloons are less defined. Additionally, relevant UN General Assembly resolutions provide general guidance on international airspace and sovereignty, though not specifically tailored to new aerial technologies. *See* ICAO, Convention on International Civil Aviation - Doc 7300, <https://www.icao.int/publications/pages/doc7300.aspx>.

provides a vital theoretical foundation from a historical and cultural perspective.<sup>45</sup> Similarly, Anne van Aaken's empirical studies underscore the importance of international law in preventing global crises and resolving cooperative conflicts.<sup>46</sup>

This incident exemplifies the dualistic nature of international law - both regulatory and interventionist - as delineated by legal frameworks, such as the Tallinn Manual on Cyber Warfare, which provides guidelines for cyber conflicts, including *jus ad bellum*, International Humanitarian Law (IHL), and neutrality law.<sup>47</sup> Meanwhile, the scholarship of Mónika Ambrus and Ramses Wessel on the concept of "temporariness in international law" emphasizes the necessity for legal structures that are adaptable yet predictable.<sup>48</sup> These aspects are particularly relevant to the unpredictable challenges posed by high-altitude balloons. The evolution of international law in regulating state relationships and intervening in global welfare reflects the dynamic shifts in global politics after the Colonial and Cold War era.<sup>49</sup>

## C. The Legal Quagmire Surrounding High-altitude Balloons: A Call for Definitional Clarity and Updated International Norms

### 1. The Definitional Dilemma and Its Legal Implications

The lack of a globally recognized definition of high-altitude balloons constitutes a major hindrance to establishing effective governance structures and achieving legal precision. This definitional ambiguity is not merely a theoretical issue but also has real-world implications, as evidenced by recent incidents involving such balloons in the US and Japan.<sup>50</sup> Bin Cheng in his work - "International Law and High Altitude Flights: Balloons, Rockets, and Man-made Satellites," also highlights the complexities arising from this lack of a clear definition.<sup>51</sup> His research underscores the urgent need for international consensus to mitigate the legal challenges posed by these balloons.

<sup>45</sup> Emmanuelle Jouanet, *International Law as an Instrument of Regulation and Social Intervention*, in A SHORT INTRODUCTION TO INTERNATIONAL LAW 64-113 (Christopher Sutcliffe trans., 2014).

<sup>46</sup> Anne Aaken, *Is International Law Conducive to Preventing Looming Disasters?*, 7(S1) GLOB. POL'Y 81-96 (2016).

<sup>47</sup> TALLINN MANUAL ON THE INTERNATIONAL LAW APPLICABLE TO CYBER WARFARE 1-256 (Michael Schmitt eds., 2013).

<sup>48</sup> Mónika Ambrus & Ramses Wessel, *Between Pragmatism and Predictability: Temporariness in International Law*, 45 NETH. Y.B. INT'L L. 3-17 (2014); Kristen Eichensehr, *Review of The Tallinn Manual on the International Law Applicable to Cyber Warfare* (Michael N. Schmitt ed., 2013), 108 AM. J. INT'L L. 585-9 (2014).

<sup>49</sup> Antony Anghie, *The Evolution of International Law: Colonial and Postcolonial Realities*, 27(5) THIRD WORLD Q. 739-53 (2006).

<sup>50</sup> Chicago Convention art. 1; UN Charter art. 33.

<sup>51</sup> Bin Cheng, *International Law and High Altitude Flights: Balloons, Rockets, and Man-made Satellites*, 6(3) INT'L & COMPAR. L. Q. 487-505 (1957).

## 2. The Inadequacy of Existing Legal Frameworks

As the Bogotá Declaration does not offer a comprehensive legal framework,<sup>52</sup> Bin Cheng further elaborated on this limitation, emphasizing that the Declaration's focus on outer-space objects leaves a key gap for high-altitude balloons.<sup>53</sup> This gap is particularly concerning, given the increasing commercial and military applications of these balloons. The Bogotá Declaration must be thus revisited and revised to include these emerging technologies.<sup>54</sup>

## 3. Sovereignty, Jurisdiction, and the Need for Legal Clarity

The lack of a universally accepted definition for high-altitude balloons complicates matters of sovereignty and jurisdiction. Nations have a sovereign right to control their airspace, as enshrined in various international agreements and domestic laws. However, the ambiguous status of high-altitude balloons has led to legal dilemmas. If a balloon drifts into another country's airspace without explicit permission, for example, is it an infringement of that country's sovereignty? Bin Cheng argues that this ambiguity could lead to diplomatic tensions or even conflicts, making it imperative to establish clear legal guidelines.<sup>55</sup>

## 4. Toward a New Legal Framework

Given the limitations of existing frameworks, such as the Bogotá Declaration, there is an urgent need for new collective legal agreements that specifically address the definitional and governance challenges associated with high-altitude balloons.<sup>56</sup> International cooperation is crucial in this regard because those balloons often cross international boundaries. A multilateral treaty or set of international guidelines could serve as a robust framework for governance. Such a framework can delineate the rights and responsibilities of a political entity and provide dispute-resolution mechanisms, thereby contributing to global stability.

## 5. Future Directions: Updating Outdated Norms

As the technology surrounding high-altitude balloons continues to evolve, so does the governance structure. The Outer Space Treaty 1967 served as a starting point for crafting new rules, although considerable updates are required to address the unique

<sup>52</sup> Bogota Declaration art. 5.

<sup>53</sup> Cheng, *supra* note 51.

<sup>54</sup> Marina Lits et al., *International Space Law*, 4(2) BRICS L. J. 135-55 (2017); Cheng, *supra* note 51.

<sup>55</sup> Cheng, *supra* note 51.

<sup>56</sup> *Id.*

challenges that these balloons present.<sup>57</sup> Matjaz Nahtigal emphasizes the necessity of reforming the Outer Space Treaty to ensure the long-term sustainability of space exploration, advocating for regulations governing activities in the stratosphere and beyond.<sup>58</sup> However, international consensus is challenging yet essential. Jack Wright Nelson and Danylo Stonis highlight the interactional dynamics and ambiguities in space law that could lead to the weaponization of space, underscoring the urgent need for clear legal frameworks.<sup>59</sup> Melissa De Zwart and Dale Stephens discuss the inevitable link between military technology and innovation, stressing its role in maintaining space security.<sup>60</sup> This collective discourse suggests that international collaboration and transparent legal reforms are crucial for the peaceful use and sustainable development of outer space, advocating for updated legal frameworks to include emerging technologies like high-altitude balloons to prevent potential conflicts and ensure global space governance progress.

## D. The Complexities of Exercising Self-Defense Rights in the Context of High-Altitude Balloons: A Multifaceted Legal Inquiry

### 1. The Right to Self-Defense and Its Legal Underpinnings

As enshrined in Article 51 of the United Nations Charter, the right to self-defense furnishes states with the legal underpinnings required to undertake measures essential for safeguarding their sovereignty.<sup>61</sup> Although this right is the cornerstone of international law, its application to high-altitude balloons introduces a host of legal and ethical dilemmas. Thomas Prehi Botchway introduced the complexities involved in exercising self-defense rights.<sup>62</sup>

<sup>57</sup> Outer Space Treaty arts. II, VI, VII & IX (potential applicability to high-altitude balloons with clarifications on airspace delimitation, liability, supervision, damage scope/procedures, and environmental protection standards).

<sup>58</sup> Matjaz Nahtigal, *Outer Space Treaty Reform and the Long-Term Sustainability of Space Exploration*, 9 TEORIJA IN PRAKSA 42-59 (2022).

<sup>59</sup> Jack Nelson, *An Interactional Analysis of Efforts to Expand the Space Regime* 6-100 (Graduate Thesis, Institute of Air and Space Law, McGill University, 2022), <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjtu4q9tYKGAxU0k68BHXyaBQYQFnoECBwQAQ&url=https%3A%2F%2Fescholarship.mcgill.ca%2Fdownloads%2Fcr56n638p&usg=AOvVaw2Mg0GjxMtQjbjFBFvTpGT&opi=89978449>; Danylo Stonis, *Ambiguities in Space Law as Path towards Weaponization of Space: The Case of the Outer Space Treaty. Remarks on Regulation of Weaponization of Outer Space by Space Law*, 1(4) COPERNICUS POL. & LEGAL STUD. 74-84 (2022).

<sup>60</sup> Melissa Zwart & Dale Stephens, *The Space (Innovation) Race: The Inevitable Relationship Between Military Technology and Innovation*, 20(1) MELB. J. INT'L L. 1-28 (2019).

<sup>61</sup> UN Charter art. 51.

<sup>62</sup> Thomas Botchway, *International Law, Sovereignty and the Responsibility to Protect: An Overview*, 11(4) J. POL. & L. 40-50 (2018).

The concept of self-defense is deeply rooted in the principles of state sovereignty and territorial integrity. However, the advent of high-altitude balloons as tools for surveillance, data collection, and potential military applications poses new challenges to this well-established legal norm. Absent a universally accepted definition for high-altitude balloons, this matter is further complicated, as it blurs the lines between what constitutes an infringement of airspace and what does not. This lack of clarity could lead to unintended escalations, as states may interpret the intrusion of such balloons into their airspaces as a hostile act, thereby invoking their right to self-defense.

Legal complexities are further exacerbated by rapid advancements in balloon technology, which enables these devices to operate at altitudes previously unreachable. This technological leap has outpaced the development of international legal frameworks and created a regulatory vacuum. Botchway's work is particularly illuminating in this context as it delves into the intricate relationship between international law and state sovereignty, providing valuable insights into how the principle of self-defense can be adapted to accommodate these new technological realities.<sup>63</sup>

## 2. The Legal Landscape: A Call for Multi-stakeholder Dialogue

Given the intricate legal landscape surrounding high-altitude balloons, there is an urgent need for multi-stakeholder dialogue and cooperation. This is further emphasized by Mara Tignino and Christian Bréthaut's analysis of six landmark cases submitted to international courts and arbitration tribunals.<sup>64</sup> Their work elucidated various aspects of the principle of not causing significant harm and advocated a preventive perspective by adopting appropriate measures to mitigate risks.

The principle of not causing significant harm is a cornerstone of international environmental law which has been applied in various contexts ranging from transboundary water disputes to air pollution. However, their application in high-altitude balloons is still in its infancy. The lack of a comprehensive legal framework governing these devices means that states are often left to their own devices concerning regulating their use and mitigating potential harm. This regulatory gap is not merely a theoretical concern but also has real-world implications, as evidenced by recent incidents involving high-altitude balloons that have led to diplomatic tensions.<sup>65</sup>

The work of Tignino and Bréthaut serves as a timely reminder of needing a

<sup>63</sup> *Id.*

<sup>64</sup> Mara Tignino & Christian Bréthaut, *The Role of International Case Law in Implementing the Obligation not to Cause Significant Harm*, 20 INT'L ENVTL AGREEMENTS: POL. L. & ECON. 631-48 (2020).

<sup>65</sup> *Id.*



preventive approach to legal governance. They argue that the principle of not causing significant harm could serve as the foundational element of a new international legal framework governing high-altitude balloons. Such a framework would require states to take proactive measures to mitigate the risks associated with the use of these devices, including the development of technical standards and establishment of monitoring and enforcement mechanisms.<sup>66</sup>

### 3. Overcoming Sovereignty Barriers for Effective Governance

The challenges in implementing space traffic management systems, as discussed by Ruth E. Stilwell, Diane Howard, and Sven Kaltenhäuser are particularly relevant.<sup>67</sup> They focused on legal, policy, and technical obstacles, particularly on how to overcome sovereignty barriers to establish and implement global space safety services. Their study is directly applicable to the governance challenges posed by high-altitude balloons, which often cross international boundaries and raise questions about sovereignty.<sup>68</sup>

The issue of sovereignty is recurring while discussing the governance of high-altitude balloons. Given that these devices are capable of traversing large distances and international boundaries, they pose unique challenges to the traditional notions of state sovereignty. The work of Stilwell, Howard, and Kaltenhäuser is particularly relevant in this context as it explores the various barriers to establishing effective governance mechanisms in the realm of space traffic management.<sup>69</sup> Their research highlighted the international cooperation and the development of common standards to overcome these barriers.

However, it is easier to achieve such cooperation because the principle of state sovereignty is a key obstacle in establishing a unified governance framework. States are often reluctant to cede control over their airspace to international bodies, fearing that this may compromise their national security. This reluctance is compounded by the lack of a universally accepted definition of high-altitude balloons, which creates ambiguity regarding their legal status.<sup>70</sup>

### 4. The Ontological Challenges and the Cosmo-legal Proposal

Elena Cirkovic introduces a ground-breaking perspective by challenging the

<sup>66</sup> *Id.*

<sup>67</sup> Ruth Stilwell et al., *Overcoming Sovereignty for Space Traffic Management*, 7(2) J. SPACE SAFETY ENG'G 158-61 (2020).

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

distinctions between human-made and non-human “laws.”<sup>71</sup> She argues for a cosmo-legal proposal that emphasizes interdisciplinary and ontological pluralism. This approach offers innovative ways to address the international legal challenges caused by environmental degradation, including those related to high-altitude balloons.<sup>72</sup>

Traditional distinctions between positive (human-made) and natural laws have long served as the foundation of legal thought. However, Cirkovic challenges these distinctions, arguing for rather a nuanced understanding of law that incorporates various ontological perspectives. This cosmo-legal proposal is particularly relevant in the context of high-altitude balloons, as it offers a new framework for understanding the complex interplay between technology, law, and society.<sup>73</sup>

Cirkovic suggested an interdisciplinary approach to legal governance. The challenges posed by high-altitude balloons are not merely legal or technical in nature, but are deeply rooted in broader ontological and epistemological questions. Any attempt to develop a comprehensive legal framework governing these devices must consider a wide range of perspectives, from the natural sciences to the social sciences and humanities.<sup>74</sup>

#### IV. The Significance of Determining the Status of High-altitude Balloons

Understanding the legal status of high-altitude balloons is crucial, particularly as they operate in the Earth’s atmosphere between 20 km and 100 km in altitude. This area intersects various scientific disciplines including atmospheric science, environmental science, biological science, and physics. Despite its complexity, the development and utilization of near-space lag significantly behind those of traditional airspace and satellite orbit spaces.<sup>75</sup> This is partly due to the limitations of traditional aircraft and satellites, which find it challenging to effectively monitor this region.<sup>76</sup> This area

<sup>71</sup> Cirkovic, *supra* note 22.

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> *Id.*

<sup>75</sup> Zhanchao Wang et al., *High-Altitude Balloon-Based Sensor System Design and Implementation*, 20(7) SENSORS 4080 (2020).

<sup>76</sup> Yueneng Yang et al., *Dynamics Modeling and Maneuverability Analysis of a Near-Space Earth Observation Platform* 223-6 (5th International Conference on Recent Advances in Space Technologies - RAST2011 Proc., 2011); Zou Fang, *TDRS Based Navigation System for Flight Vehicles in Near Space* 1-4 (IEEE International Conference on Signal

intersects various scientific disciplines including atmospheric science,<sup>77</sup> environmental science,<sup>78</sup> biological science, and physics.<sup>79</sup> Despite its complexity, the development and utilization of near-space lag significantly behind those of traditional airspace and satellite orbit spaces.<sup>80</sup> This is partly due to the limitations of traditional aircraft, which struggle to reach these high-altitude balloons as vehicles for near-space exploration and offer several advantages that underscore the need for a clear legal framework.

First, these balloons can sustain low-cost flights for extended periods ranging from months to years. This long endurance allows for comprehensive and continuous regional observation and detection, and is not easily matched by other aerial vehicles.<sup>81</sup> Second, compared to satellites, high-altitude balloons can carry heavier payloads, thereby enhancing the accuracy and range of observations. For instance, the spatial resolution and signal strength of optical observation equipment can be significantly improved in near space.<sup>82</sup> Finally, the payloads deployed in near space via high-altitude balloons can be recovered at a low cost with minimal risk, a feat that is challenging for satellites to accomplish.<sup>83</sup>

Given their unique capabilities, the legal status of high-altitude balloons remains a pressing issue. Their operations in near space raise questions about sovereignty, jurisdiction, and the application of existing international laws designed for traditional airspace and outer space. Therefore, a comprehensive legal framework is urgently needed to govern the use of high-altitude balloons, considering their potential for

Processing, Communications and Computing Proc., 2011).

- <sup>77</sup> Weiwei He et al., *The Near-Space Wind and Temperature Sensing Interferometer: Forward Model and Measurement Simulation*, 11(4) REMOTE SENSING 914 (2019).
- <sup>78</sup> Zhanchao Wang et al., *Near-Space Wide-Area and High-Resolution Imaging System Design and Implementation*, 23(14) SENSORS 6454 (2023).
- <sup>79</sup> KEY BASIC SCIENTIFIC PROBLEMS ON NEAR-SPACE VEHICLES 1-119 (Shanyi Du eds., 2023).
- <sup>80</sup> *Id.* at 1-23. See also Yanqiu Wang et al., *Balloon-based Exposed Payload Designed for Astrobiological Research in Earth's Near Space*, Preprints.org (May 23, 2023), at 1-12, <https://www.preprints.org/manuscript/202305.1629/v1>. Balloon-based balloon platforms (such as CAS-BAP) spearheaded by the Chinese Academy of Sciences, are used for astrobiological research in Earth's near space, enabling scientific fields to offer advantages over traditional aircraft exploration.
- <sup>81</sup> Yuan Hu et al., *Environmental Adaptability Analysis of Near Space Laser Communication Optical System* 331-3 (INTERNATIONAL CONFERENCE ON OPTOELECTRONICS AND MICROELECTRONICS PROC., 2012).
- <sup>82</sup> Hu Shi-guo et al., *A New Optimal Guidance Law for Near Space Hypersonic Vehicle Based on Markov Jump Linear System* 478-82 (Chinese Control and Decision Conference Proc., 2011).
- <sup>83</sup> Saeed Alsamhi et al., *Performance Evaluation of Broadband Service Delivery Via Tethered Balloon Technology* 133-8 (11TH INTERNATIONAL CONFERENCE ON INDUSTRIAL AND INFORMATION SYSTEMS PROC., 2016); Joseph Shaw et al., *Multispectral Imaging Systems on Tethered Balloons for Optical Remote Sensing Education and Research*, 6 J. APPLIED REMOTE SENSING 063613 (2012); D. Thompson et al., *Gamma-ray Large-Area Space Telescope (GLAST) Balloon Flight Engineering Model: Overview*, 49(4) IEEE TRANSACTIONS NUCLEAR SCI. 1898-1903 (2002).

both civilian and military applications.<sup>84</sup>

### A. The Nature of High-altitude Balloons: A Balloon or a System?

Whether high-altitude balloons are merely balloons or should be considered as a system is a pivotal question on their legal classification under international law. If considered mere balloons, they may fall under the category of civil aircraft. If classified a system, they are categorized into state aircraft, especially when used for governmental non-commercial purposes, such as intelligence gathering.<sup>85</sup>

The term ‘system’ denotes more than mere buoyancy; it encompasses the advanced functionalities facilitated by modern technologies. High-altitude balloons are equipped with advanced technologies for various purposes including weather monitoring, scientific experiments, and intelligence gathering. They can carry payloads including sophisticated cameras, sensors, and communication devices.<sup>86</sup> Given that stratospheric balloons possess more advanced capabilities than traditional balloons, classifying them simply as ‘balloons’ no longer accurately reflects their nature. Their functions have expanded into the domains traditionally occupied by satellites and aircraft, such as intelligence gathering, communication relay, and environmental monitoring.<sup>87</sup> Therefore, from a legal perspective, stratospheric balloons, especially those equipped with task-specific technologies, should be considered complex “aviation systems” rather than mere ‘balloons.’ This classification aligns with their advanced capabilities and clarifies their legal rights and responsibilities under international aviation conventions.

### B. The Military Aspect: Auxiliary or Combatant?

The military classification of high-altitude balloons is complex. It necessitates a nuanced understanding of terms like ‘auxiliary’ and ‘combatant’ as defined under international humanitarian law. If these balloons are considered non-military

<sup>84</sup> Weiyi Chen et al., *Integration of Space and Ground Collaboration Based on Near Space Platform* 596-602 (8th International Conference on Mechanical and Aerospace Engineering Proc., 2017).

<sup>85</sup> Wolff Heinegg, *Balloons are Not Always Joyful: The Legality of Downing the Chinese Spy Balloon*, Lieber Institute West Point (Mar. 10, 2023), <https://lieber.westpoint.edu/balloons-are-not-always-joyful-legality-downing-chinese-spy-balloon>.

<sup>86</sup> Wilson Vogt et al., *Altitude Control System for High Altitude Helium Weather Balloons 1* (ACADEMIC HIGH ALTITUDE CONFERENCE PROC., 2022); Alistair Chan et al., *High Altitude Payload Structures and Related Methods*, U.S. Patent No. 8,985,477 B2 (Mar. 24, 2015), <https://patentimages.storage.googleapis.com/47/d5/e4/f73815317cb677/US8985477.pdf>.

<sup>87</sup> Courtney Albon, *Why Stratospheric Balloons are Used in Era of Space-based Intelligence*, C4ISRNET (Feb. 6, 2023), <https://www.c4isrnet.com/battlefield-tech/space/2023/02/06/how-stratospheric-balloons-could-complement-space-based-intelligence>.

aircraft, they may be viewed as auxiliary vehicles that lack combat rights. However, their sophisticated capabilities blur these distinctions. If classified as combatants, international humanitarian law principles such as distinction and proportionality would need to be observed in their deployment and targeting. For instance, they can only be directed at military objectives, and the collateral damage must not be excessive relative to the military advantage gained. A new treaty may be warranted to provide a tailored legal framework for military high-altitude balloons, considering their unique characteristics compared to those of traditional aerial vehicles. At a minimum, existing laws on armed conflict should be updated to address these new technologies.<sup>88</sup>

In practice, high-altitude balloons are used in various military applications, including surveillance and intelligence gathering. Their long endurance and ability to carry heavy payloads render them suitable for these roles. However, its use in combat scenarios remains debatable. Under international humanitarian law, the classification of balloons as either auxiliary or combatant has implications for their lawful use in conflict zones. If classified as combatants, they can be legally targeted by enemy forces. Conversely, if considered auxiliary, they may enjoy certain protections but would be restricted from participating in hostilities. Therefore, a clear legal framework is required to address the military classification of high-altitude balloons and to ensure that they are used in compliance with international law.<sup>89</sup>

### C. The Status of Non-military Operators

The status of non-military operators of high-altitude balloons during armed conflicts is a complex issue governed. Additional Protocol I to the Geneva Conventions<sup>90</sup> provides that civilians who do not take a direct part in hostilities are protected persons and should not be made the object of attack. However, similar actions by civilians on land could constitute direct participation in hostilities, making them liable for prosecution without the protection accorded to war prisoners.<sup>91</sup>

This legal inconsistency raises questions about the status of non-military operators, particularly when the balloons are used for such activities as intelligence

<sup>88</sup> US Defense Technical Information Center, Unmanned Systems Integrated Roadmap 2017-2042, <https://apps.dtic.mil/sti/citations/AD1059546>.

<sup>89</sup> Classifying high-altitude balloons under IHL (e.g., as combatants or auxiliaries) is complex due to their dual-use nature and remote operation. *See* Geneva Conventions and Additional Protocols I-III (addressing distinction, proportionality, and precautions in attack). Further analysis is needed to ensure compliance with IHL regarding targeting, responsibility, and accountability.

<sup>90</sup> Additional Protocol I to the Geneva Conventions art. 47.

<sup>91</sup> *Id.*

gathering, which could be interpreted as “direct participation in hostilities”<sup>92</sup> under IHL. Given the existing ambiguities in international law, it is crucial to clearly define the legal status of non-military operators. Future legal scholarship and international negotiations should try to clarify these ambiguities and ensure that operators are fully aware of their rights and responsibilities.

## D. Is Intelligence Gathering Sovereign Violation? A Multidimensional Analysis

The recent incident involving the PRC reconnaissance balloons flying over the US airspace has exposed key gaps in the American aerial threat detection capabilities. As articulated by Glen VanHerck, Commander of the North American Aerospace Defense Command, this incident accelerated the development of new surveillance technologies.<sup>93</sup> Despite the radar capabilities that could detect balloons, the data were filtered out, highlighting a critical vulnerability.

The incident not only intensified Sino-American tensions, but also re-evaluated existing technologies and strategies. One year after the high-altitude balloon incident, the US’s efforts to address such events remain inadequate. While the Department of State urges international cooperation, NORAD Commander VanHerck acknowledges the US’s limitations in detecting and responding to balloons. Despite no further intrusions, PRC’s balloon program continues, possibly shifting focus to the Western Pacific. As the Biden administration attempts to downplay the incident and improve the US-China relations, the lack of a comprehensive legal framework and the ongoing surveillance activities underscore the urgent need for multilateral treaties and norms governing high-altitude balloons to ensure the safety and stability of the aerospace domain.<sup>94</sup>

The reconnaissance balloons case serves as a case study for examining the limitations

<sup>92</sup> Direct Participation in Hostilities (DPH) refers to acts of individuals who directly engage in hostilities during an armed conflict. Defining DPH can be complex, especially with the evolving nature of warfare and the increasing use of technology like drones and cyberwarfare. See ICRC IHL Database, Convention (IV) relative to the Protection of Civilian Persons in Time of War, <https://ihl-databases.icrc.org/en/ihl-treaties/gciv-1949>; CUSTOMARY INTERNATIONAL HUMANITARIAN LAW, Rule 137 (J.-M. Henckaerts & L. Doswald-Beck eds., 2005); TALLINN MANUAL, *supra* note 47, at 90-182.

<sup>93</sup> Patrick Smith, *Chinese Spy Balloon Exposed Gaps in US Ability to Detect Threats, NORAD Commander Says*, NBC NEWS (July 21, 2023), <https://www.nbcnews.com/news/us-news/chinese-spy-surveillance-balloon-flaws-threat-detection-norad-defense-rcna95094>.

<sup>94</sup> Courtney Kube & Carol Lee, *The Secret U.S. Effort to Track, Hide and Surveil the Chinese Spy Balloon*, NBC NEWS (Dec. 23, 2023), <https://www.nbcnews.com/news/investigations/secret-us-effort-track-hide-surveil-chinese-spy-balloon-rcna130991>.

and potential overreach of surveillance technologies,<sup>95</sup> as well as the challenges posed by nontraditional forms of espionage.<sup>96</sup> In this regard, multidimensional analysis is essential, focusing on both technological capabilities and the legal constraints of using high-altitude balloons for intelligence gathering, as well as their ethical and geopolitical implications.

## V. Conclusion

The recent case of the PRC's high-altitude reconnaissance balloons underscores the urgent need for a comprehensive legal framework.<sup>97</sup> This study has delved into the complexities surrounding the legal status of high-altitude balloons, drawing on case studies such as the 1988 bombing of Pan Am Flight 103 in Lockerbie, Scotland. While this case primarily focused on terrorism and state responsibility, its legal implications offer valuable lessons for addressing the challenges posed by disruptive technologies such as high-altitude balloons.

The Chicago Convention is not sufficient to address the unique challenges posed by these technologies.<sup>98</sup> The absence of a precise legal definition of high-altitude balloons exacerbates the ambiguities surrounding sovereignty and jurisdiction. The author argues that there is an urgent need for new multilateral treaties or amendments to existing conventions to provide a robust legal framework.<sup>99</sup> The recent incident has raised questions about the sovereignty of airspace and the legality of responses deemed "proportional" under specific provisions of Article 51 of the UN Charter and the United States War Powers Resolution.<sup>100</sup>

<sup>95</sup> Amanda Holpuch, *A Brief History of Spying with Balloons*, N.Y. TIMES (Feb. 3, 2023), <https://www.nytimes.com/2023/02/03/us/spy-balloon-history.html>; Hanyu Hong et al., *A Real-Time Critical Part Detection for The Blurred Image of Infrared Reconnaissance Balloon with Boundary Curvature Feature Analysis*, 18(3) J. REAL-TIME IMAGE PROCESSING 619-34 (2021).

<sup>96</sup> See generally DANIEL HARMON, 21ST-CENTURY SURVEILLANCE TECHNOLOGIES 1-112 (2017).

<sup>97</sup> U.N. Charter art. 2(4).

<sup>98</sup> Chicago Convention art. 3 *bis*. See Kenneth Watkin, *Warriors Without Rights? Combatants, Unprivileged Belligerents, and the Struggle Over Legitimacy* 4-72 (Program on Humanitarian Policy and Conflict Research, Harvard University Occasional Paper Series No. 2, Winter 2005), <https://www.hpcrresearch.org/sites/default/files/publications/OccasionalPaper2.pdf>.

<sup>99</sup> UNOOSA, *The Principles on Remote Sensing*, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/remotesensing-principles.html>.

<sup>100</sup> UN Charter art. 51. This article outlines the inherent right of self-defense, permitting states to take military action in response to an armed attack or an imminent threat; Congressional Research Service, *The War Powers Resolution: Concepts and Practice* (2019), at 70, <https://crsreports.congress.gov/product/pdf/R/R42699>. This document examines

The military applications of high-altitude balloons introduce another layer of complexity.<sup>101</sup> Their classification as auxiliary or combatant has the key implications under international law, particularly in the context of armed conflicts. This study calls for a comprehensive legal framework that clearly delineates the rights and duties of the parties in such a scenario.<sup>102</sup> The involvement of non-State actors in the operation of high-altitude balloons will complicate legal frameworks further.<sup>103</sup>

The regulation of high-altitude balloons requires an interdisciplinary approach that incorporates insights from aerospace engineering, international relations, and ethical considerations.<sup>104</sup> Technical safeguards such as geofencing technologies can serve as complementary measures to legal frameworks. The author would contend that the governance of disruptive technologies, such as high-altitude balloons, requires not only reactive legal adjustments, but also proactive international cooperation.<sup>105</sup> As a consequence, this study argues that the governance of disruptive technologies, such as high-altitude balloons, requires not only legal responsibility, but also a degree of foresight and ethical consideration that current legal frameworks may not fully encompass.<sup>106</sup>

Received: March 1, 2024

Modified: April 1, 2024

Accepted: May 1, 2024

the concept of proportionality in the context of the 1988 Persian Gulf incident, offering insights into the application of this principle in situations involving the use of force.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> Bogota Declaration art. 5.

<sup>105</sup> UNOOSA, *supra* note 99.

<sup>106</sup> Bogota Declaration art. 5.