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THE DELIMITATION OF AIR AND SPACE IN THE CONTEXT OF AEROSPACE VEHICLES AND THE USE OF FORCE

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Abstract

Since the beginning of the space era, there has been ongoing disagreement on the boundaries of airspace and outer space. The boundary between their different legal systems will be put to the test as hybrid aerospace vehicles that can move between the two zones and operate in them are developed. And this test might not involve a discussion of appropriate culpability regimes in a courtroom after the fact, but rather a decision made in real time in a military operations center on whether to shoot down an aerospace vehicle that has violated a country's airspace.One recent instance of the sensitivity surrounding violations of territorial integrity is the shooting down of a Russian bomber by Turkish fighters. In the absence of a consensus among the states over the legal framework guiding the transfer from the atmosphere to space, this article examines the applicable legislation. This article examines delimitation via the prism of the potential use of force and state security interests, whereas previous works have done so from the premise of liability, air and space traffic management, or other views. It starts by dissecting air and space into their fundamental, or black-and-white, components, paying close attention to their legal frameworks and the distinction between government- and privately-owned vehicles. It then uses a conservative (or positivist) perspective and a commensurability analysis to look at the space between the two regimes. These methods of analysis show that, from a use of force and security standpoint, the lowest satellite orbit should be regarded as the legal threshold between the airspace and outer space regimes within the current legal framework.

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Introduction

This article examines the implications of flying vehicles operating in controlled, intentional manners in both airspace and outer space, focusing on the potential use of force by states against such vehicles. The author argues that the current legal structure for such vehicles should be viewed as an airspace regime for operations below low orbit, triggering the rules of state territorial sovereignty. Overflight by such vehicles is considered a violation of territorial integrity, potentially leading to actions under international law, including force. The potential for force is even greater for overflight by state or military vehicles, which enjoy more limited rights of passage under an airspace regime. The author argues that the assertion that airspace is the appropriate regime is principally one by default. The author argues that outer space law is a specific and limited deviation from the baseline position that states can assert rights of territorial sovereignty as high as possible. If an area cannot be considered "outer space," it must be considered part of the default, or baseline: sovereign airspace. The work is divided into three substantive chapters, focusing on the baselines and defaults that should guide state actions, with a focus on a known, primary concern for states: their sovereignty and national security.

A Framework For Analysis: Aerospace Vehicles And The Use Of Force

Aerospace Vehicles And Possible Applications

This chapter discusses the nature of airspace vehicles, their use of force, and the analytical framework used to demonstrate the central thesis that the zone encompassing the unclear upper edge of airspace and the unclear lower edge of outer space should be considered an airspace regime, particularly in relation to the use of force against vehicles operating in this zone.

Aerospace vehicles have been considered a potential reality since the 1950s, with the U.S. Space Shuttle being the first to take flight in 1981. Spaceplanes that can execute single-stage take-offs more like a traditional airplane are also being pursued, though with far less success to date.[1] The current U.S. Air Force X-37B, presently a remotely piloted vehicle, operates in a similar fashion to the Space Shuttle, with an initial rocket launch, independent operation, and then glide return to Earth. However, if combined with a propulsion system such as the SABRE (Synergetic Air-

[1] Section II.D.2 infra for more discussion of this term.

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Breathing Rocket Engine), currently being designed and tested by Reaction Engines, Ltd., the stage could be set for a truly full-functional hybrid aerospace vehicle, transcending the traditional definitions of airplane and space-rocket.

The potential applications of this new technology are nearly limitless, with the focus currently on suborbital tourism and adventure, but the opportunities for travel, scientific research, telecommunications, or a host of other applications abound. However, this potential is not without concerns—particularly when governments (and frequently the military departments of governments) are executing the operations. Distrust of other states is simply a part of world affairs. One contemporary example of this is the X-37B experimental spaceplane discussed above. Swiss Space Systems (S3), and a number of other companies are developing similar vehicles that can operate in both air and space for commercial (or government) reasons. This technology is not exclusive to the United States or to military research.

Two scenarios demonstrate the potential points of contention for actions conducted in aerospace based on emerging technologies. First, the armed military aircraft vehicles may conduct provocative territory invasions on purpose. Such activities would constitute deliberate, provocative acts, presumably as an extension of state foreign policy goals. Such actions occur in the current state of international affairs. For instance, the Russian military has frequently tested the boundaries of North Atlantic Treaty Organization (NATO) member-nation airspace, seeming to gauge the response (both tactical and political) and to make a political statement. Counter to this, the United States has a policy to test claims of territory beyond the perceived limits of international law. The tension between assertions of sovereignty and those eager to test it can have dangerous results.

In the above scenarios, if the aerospace vehicles are state—and particularly military—craft, the key factors in determining whether the use of force may be acceptable are the questions of where the vehicles are operating and whether the vehicles are encroaching on sovereign territory.[2] If aerospace vehicles are operating in a state's sovereign territory, force may be an option to remedy the violation. Second, whether the craft in question is a civil or state vehicle will also affect the use of force analysis.[3]

[2] Roy Houchin, Us Hypersonic Research And Development
[3] SPACE SECURITY INDEX 2011

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The Analytic Lens And The Application Of Force

This argument analyzes the potential for force using a rubric. It's not a study of the law of war or armed conflict, but rather uses existing law of war principles to develop the delimitation issue. However, some important comments on the use of force under international law are provided.

The law of war

The law of war can be divided into two disciplines: jus ad bellum, the law of going to war, and jus in bello, the law applied during the conflict.[4] These subfields are distinct and independent, and even if a prospective target meets all jus in bello criteria, it does not justify the use of force without an existing conflict or a recognized jus ad bellum mechanism.

The primary legal triggers for conflict under jus ad bellum are self-defense and collective action through the United Nations (U.N.) Security Council, under Chapter VII of the U.N. Charter. Self-defense is the most likely jus ad bellum issue, and can be invoked either in the event of an "armed attack" pursuant to Article 51 of the U.N. Charter or as a matter of customary international law where a "'necessity of self-defense is instant, overwhelming, leaving no choice of means, and no moment for deliberation."

The scope of a state's right to self-defense in response to an attack varies in the assertions of legal scholars and state practitioners. Murphy identifies three main self-defense constructs: "self-defense" refers to the use of armed coercion by a state against another state in response to a prior use of armed coercion by the other state or by a non-state actor operating from that other state; "[Anticipatory self-defense" refers to the use of armed coercion by a state to halt an imminent act of armed coercion by another state; and "reemptive self-defense" refers to the use of armed coercion by a state to prevent another state from pursuing a particular course of action that is not yet directly threatening but could result at some future point in an act of armed coercion against the first state.[5]

A Broad Notion of Force

This work explores the use of force as an impetus to action and in response to offensive overflight. Force lies at the intersection of politics and belligerent actions, with varying degrees

[4] Protocol Additional to the Geneva Conventions Of 12 August 1949
[5] U.N. Charter arts. 41–42 (allowing the Security Council to act, with force if Necessary, to maintain or secure international peace and security)

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of action, including force or the threat thereof. As politics change, non-lethal technologies emerge, and state practice develops, the spectrum of force is ever-changing. Force can include kinetic actions with missiles, bombs, or sophisticated antisatellite weapons, but in the modern technological era, responsive actions may include cyber attacks, jamming, and other acts designed to counteract offensive incursions or overflights.[6] Force may be directed at aerospace vehicles, but it doesn't necessarily amount to an "armed attack." Brierly noted that war is only the most extreme form of appeal to force, and certain measures of coercion by violent means, not amounting to war, must also be fitted into the international system. The general guiding principles are jus ad bellum-appropriate uses of force, but the threat of force broadly and contemplation of what may trigger a forceful response from one state should also be considered.

Why Territorial Sovereignty Matters

Territorial sovereignty is a crucial aspect of international relations, as stated in Article 2(4) of the U.N. Charter. States are bound by their borders, and threats to territory are not taken lightly. In the modern world, sovereignty and territory are permanently linked, with sovereign equality being a cornerstone of international relations. The degree to which states are inclined to protect territory also demonstrates its importance.[7] More than half of the nine contentious cases that culminated at the ICJ in 2013 and 2014 involved delimitation of boundaries and access to the sea. States also protect sovereign territory in the overflight context through the shoot-down of encroaching craft.

Article 2(4) does not provide a clear remedy for a violation of territorial integrity, but a violation of sovereignty may open the door to force. In some states' analyses, the violation of territorial sovereignty is a potential indicator of a threat tantamount to an armed attack, warranting the use of force in self-defense. In assessing the propriety of use of force or the likelihood of the use of force in the event of an overflight by an aircraft or space craft, whether the craft is in sovereign territory is an essential factor.

[6] U.N. Charter Article 2(4) Ruys also notes the differences in positon among some states as to whether all force constitutes an "armed Attack" triggering Article 51 of the U.N. Charter:
[7] U.N. Charter art. 2(1)("The Organization is based on the principle of the Sovereign equality of all its Members.")

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Why State Versus Civilian Vehicles Matters

The status of a craft, whether civilian or state, can significantly influence its use of force. The Chicago Convention, Article 3bis, prohibits the use of force against civilian aircraft for territorial incursions, but this only applies in times of peace and does not prejudice states in self-defense. Three of the four core principles of the LOAC ensure the protection of civilians and civilian objects, including civilian aircraft or spacecraft.[8] If an object is civilian, it should not be targeted except in unique circumstances. Military and state objects do not enjoy such protections, and their destruction is permissible once the legal analysis reaches the jus in bello stage. The distinction between a craft as a state vehicle or civilian one can also impact its perceived threat under jus ad bellum. A civilian craft operating for its own interests is typically less threatening than a state vehicle, particularly military, which may be armed and executing the will of another state. Therefore, the status of a craft significantly impacts its use of force, both in terms of jus ad bellum and jus in bello.

The Analytical Framework

This article proposes a sovereignty-based airspace legal regime for various scenarios and activities below orbit. The analysis is divided into two parts: first, examining the physical, geographic, and legal distinctions between airspace and outer space, and second, introducing the less settled zone between the two domains. The author argues that there are settled minimum standards for each domain, with sovereignty and state versus civil craft being the primary factors for the use of force.[9]

The article also Introduces the less settled zone between the two domains, referred to as "gray space," reflecting the perceived murkiness of its borders. The delimitation problem should be resolved in the context of this lack of consensus. The argument takes a 30,000-kilometer view to examine both the settled zones of airspace and outer space in their entirety.

The author uses a positivists approach, arguing that the default position for states is an assertion of sovereignty to its greatest limits of reason. Outer space is an exception to the rule, but it must be narrowly construed. The article also discusses the potential commensurability of the airspace

[8] Protocol Relating to an Amendment to the Convention on International Civil Aviation art. May 10, 1984, ICAO Doc. 9436
[9] Article 51 of the U.N. Charter as A deviation from Article 2(4), the general rule

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and outer space regimes, stating that they fall on a consistent continuum designed to maximize state power and avoid a third world war. This supports the finding that airspace (and sovereignty) is the baseline or default regime and should be applied to emerging activities that do not clearly fall under an outer space regime.

The Black And White: Legal Frameworks In Airspace And Outer Space—Sovereignty And State Vehicles

The debate over the boundaries of airspace and outer space is a longstanding issue, predating the majority of international outer space law. The Paris Convention and Chicago Convention, two public international air law documents, did not define the vertical limit of airspace. Instead, the International Civil Aviation Organization (ICAO) and the Outer Space Treaty focus on managing international civil aviation within airspace. The general rules for operating in airspace and outer space are black-and-white, but the scope of these legal regimes is more gray. [10]This chapter discusses the fundamental aspects of space and air domains, focusing on state sovereignty and the distinction between state and civilian craft. The goal is to establish accepted definitions for both airspace and outer space law, with clear legal rules relevant to force application. Airspace is addressed first, followed by outer space.[11] The third section briefly addresses the legal gray area between the well-defined portions of these two regimes, demonstrating a degree of possible legal uncertainty. However, this discussion highlights the fact that there are settled areas of law from which the discussion of using force against vehicles operating between the zones will proceed.

AIRSPACE: SOVEREIGN TERRITORY

The physical and geographical characteristics of the area known as airspace, as well as the activities of airplanes, define it. The outcome is a generally acknowledged region that is at least 21 kilometers in size.

70,500 feet, or ters. States are able to exert exclusive authority over the airspace within their borders. This claim of con-However, control is constrained by a number of agreements, chief

[10] Convention on International Civil Aviation, , art. 44 (listing the Objectives of ICAO, which generally focus on safety and development of civil Aviation)
[11] Outer Space Treaty

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among them the Chicago Convention, which makes a distinction between private airplanes. The characteristics of the airspace, the function of sovereignty throughout, as well as the significance of the difference between In this part, the differences betpween state and civil aircraft are covered.

The Physical Nature of Airspace:

Airspace is the space where air is normally found and is identical with atmospheric space. The legal regime for airspace is primarily designed for the flight of aircraft, which include airplanes, gliders, balloons, helicopters, and other lighter- and heavier-than-air vehicles.[12] The definition of aircraft is not entirely static, and ICAO can modify the Annexs to clarify the vehicles that do and do not fall under its purview.

The required "reactions of the air for aircraft have a vertical limit, as the static air pressure above the wing decreases while it remains substantially stable below it due to the shape of the wing. This lift effect requires adequate density of the air, which decreases as altitude rises. As altitude rises, the air thins and engines cannot produce adequate momentum, making it unlikely that an aircraft will ever fly above 60 kilometers with an air-breathing engine.

The effective vertical geo-graphic range of current aircraft must be discussed. At the dawn of aviation, planes such as those operated by the Wright Brothers or Alberto Santos-Dumont flew only a few feet off the ground but are considered aircraft. On the upper tier of aircraft operation are specialized military aircraft such as the U-2 and SR-71 that fly at altitudes up to 85,000 feet. Civilian aircraft typically operate with a ceiling of approximately 40,000 feet but a high end of 51,000 feet.

The Legal Nature of Airspace: Sovereign Territory

The legal nature of airspace has a long history, with states asserting sovereignty over their airspace since 1919. The Chicago Convention, for example, recognizes that every state has complete and exclusive sovereignty over the airspace above its territory. This sovereignty extends to land areas and territorial waters adjacent to the state, which is inherited from Roman law. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) further defines and

[12] Convention on International Civil Aviation,annex 7. ThisDefinition has been in effect since 1968

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limits the horizontal extent of sovereignty by way of rights of passage for aircraft. Littoral states cannot assert full air sovereignty over international straits or archipelagic sea lanes, and the broader exception of innocent passage through territorial seas does not apply to aircraft. Airspace sovereignty can be limited under unique circumstances such as distress. While China, India, Japan, Russia, and other space-faring states have ratified UNCLOS, the United States and Kazakhstan have not. The exclusive sovereignty of states over their airspace is endorsed throughout the Chicago Convention, with Articles 6 (Scheduled air services) and 7 (Cabotage) confirming that international carriers may not operate in or over a state without that state's permission.

The Legal Nature of Airspace: Civil and State Aircraft

The Chicago Convention recognizes sovereignty over airspace, but it has exceptions for non-scheduled aircraft and non-traffic purposes. Article 5 allows non-scheduled aircraft to make non-stop flights across a state's territory without prior permission. Article 6 establishes bilateral and multilateral agreements for entry, stoppage, and international air services.[13] However, the convention's exemptions and exclusions apply only to civil aircraft, not state craft. Article 3 distinguishes between civil and state aircraft, stating that the convention applies only to civil aircraft and not state craft.[14] This departure from the Paris Convention further subdivided state craft into military and aircraft exclusively employed in state service.[15] State vehicles enjoy less freedom of movement over territorial airspace, with specific rights requiring explicit negotiation.[16]

Airspace:

In conclusion, there is a fundamental, binary understanding of airspace that consists of the range of operation, at the very least Of airplanes to a minimum of 21,500 feet (70,500 feet). In the air, States that are adjacent to one another may claim territorial sovereignty and Ought to be acknowledged by other states. Although overflight by civilian aircraft is permitted by the Chicago Convention, the airspace regime Demonstrates no such regard for statecraft—they are different from Private airplanes. This implies that there are few alternatives for overflight if A region is considered to be airspace, and aircraft (or other) that fly overhead face the risk of

[13] Convention on International Civil Aviation, art. 25 (aircraft In distress).
[14] Convention on International Civil Aviation, art. 1
[15] Convention on International Civil Aviation, art. 3
[16] Paris Convention, art. 30 and, 32

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invading another person's territory and inciting hostility.

Conclusion

The delimitation debate in the lex lata suggests that sovereignty extends as high as possible until it is clearly capped, with the lowest definitive reach of the outer space regime being orbit. In cases of doubt about state sovereignty, it should be assumed that such sovereignty exists. This work has pulled airspace and outer space apart to assess them independently, including their nature and accompanying legal regimes. It then attempted to put them back together to demonstrate how the regimes fit together. The logical conclusion is that the boundary between air and space is at orbit.

This is not a normative prescription for what regime is best for aerospace; it is merely an argument for what is. It does not prejudice any arguments for creating a different line or even a unique sui generis aerospace zone. It is also not meant to suggest that there are not difficulties with the present regulation of the zone, particularly the potential inapplicability of ICAO rules to aerospace vehicles (particularly state vehicles).

The conclusion should generally be regarded as a spatialist position on delimitation. However, spatial and functional lines are blurred in both orbit and in aerospace, so this is not a distinction dealt with in great detail here. In this author's view, a line in space provides the greatest degree of clarity.[17]

If an operator deciding whether to fire on an aerospace vehicle has to guess whether sovereignty applies, the craft is operating in an area of no consensus. If a mission planner is contemplating a flight path through an area that may (legitimately) be considered sovereign, this similarly is an area of no consensus. If in genuine doubt, the craft should be construed as being in sovereign territory.

Satellite vehicles present a unique new problem for the assertion of sovereignty. Just because there is a new threat to territorial integrity does not mean that such sovereignty is diminished. Certainly, a convention or treaty could resolve the issue, and perhaps a formal passage regime

[17] THE NEED FOR AN INTEGRATED REGULATORY REGIME FOR AVIATION AND SPACE.

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for aerospace vehicles could be created by states[18]. However, it is also possible that states will favor their sovereignty over free use of a new application.

Until that happens, states must operate under the extant law and its present line, created by the disposition of states towards sovereignty and checked only by their interest in allowing freedom of motion in orbit and beyond.

[18] Echoing the Convention on the Territorial Sea and the Contiguous Zone's Article 14(6)