

**SOVEREIGNTY'S GRAY AREA:
THE DELIMITATION OF AIR AND SPACE IN THE CONTEXT OF
AEROSPACE VEHICLES AND THE USE OF FORCE**

by

Matthew T. King

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McGill University, Faculty of Law
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Abstract

Debate over the delimitation of airspace and outer space has persisted since the dawn of the space age, without resolution. With the development of hybrid aerospace vehicles that can operate in and transition between the two zones, the line between their disparate legal regimes will be tested. And, this test may not come with an after-the-fact courtroom debate over applicable liability regimes; it may come with a real-time decision made in a military operations center as to whether an aerospace vehicle has violated sovereign airspace and should be shot down.

This thesis explores the controlling law in the absence of a clear resolution from states as to the legal regime governing the transition from air to space. While others have examined delimitation from the standpoint of liability regimes, air and space traffic management, or other perspectives, this work addresses delimitation through the lens of the potential use of force and state security interests. It first breaks down air and space into their core, or black-and-white, elements, with particular attention to their rules of sovereignty and the distinction of state and civilian vehicles. Then, it examines the gray area in between the regimes in two ways, using a conservative (or positivist) approach and a commensurability analysis. These modes of analysis reveal that, under the current legal construct, the lowest satellite orbit should be regarded as the cap on state assertions of sovereignty, and therefore the legal line between the airspace and outer space regimes.

Résumé

Le débat sur la délimitation de l'espace aérien et de l'espace extra-atmosphérique persiste depuis les débuts de l'ère spatiale, sans résolution. Avec le développement des véhicules aérospatiaux hybrides pouvant opérer dans et en transition entre les deux zones, la frontière entre leurs régimes juridiques disparates sera testée. De plus, ce teste ne viendra peut-être pas avec un débat juridique à posteriori sur les régimes de responsabilité applicables; il viendra peut-être avec une décision en temps réel prise dans un centre d'opérations militaire quant à savoir si un véhicule aérospatial a violé l'espace aérien souverain et devrait être abattu.

Cette thèse explore la loi applicable en l'absence d'une résolution claire des États quant au régime juridique régissant la transition de l'espace aérien à l'espace extra-atmosphérique. Alors que d'autres œuvres ont examiné la délimitation des perspectives des régimes de responsabilité, de la gestion de la circulation aérienne et spatiale, ou d'autres, cette œuvre examine la délimitation dans l'optique d'un recours possible à la force et aux intérêts de la sécurité de l'État. Elle décompose l'air et l'espace en leurs éléments clés, ou noirs et blancs, avec une attention particulière à leurs règles de souveraineté et de la distinction entre les véhicules étatiques et civils. Ensuite, elle examine la zone grise entre les régimes de deux façons, en utilisant une approche conservatrice (ou positiviste) et une analyse de commensurabilité. Ces modes d'analyse révèlent que, en vertu de la notion juridique actuelle, l'orbite de satellite la plus basse devrait être considérée comme la limite sur des réclamations de souveraineté étatique, et donc la ligne juridique entre les régimes aériens et spatiaux.

Acronyms and Abbreviations

ASAT	Anti-Satellite Weapon
BBC	British Broadcasting Corporation
COPUOS	UN Committee on the Peaceful Uses of Outer Space
GEO	Geosynchronous Orbit
ICAO	International Civil Aviation Organization
ICJ	International Court of Justice
ICRC	International Committee of the Red Cross
IHL	International Humanitarian Law
ISR	Intelligence, surveillance, and reconnaissance
ITU	International Telecommunications Union
LEO	Low Earth Orbit
LOAC	Law of Armed Conflict
NASA	US National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
SARPS	Standards and Recommended Practices
UK	United Kingdom
UN	United Nations
US	United States
UNCLOS	UN Convention on the Law of the Sea
VCLT	Vienna Convention on the Law of Treaties

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INTRODUCTION

Imagine a flying vehicle that can operate in a controlled, intentional manner in both air and in outer space. It has the capacity to take off, fully-maneuver, and safely land again—all while maintaining the capacity to conduct operations (of varying nature) both in the air and in space. Hopefully, offensive territorial incursions by and attacks against such craft are among the last thoughts to cross one's mind when considering the incredible potential benefits of these vehicles.¹ Nonetheless, their ability to test the limits of what states consider airspace and outer space begs a much debated question in air and space law—where, exactly, is the line between air and space?

This paper examines the implications of these vehicles under the rules of law governing air and outer space, with specific attention to the repercussions for the possible use of force by states against such vehicles (particularly *jus ad bellum*). From this context, I argue that, despite the numerous theories on the delimitation of air and space that have been articulated since the beginning of the space age, the presently existing legal structure applicable to such vehicles should be viewed as an *airspace* (as opposed to *outer space*) regime for any operations below orbit. The practical effect of this finding is that the rules of state territorial sovereignty then apply. This makes overflight by such vehicles (while operating below clearly established outer space) a violation of territorial integrity, which—depending on the circumstances—may trigger various actions under international law, to include the use of force. The potential for the use of force is even greater for overflight by state or military vehicles, which enjoy far more limited rights of passage under an airspace regime and are more likely to be construed as threatening by the states whose sovereignty is being violated.

The assertion that airspace is the appropriate regime is principally one by default. This work examines the two potentially relevant legal regimes governing the flight of these vehicles—air law and outer space law—and argues that, notwithstanding their fundamental differences in matters related to the use of force, they essentially exist on one continuum defined by state sovereignty and security. Viewed in this context, I argue that outer space law is a

¹ Perhaps encouragingly, the bulk of academic discussion of these vehicles and their domain of operation focuses on other matters, leaving somewhat of a dearth of literature on the use of force against such vehicles.

specific and limited deviation from the baseline position that states can (and do) assert rights of territorial sovereignty as high as possible. That is, outer space law is a defined cap on sovereignty; an exception to the default rule. Thus, if an area cannot be considered “outer space” (in physical, geographic, or functional terms) then it must be considered part of the default or baseline—sovereign airspace. The delimitation debate among publicists and among states demonstrates the lack of clarity in a line between air and space. In the absence of clarity, we yield to the default legal position; that is, follow the rule and not the exception. Under this approach, airspace should be the going regime unless and until states agree to a change in the law (as they did for the outer space regime).

This work is divided into three chapters. The first further develops the argument and its analytical framework, and discusses some of the premises (factual and legal) underlying the analysis. The second chapter examines the airspace and outer space regimes as they exist presently, and advances the idea of “gray space,” or the legally unclear zone existing at the edges of the more black-and-white aspects of airspace and outer space. The third chapter then addresses how the gray area should be addressed; that is, it explains why the default position should be towards sovereignty, with orbit as the dividing line between the two zones.

In all, this work is not intended as a prescription for what the law *should* be for the division of airspace and outer space legal regimes. In the legal literature, there exist many good ideas on delimitation, based on many different concerns such as air/space traffic control, insurance, commercial development (in particular space tourism and hypersonic transportation), pure science, and a host of other notions. Any one of these concerns may be a firm basis on which a regime of delimitation can be founded (with the remaining concerns adjusting their regulations and practice to whatever line—assuming the consensus is for a line—is determined). But, as yet, there is no clear state consensus as to a line or the primary foundation upon which any such delimitation should be based. In the absence of a clear custom or convention under international law—which would trump any analysis here—this work attempts to explore the baselines and defaults that should guide state actions, with focus on a known, primary concern for states: their sovereignty and national security.

CHAPTER I

Aerospace Vehicles and the Use of Force: A Framework for Analysis

This Chapter further develops the matters introduced above. It describes the nature of the vehicles in question throughout this work, addresses the use of force as used in this work, and establishes the general analytical framework set out 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 regarded as falling under an airspace regime, at least with regard to the use of force against vehicles operating in this zone.

A. Aerospace Vehicles and Their Potential Applications

An aerospace vehicle² as described above is nothing new or shocking to even the most peripheral viewer of science fiction. But, the vision of such vehicles is not like suggestions of time-travel, highways full of flying cars, or other only theoretically possible or distant advances in technology, divorced from current reality and research pursuits. Such craft have been considered, technologically, as a potential reality since at least the 1950's.³ And, extant technology confirms the imminence of their existence and use.⁴ For instance, the United States

² For more discussion of this term, see *infra* Chapter I.D.2.

³ See, eg, Roy Houchin, *US Hypersonic Research and Development: The Rise and Fall of Dyna-Soar, 1944-1963*, Space Power and Politics (London; New York, NY: Routledge, 2006) (describing the Boeing X-20, or Dyna-Soar, which was designed to take off like a plane but operate in high-altitude air or outer space); Martin Caidin, *Wings into Space: The History and Future of Winged Space Flight* (New York: Holt, Rinehart and Winston, Inc., 1964) at 128 (looking towards the future and discussing the aerospace plane, “the winged vehicle that will leave earth under its own power, perform its space mission, and return under its own power and piloted guidance.”). See also Roger Launius, “The Strange Career of the American Spaceplane: The Long History of Wings and Wheels in Human Space Operations” (2013) 55:4 *Centaurus* 412 (outlining the entire history of the spaceplane concept, from the 1920's through its expected continuation into the future).

⁴ See Joseph Pelton, “Regulatory Issues for New Global Aerospace Systems” in Ram Jakhu & Kuan-Wei Chen, eds, *Regulation of Emerging Modes of Aerospace Transportation* (Montreal: Centre for Research in Air and Space Law, 2014) 77 at 81–88 (highlighting various emerging space systems, their applications, and the companies developing them); Cesar Jaramillo, ed, *Space Security Index 2014* (Kitchener, ON: Project Ploughshares, 2014) at 56 (describing new suborbital and space tourism technologies); see also Dean Reinhardt, “The Vertical Limit of State Sovereignty” (2007) 72 *J Air L & Com* 65 at 88–99; Susan Trepczynski, *Edge of Space: Emerging Technologies, The “New” Space Industry, and the Continuing Debate on the Delimitation of Outer Space* (LL.M. Thesis) McGill University Institute of Air and Space Law (on file with McGill University Law Library), 2006 [unpublished] at 3–21 (detailing numerous emerging technologies, which though amassed in 2006 still represents the general setting today).

(US) Space Shuttle, first taking flight in 1981, was launched into space where it could orbit Earth and maneuver through space, and then return to Earth as an aircraft (albeit a glider without powered flight).⁵ Spaceplanes that can execute single-stage take-offs more like a traditional airplane are also being pursued, though with far less success to date.⁶

The current US 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.⁷ However, if such a vehicle was combined with a propulsion system such as the SABRE (Synergetic Air-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.⁸ This

⁵ See Jamie Noguchi, “NASA - The Space Shuttle”, online: *NASA.gov* <http://www.nasa.gov/externalflash/the_shuttle/>. The Soviet Union also planned for a similar craft, the Buran, but it only executed one mission in 1988. Marietta Benkö & Engelbert Plescher, *Space Law: Reconsidering the Definition/Delimitation Question and the Passage of Spacecraft through Foreign Airspace*, Essential Air and Space Law 12 (The Hague: Eleven International Publishing, 2013) at 21–22. Though it could transit the airspace, the Space Shuttle was exclusively intended for use in outer space. According to Zanghi, it was considered a space object for two primary reasons: first, the definition of “space object” in the relevant space conventions is broad; and second, it fell to earth much like a capsule (not like a plane), due to the steep inclination and “scarce maneuverability,” so it was more a space vehicle. Claudio Zanghi, “Aerospace Object” in Gabriel Lafferranderie & Daphne Crowther, eds, *Outlook on Space Law Over the Next 30 Years: Essays Published for the 30th Anniversary of the Outer Space Treaty* (The Hague, London, Boston: Kluwer Law International, 1997) 115 at 117. This second, and more important, prong would not apply to an aerospace vehicle that can engage in controlled flight at all altitudes.

⁶ See Kenneth Chang, “25 Years Ago, NASA Envisioned Its Own ‘Orient Express’”, *The New York Times* (20 October 2014), online: <<http://www.nytimes.com/2014/10/21/science/25-years-ago-nasa-envisioned-its-own-orient-express.html>>; “Orbital Space Plane Fact Sheet (FS-2003-05-64-MSFC)”, (May 2003), online: *NASA.gov* <<http://www.nasa.gov/centers/marshall/news/background/facts/ospfacts.html>> (anticipating such a spaceplane by 2012); “Spaceplane”, (22 June 2015), online: *Wikipedia* <<https://en.wikipedia.org/w/index.php?title=Spaceplane&oldid=668177939>> (noting that of the five successful spaceplanes, all have glider-only space (and return) segments). But see Sharon Weinberger, “Return of the SpacePlane” (2010) 187:5 *Popular Mechanics* 60.

⁷ See “X-37B Orbital Test Vehicle Fact Sheet”, (21 May 2010), online: *US Air Force* <<http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104539/x-37b-orbital-test-vehicle.aspx>>.

⁸ “Reaction Engines Ltd - The SABRE Engine”, (2014), online: *Reaction Engines.com* <<http://www.reactionengines.co.uk/sabre.html>> (the SABRE has integrated air breathing and conventional rocket modes into one engine); Alan Tovey, “Concorde Mark 2: Airbus files plans for new supersonic jet”, (6 August 2015), online: *The Telegraph* <<http://www.telegraph.co.uk/finance/newsbysector/industry/engineering/11782446/Concorde-Mark-2-Airbus-files-plans-for-new-supersonic-jet.html>> (describing the proposed Concorde 2, which plans to

work posits the eventual (and near-term) existence of such technologies.

The potential applications of this new technology are nearly limitless. Presently, the focus seems to be on suborbital tourism and adventure. But, the opportunities for travel,⁹ scientific research, telecommunications,¹⁰ or a host of other applications abound.

But, this potential is not without concerns—particularly when governments (and frequently the military departments of governments) are executing the operations. Distrust of states is simply a part of world affairs. One contemporary example of this is the X-37B experimental spaceplane discussed above. It is not technology that is unique to the US, or to military research—Virgin Galactic, Swiss Space Systems (S3), and a host of others are working on similar vehicles that can operate in both air and space for civilian (or government) purposes. Still, in October 2014, when the X-37B returned to Earth from a 675 day mission, during which it launched from Earth, operated in outer space, and returned to base intact and ready for re-use, the mission garnered a great deal of attention.¹¹ Abundant media coverage of the flight focused not just on the technological advances it represents, but also the mysteries and theories about its “secret” mission or possible uses.¹² Noting the “mysterious” nature of the craft and its mission

integrate three engine types into one craft to achieve an upright rocket stage and cruising altitudes of 100,000 feet (over 30 kilometers)).

⁹ This includes travel to outer space, for instance to the International Space Station, as well as high-speed (hypersonic) point-to-point terrestrial destination travel, during which a specialized plane ascends to nearly 100 kilometers (62 miles or 329,000 feet) before rapidly descending to its destination. See Maria Fischer, “New York to Tokyo By Way of Outer Space”, (5 November 2012), online: *Space Safety Magazine* <<http://www.spacesafetymagazine.com/aerospace-engineering/spacecraft-design/york-tokyo-outer-space/>> (discussing the XCOR Lynx program, which projects the NY to Tokyo trip taking 90 minutes).

¹⁰ See Joseph Pelton, “Geosynchronous Satellites at 14 Miles Altitude?” (1995) 2Q95 New Telecom Quarterly 11 (describing the potential for communications platforms that linger in suborbital “proto-space” to provide cost-effective and consistent telecommunications coverage); “Project Loon – Google”, online: *Google.com* <<http://www.google.com/loon/>> (a network of high-altitude balloons that can provide regional internet coverage).

¹¹ See Mike Wall, “X-37B Military Space Plane Lands After Record-Shattering Secret Mission”, online: *Space.com* <<http://www.space.com/27427-x37b-space-plane-air-force-landing.html>>; Rob Crilly, “Top-secret US space drone returns to Earth after two-year orbit”, (18 October 2014), online: *The Telegraph* <<http://www.telegraph.co.uk/news/science/space/11171389/Top-secret-US-space-drone-returns-to-Earth-after-two-year-orbit.html>>.

¹² See Elizabeth Howell, “X-37B Space Plane Returns: 5 Theories About Its Secret Mission”, online: *LiveScience.com* <<http://www.livescience.com/48338-x37b-space-plane-conspiracy-theories.html>> (“The top-secret nature of the X-37B missions has sparked a number of conspiracy theories,” including purposes

persisted in coverage of its more recent May 2015 launch.¹³ The technology is only likely to advance further, eventually allowing for both civilian and military vehicles that can fully operate at will in both air and outer space, at virtually any altitude; with the advanced technology there is likely to be commensurate mistrust and concern.

And, this mistrust and concern is not limited to individuals and news organizations; states and policymakers are wary of the aerospace capabilities of foreign governments, which could directly threaten their national security or territorial integrity.¹⁴ Two scenarios demonstrate the potential points of contention for actions conducted in aerospace, based on emerging technologies.

of surveillance of Earth or space objects, orbital bombardment, disruption or destruction of satellites, and deploying other spy satellites).

¹³ See, eg, Mike Wall, “US Air Force Launches X-37B Space Plane on 4th Mystery Mission”, (20 May 2015), online: *Space.com* <<http://www.space.com/29448-x37b-space-plane-launches-fourth-mission.html>>. Potentially adding fuel to the fire of those concerned with the potential malevolent uses of such a vehicle, the head of the US Air Force Space Command, General John Hyten, was asked on a major news program about the X-37B and he could not deny its potential as a weapons system. See David Martin, “The Battle Above”, *60 Minutes (CBS)* (26 April 2015), online: <<http://www.cbsnews.com/videos/the-battle-above-part-two/>>. The interview and news story overall focused on self-defense and anti-attack technology (as opposed to US attack capabilities), with the Secretary of the US Air Force even stating that the US presently has no weapons in space. However, when the X-37B space plane is brought up the Air Force does not deny its potential uses as an offensive weapon:

Q (David Martin): “So, here’s your chance to end all the speculation about what this space plane [the X-37B] is really for. ...Can you tell me whether or not someday the spaceplane is going to become a weapons system?”

A (General Hyten): “The intent is—[] I cannot answer that question. ... I’m not going to say what it’s going to become because we’re experimenting.”

Ibid. Cf. Houchin, *supra* note 3 at 104–05 (discussing the US Dyna-Soar spaceplane, which was intended for use as an orbital weapons system and hypersonic bomber in its second and third phases, but was presented initially only as a suborbital (non-space) jet platform to avoid scrutiny from the Eisenhower administration as a space weapon).

¹⁴ See Brian Weeden, “The End of Sanctuary in Space: Why America is Considering Getting More Aggressive in Orbit”, (7 January 2015), online: *War is Boring* <<https://medium.com/war-is-boring/the-end-of-sanctuary-in-space-2d58fba741a>> (discussing both the US concerns and reactions to Chinese and Russian space activities, as well as concern created for China, Russia, and other states by the US (particularly the X-37B, the articulation of a potentially aggressive space control policy and assets, and rejection of the UN-based attempts at a resolution on the placement of weapons in outer space)); see also Tim Schwarz, “North Korean space scientist to US people: ‘Trust us’”, (3 July 2015), online: *CNN.com* <<http://www.cnn.com/2015/07/03/asia/north-korean-space-program/index.html>> (examining US concerns over North Korea’s non-military space program and agency, the National Aerospace Development Administration (NADA)).

First, there may be intentionally provocative territorial incursions by armed military aerospace vehicles. Such activities would not be simple high-altitude overflight for access to outer space, or matters of distress or other recognized exigency; instead, they 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 NATO member-nation airspace, seemingly to gauge the response (both tactical and political) and generally to make a political statement.¹⁵ China also has a program to broaden its territorial sea (and thereby airspace) through asserting control over various Pacific islands.¹⁶ Counter to this, the US has a policy to test (that is, not respect through asserting passage rights) claims of territory beyond the perceived limits of international law.¹⁷ The tension between assertions of sovereignty and those eager to test it can have dangerous results.¹⁸ As it is occurring today with ships and aircraft, there is little reason to doubt the

¹⁵ Kevin Bohn & Steve Almasy, “U.S. says Russian fighter jet intercept was ‘unsafe’ - CNN.com”, (12 April 2015), online: <<http://www.cnn.com/2015/04/11/europe/russia-u-s-plane-intercept/index.html>>; Lindsay Isaac & Greg Botelho, “Dutch fighter jets intercept 2 Russian bombers in their airspace - CNN.com”, (23 April 2014), online: <<http://www.cnn.com/2014/04/23/world/europe/russian-bombers-intercepted/index.html>>; Brad Lendon, “NATO jets scrambled more than 400 times this year for Russian intercepts - CNN.com”, (21 November 2014), online: <<http://www.cnn.com/2014/11/21/world/europe/nato-russia-intercepts/index.html>>; Laura Perez Maestro & Jason Hanna, “UK jets intercept Russian aircraft near British airspace - CNN.com”, (19 February 2015), online: <<http://www.cnn.com/2015/02/19/world/uk-russia-aircraft-intercepted/index.html>>; Jamie Crawford, “‘Unusual’ Russian flights concern NATO - CNN.com”, (30 October 2014), online: <<http://www.cnn.com/2014/10/29/world/russian-aircraft-european-airspace/index.html>>; Steve Brusk & Ralph Ellis, “Russian planes intercepted near U.S., Canadian airspace - CNN.com”, (13 November 2014), online: <<http://www.cnn.com/2014/09/19/us/russian-plane-incidents/index.html>>. Of course, Russia is not the only state to have used aerial incursions as a form of boundary testing. See, eg, Arthur Rovine, *Digest of United States Practice in International Law* (1973) (Washington, D.C.: US Government Printing Office, 1974) at 302 (describing a March 1973 incident between the US and Libya, arising over a US C-130’s flight over a claimed “restricted area” within 100 nautical miles of Tripoli).

¹⁶ See Simon Denyer, “See China’s Rapid Island-Building Strategy in Action”, *The Washington Post* (1 July 2015), online: <<https://www.washingtonpost.com/blogs/worldviews/wp/2015/07/01/new-images-show-china-building-military-facilities-in-south-china-sea/>>.

¹⁷ See David Cloud, “U.S. publicly challenges China’s moves in disputed islands”, (21 May 2015), online: *Los Angeles Times* <<http://www.latimes.com/world/asia/la-fg-us-china-20150522-story.html#page=1>>; President of the United States (Ronald Reagan), “United States Oceans Policy”, (10 March 1983), online: <<http://www.state.gov/documents/organization/143224.pdf>> (“the United States will exercise and assert its navigation and overflight rights and freedoms on a worldwide basis in a manner that is consistent with the balance of interests reflected in the [UN Convention on the Law of the Sea]. The United States will not, however, acquiesce in unilateral acts of other states designed to restrict the rights and freedoms of the international community in navigation and overflight and other related high seas uses.”).

¹⁸ See, eg, Shirley Kan et al, *China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy*

potential for such incursions being employed as a policy tool in the future, with aerospace vehicles as another tool for states.

Second, quasi-satellite systems may loiter in the aerospace region, such as the nascent Google Loon system.¹⁹ If unwanted, such a telecommunication or remote sensing capacity could be construed as highly offensive by a state receiving the transmissions (be it simple internet access, or media broadcasts), eliciting an adverse reaction. For instance, in recent history Iran was believed to be the source of jamming targeted against the French EUTELSAT (a traditional orbital satellite) and its media signals; it is suspected that this is in response to the broadcast of unwanted television programming (such as BBC Persian) into Iran.²⁰ An intelligence, surveillance, and reconnaissance (ISR) asset operating in aerospace could provoke an equally or even more hostile response than just jamming.

In the above scenarios, if the aerospace vehicles are state (and particularly military) craft, the key factor in determining whether the use of force may be an acceptable action is the question of where it is operating—whether the vehicle is encroaching sovereignty territory. States may dislike that orbital satellites overfly their territory; but that is no violation of any territorial integrity, so no actions employing force would be appropriate. However, if the aerospace vehicles are operating in a state's sovereign territory, force may be an option to remedy the violation. Thus, it is the determination of whether the area of operation (aerospace) can legitimately be claimed as sovereign that will often drive the determination of the propriety of the use of force. Second to this, whether the craft in question is a civilian or state vehicle will also affect the use of force analysis.

Implications, CRS RL30946 (US Congressional Research Service, 2001) (analyzing the April 2001 incident where a Chinese fighter jet collided with a US P-3 during an aerial intercept off the coast of China); John King, "U.S.: N. Korea plane intercept 'reckless'", (4 March 2003), online: *CNN.com* <<http://www.cnn.com/2003/US/03/04/nkorea.intercept/index.html>>; John Rolph, "Freedom of Navigation and the Black Sea Bumping Incident: How 'Innocent' Must Innocent Passage Be?" (1992) 135 *Mil L Rev* 137 (describing a 1988 sea collision between the US and USSR while the US tested and the USSR asserted sovereignty in the Black Sea).

¹⁹ See "Project Loon – Google" *supra* note 10.

²⁰ See Cesar Jaramillo, ed, *Space Security 2011*, Space Security Index (Waterloo, ON: Project Ploughshares, 2011) at 151; "Press Release: ITU Radio Regulations Board urges Iran to end interference hampering EUTELSAT satellite operations", (26 March 2010), online: *ITU.int* <http://www.itu.int/newsroom/press_releases/2010/14.html>.

B. The Use of Force as an Analytical Lens

As noted above, the potential for the use of force is a rubric through which this argument's analysis is performed. This work is not intended as a study of the law of war or the law of armed conflict, *per se*; instead, this study uses existing understanding of law of war principles as a tool to develop the delimitation issue. At the outset, though, a few comments on the use of force under international law are important.

1. The Law of War

The law of war can be subdivided into two disciplines, *jus ad bellum* (the law of going to war) and *jus in bello* (the law applied during the conflict).²¹ Each are relevant to the present analysis of the potential application of force by states.²² These subfields are distinct and

²¹ See US Department of Defense, *Department of Defense Law of War Manual* (2015) at 7, para 1.3 (“For the purposes of this manual, the law of war is that part of international law that regulates the resort to armed force; the conduct of hostilities and the protection of war victims in both international and non-international armed conflict; belligerent occupation; and the relationships between belligerent, neutral, and non-belligerent States.”). The term “Law of War” is used here for clarity in reference to both *jus ad bellum* and *jus in bello*, and not to suggest a view the scope of prohibitions governing the use of force is limited only to declared “wars.” In some circles, the term LOAC is used in this broad manner as a substitute for law of war. See *ibid* at 8, para 1.3.1.2 (“The law of war is often called the law of armed conflict. Both terms can be found in DoD directives and training materials.”). However, in other circles, LOAC refers exclusively to *jus in bello*. For clarity, as both *jus ad bellum* and *jus in bello* are discussed herein, they will be referred to as such and the term “LOAC” will generally be avoided.

²² For thorough analyses of the law of war and the application of force, see generally Sean Murphy, “The Doctrine of Preemptive Self-Defense” (2005) 50 Vill L Rev 699 (*jus ad bellum*); Michael Schmitt, “Cyber Operations and the *Jus ad Bellum* Revisited” (2011) 56 Vill L Rev 569 (*jus ad bellum*); Gary Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge; New York: Cambridge University Press, 2010) (*jus in bello*); Dieter Fleck, ed, *The Handbook of International Humanitarian Law*, 2nd ed (Oxford; New York: Oxford University Press, 2008) (*jus in bello*); *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977, 1125 UNTS 3 (entered into force 7 December 1978) [API] (*jus in bello*).

For outer space-oriented analyses, see, for example, Duncan Blake, “The Law Applicable to Military Strategic Use of Outer Space” in Hitoshi Nasu & Robert McLaughlin, eds, *New Technologies and the Law of Armed Conflict* (T.M.C. Asser Press, 2014) 115 at 129 et seq; Michel Bourbonnière & Ricky J Lee, “*Jus ad Bellum* and *Jus in Bello* Considerations on the Targeting of Satellites: The Targeting of Post-Modern Military Space Assets” (2014) 44 Israel Yearbook on Human Rights 167; Michel Bourbonnière & Ricky J Lee, “Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict” (2008) 18:5 European Journal of International Law 873; Robert Ramey, “Armed Conflict on the Final Frontier: The Law of War in Space” (2000) 48 AF L Rev 1. But see also Steven Freeland, “The Laws of War in Outer Space” in Kai-Uwe Schrogl et al, eds, *Handbook of Space Security* (New York: Springer, 2015) 81 at 102 (“Overall, given the unique nature of outer space, the fundamental principles of the laws of war – developed to regulate terrestrial

independent; the existence of legality under one does not presume the other. That is, even if in an armed conflict permissible under *jus ad bellum*, a state still must adhere to *jus in bello* restrictions on the application of force; even if a prospective target would meet all *jus in bello* criteria, that does not justify the use of force absent 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 UN Security Council, under Chapter VII of the UN Charter.²³ 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 UN Charter,²⁴ 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.”²⁵ The scope of a state’s right to self-defense in response to an attack (or, potentially, a threat thereof) varies in the assertions of legal scholars and state practitioners. Murphy identifies three main self-defense constructs:

“[S]elf-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 (or non-state actor operating from that other state). Thus, anticipatory self-defense contemplates a situation where a state has not yet been the victim of such a coercive act, but perceives that such an act is about to occur in the immediate future[.] ... “[P]reemptive self-defense” is used to refer to the use of armed coercion by a state to prevent another state (or non-state actor) from pursuing a particular course of action that is not yet directly

warfare and armed conflict – are probably neither sufficiently specific nor entirely appropriate for military action in outer space.”).

²³ *Charter of the United Nations*, 26 June 1945, Can TS 1945 No 7 [*UN Charter*] at arts 41–42 (allowing the Security Council to act, with force if necessary, to maintain or secure international peace and security).

²⁴ *Ibid* at art 51 (“Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security.”).

²⁵ Hunter Miller, ed, “The Caroline Case” in *Treaties and Other International Acts of the United States of America (Volume 4, Documents 80-121: 1836-1846)* (Washington, D.C.: US Government Printing Office, 1934) (available at http://avalon.law.yale.edu/19th_century/br-1842d.asp) (containing the exchanges between US Secretary of State Daniel Webster and Great Britain’s Lord Ashburton); see also *Military and Paramilitary Activities in and against Nicaragua (Nicar v US)*, *Merits Judgment* (Jun 27), [1986] ICJ Rep 14 (International Court of Justice); Murphy, *supra* note 22 at 711 (discussing the Caroline incident in the context of anticipatory self-defense).

threatening, but which, if permitted to continue, could result at some future point in an act of armed coercion against the first state.²⁶

While this work does not advocate any particular view of the scope of self-defense, it generally contemplates a preemptive self-defense model for its analysis. This is because, for planning purposes, aerospace-faring states should anticipate that their provocative overflights may encounter the most forward-leaning (from likelihood of the use of force perspective) subjacent state. Also, as technology develops for both vehicles and weapons, states may become much more sensitive to the potential gravity of a territorial incursion, making the preemptive school more common in state assertions.²⁷

The core aspects of *jus in bello*—also often called international humanitarian law (IHL)—relevant to this study are the principles of distinction, military necessity, proportionality, and humanity. Distinction compels belligerents to distinguish between military and civilian objects and targets, and not to target purely civilian objects or engage in indiscriminate attacks.²⁸ Military necessity similarly ensures that any potential target has a military-based purpose for its destruction or neutralization.²⁹ Proportionality requires that belligerents ensure that any collateral civilian damage caused by an otherwise legal attack (having passed the distinction and

²⁶ Murphy, *supra* note 22 at 703–04 (further noting that “preemptive self-defense is, of course, ‘anticipatory’ and might even be called ‘preventive’ self-defense, but for purposes of this article, such terminology is not used to describe this form of self-defense.”). Murphy goes on to assess four schools of thought on right of self-defense, and their main proponents. *Ibid* at 706 et seq (developing the “strict-constructionist,” “imminent threat,” “qualitative threat,” and “Charter-is-dead” schools); see also John Yoo, “Using Force” (2004) 71 U Chicago L Rev 729 (arguing, essentially, for a preemptive self-defense model).

²⁷ Yoo addresses how modern considerations affect the imminence analysis of a potential attack, noting “the probability of an attack would be a function of two factors: capability and intention.” Yoo, *supra* note 26 at 757–58. He finds that, “[t]his calculus explains why nineteenth-century uses of force of the type in the *Caroline* case would not justify a broad right of preemptive self-defense, as the harm from border incursions in an age before mechanized warfare was not that great.” *Ibid* at 758. See The White House (George W Bush), *The National Security Strategy of the United States of America: September 2002* (US, The White House, 2002) at 15 (regarding the threats of weapons of mass destruction and terrorism, noting that “To forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively.”).

²⁸ See *API*, *supra* note 22 at art 51.

²⁹ See *ibid* at art 52 et seq (generally defining military objects, and limiting the destruction of specific types of targets such as cultural and religious objects, those indispensable for survival of the civilian population, those which would cause severe environmental damage, and those which contain dangerous forces (like dams, dykes, and nuclear power facilities)).

necessity analyses) not be excessive relative to the anticipated military gain.³⁰ Finally, humanity dictates that force not be employed for the purpose of causing “superfluous injury or unnecessary suffering” of otherwise lawful targets.³¹

This is obviously not an exhaustive study of the law of war, but this is the framework from which discussions of the use of force below emerge.

2. A Broad Notion of Force

This work takes a broad view of the use of force, both as the impetus to action and in response to an offensive overflight. In essence, force here lies at the intersection of politics and belligerent actions. Clausewitz famously described war as an extension of politics by other means.³² On this spectrum between political acts and outright war or open hostilities are varying degrees of action, to include force or the threat thereof. And, as politics change, non-lethal technologies emerge, and state practice develops, the spectrum is ever-changing.³³ Certainly, force can mean kinetic actions with missiles, bombs, or sophisticated anti-satellite weapons (ASATs); but, in the modern technological era, responsive actions may also include cyber attacks,³⁴ jamming and other harmful signal interference,³⁵ or other acts designed to counteract

³⁰ See *ibid* at art 57.

³¹ *Ibid* at art 35(2).

³² Carl von Clausewitz, *On War*, translated by JJ Graham (London, 1873), chap 1 sec. 24 (“We see, therefore, that war is not merely a political act, but also a real political instrument, a continuation of political commerce, a carrying out of the same by other means.”) (available at <http://www.clausewitz.com/readings/OnWar1873/BK1ch01.html>); see also LC Green, “Cicero And Clausewitz Or Quincy Wright: The Interplay Of Law And War” (1999) 47 Chitty’s LJ & Fam L Rev 37.

³³ As a matter of illustration, US policy has changed to make less clear whether the “use of force” is appropriate to defend access to and use of outer space. The 1999 *Space Policy* asserted that “interference with U.S. space systems will be viewed as an infringement on our sovereign rights. The U.S. may take all appropriate self-defense measures, including ...the use of force” US Department of Defense, *Department of Defense Directive 3100.10, Space Policy (July 9, 1999)* (1999) at para 4.2.1. However, the 2012 iteration removes the explicit mention of force, stating “[s]uch interference, or interference with other space systems upon which the United States relies, is irresponsible in peacetime and may be escalatory during a crisis. The United States will retain the capabilities to respond at the time and place of our choosing.” US Department of Defense, *Department of Defense Directive 3100.10, Space Policy (October 18, 2012)* (2012) at para 4.b. So, while the term “force” has been removed, the policy and operative considerations remain the same.

³⁴ See Schmitt, *supra* note 22 (discussing cyber attacks).

³⁵ Sarah Mountin, “The Legality and Implications of Intentional Interference with Commercial Communication Satellite Signals” (2014) 90 Int’l L Stud 101 (discussing harmful interference).

an offensive incursion or overflight that may or may not amount to “uses of force” under the prevailing law (or the positions of states).³⁶ When force is referred to here, it can be any such action along this spectrum, directed at aerospace vehicles. It need not, necessarily, amount to an “armed attack” level to warrant consideration in this work—though, kinetic actions such as shooting down an aerospace vehicle are the focus.

Writing in the early 1930’s, Brierly noted that “War, however, is only the most extreme form that an appeal to force may take; and certain measures of coercion by violent means, but not amounting to war and regarded as consistent with the continuance of a state of peace between the parties, have also to be fitted into the international system.”³⁷ This is even more true today, when formal “war” is no longer declared, there are debatable applications of the regimes for countermeasures and reprisals, and provocative actions and implicit threats of force seem almost

³⁶ For an in-depth discussion of whether all “force” constitutes a “use of force” under the prohibition of UN Charter Article 2(4), see Tom Ruys, “The Meaning of ‘Force’ and the Boundaries of the *Jus Ad Bellum*: Are ‘Minimal’ Uses of Force Excluded from UN Charter Article 2(4)?” (2014) 108 AJIL 159. Ruys also notes the differences in position among some states as to whether all force constitutes an “armed attack” triggering Article 51 of the UN Charter:

[I]f the characterization of certain acts as the use of force removes the possibility of invoking grounds precluding wrongfulness, the inverse qualification—that is, a finding that certain acts do *not* constitute the use of force—in principle rules out the possibility of exercising or invoking the right of self-defense in reaction thereto. It is widely accepted that every armed attack automatically constitutes a use of force, but views differ in legal doctrine on the extent of the gap between the two notions. Those who limit armed attacks to large-scale attacks construe the gap widely, whereas others, who accept that more small-scale attacks may equally trigger the right of self-defense, construe the gap more narrowly (and some essentially regard the two notions as materially identical). ... The implication is that, absent a use of force, there can be no armed attack—and, accordingly, no recourse to self-defense. Conversely, it is safe to assume that, whenever a state invokes the right of self-defense in response to a certain act, it views the latter act as constituting an armed attack and, by definition, a use of force.

Ibid at 162–63 (footnotes omitted); see also *Paramilitary Activities Case*, *supra* note 25 at 103–04, para 195 (describing actions less than full attacks by armed bands, such as “assistance to rebels in the form of the provision of weapons or logistical or other support” as uses of force); Matthew Waxman, “Cyber-Attacks and the Use of Force: Back to the Future of Article 2(4)” (2013) 36 Yale J Int’l L 421 (discussing the meaning of “force” in a cyber context); US Department of Defense, *supra* note 21 at 998, para 16.3.1 (“Cyber operations may in certain circumstances constitute uses of force within the meaning of Article 2(4) of the Charter of the United Nations and customary international law. For example, if cyber operations cause effects that, if caused by traditional physical means, would be regarded as a use of force under *jus ad bellum*, then such cyber operations would likely also be regarded as a use of force.”).

³⁷ J L Brierly, “International Law and the Resort to Armed Force” in Tarcisio Gazzini & Nicholas Tsagourias, eds, *The Use of Force in International Law*, The International Law of Peace and Security (Farnham, England; Burlington, VT: Ashgate, 2012) 67 at 67.

to be another means of expression in international discourse.³⁸ So, while *jus ad bellum*-appropriate uses of force are the general guiding principles herein, the threat of force broadly—and contemplation of what may trigger, legally or not, a forceful response from one state even though others may find it inappropriate—should also be considered.³⁹

3. Why Territorial Sovereignty Matters

Article 2(4) of the Charter of the United Nations states: “All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.” Territory is an existential matter for states, and threats to it are not taken lightly.

Gone are the days where a nomadic tribe, regarded as a sovereign body, can cross through and among lands only “casually attached to one territory as it passes through it; deserts it

³⁸ See *Paramilitary Activities Case*, *supra* note 25 at 101, para 191 (distinguishing between “the most grave forms of the use of force (those constituting an armed attack) from other less grave forms.”); *Case Concerning Oil Platforms (Iran v US)*, *Merits Judgment* (Nov 6), [2003] ICJ Rep 161 (addressing hostile acts and uses of force lesser than “armed attacks,” and further analyzing the Paramilitary Activities ruling), *ibid* at 333 (separate ruling of Judge Simma) (admonishing the Court for inadequately addressing defense and countermeasures against aggression not amounting to “armed attack”); see generally Ruys, *supra* note 36.

This is not to argue that the *law* of countermeasures is unclear. To the contrary, it is broadly accepted that countermeasures are non-force actions available only in response to internationally wrongful acts (directly attributable to a derelict state) in order to compel the derelict state back into compliance with its obligations. *ILC Articles on Responsibility of States for Internationally Wrongful Acts with commentaries* (2001), 53 UN GAOR Supp (No 10) at 31, UN Doc A/56/10 (2001) [*ILC Articles on State Responsibility*] at 128–39, arts 49–54 and commentaries (in particular, Article 50 notes that the assertion of countermeasures does not remove “the obligation to refrain from the threat or use of force as embodied in the Charter of the United Nations”); Michael Schmitt, “‘Below the Threshold’ Cyber Operations: The Countermeasures Response Option and International Law” (2014) 54 Va J Int’l L 697 at 700–01 (“countermeasures are State actions, or omissions, directed at another State that would otherwise violate an obligation owed to that State and that are conducted by the former in order to compel or convince the latter to desist in its own internationally wrongful acts or omissions. They constitute a means of self-help in an international system generally devoid of compulsory dispute resolution mechanisms.”). However, as discussed above, the factual predicates for what constitutes “force” (or even an internationally wrongful act) warranting countermeasures is not settled.

³⁹ For instance, Yoo notes a perspective that “rejects the notion that international law can govern the use of force because security is too dear an interest to states.” Yoo, *supra* note 26 at 731. For such states, internal concerns (and not external legal limitations) will be stronger drivers of a response to an unwanted overflight of sovereign territory.

again and is never permanently attached to any single territory.”⁴⁰ States have borders; sovereignty and territory are permanently linked in the modern world.⁴¹ For instance, in addition to Article 2(4), the UN Charter notes that sovereign equality is a cornerstone of relations.⁴² Similarly, in the *Corfu Channel* case, the International Court of Justice (ICJ) noted, “[b]etween independent States, respect for territorial sovereignty is an essential foundation of international relations.”⁴³

The degree to which states are inclined to protect territory also demonstrates its importance to them. Of the nine contentious cases that culminated at the ICJ in 2013 and 2014, more than half involved delimitation of boundaries (maritime) and access to the sea.⁴⁴ States also protect sovereign territory in the overflight context through the shoot down of encroaching craft.⁴⁵ The November 2015 incident in which Turkish F-16 fighters shot down a Russian Su-24

⁴⁰ Sheldon Amos, *Lectures on International Law, Delivered in the Middle Temple Hall to the Students of the Inns of Court* (London: Stevens and Sons, 1874) at 36.

⁴¹ See *ibid* at 37 (“To so great an extent is this true that the idea of an independent State, as distinguished from the territory of the State, is almost inconceivable.”).

⁴² *UN Charter*, *supra* note 23 at art 2(1) (“The Organization is based on the principle of the sovereign equality of all its Members.”).

⁴³ *Corfu Channel Case (UK v Alb)* (Apr 9), [1949] ICJ Rep 4 (International Court of Justice) at 35.

⁴⁴ “List of Contentious Cases by date of introduction”, online: *International Court of Justice* <<http://www.icj-cij.org/docket/index.php?p1=3&p2=3>>. Three more cases involve nuclear disarmament (a topic generally applicable to air and space force, as well).

⁴⁵ See generally Bernard Donahue, “Attacks on Foreign Civil Aircraft Trespassing in National Airspace” (1989) 30 AF L Rev 49 at 54. Donahue found:

In the post-World War II era [to 1988], four notorious incidents have occurred involving the downing or destruction of civil passenger aircraft that violated the sovereign airspace of another nation. In 1955 an Israel Airlines (El Al) Constellation flying from London to Tel Aviv with an enroute stop in Vienna strayed into Bulgarian airspace and was destroyed without warning. The second event also involved Israel. In 1973 the Israeli Air Force destroyed a Libyan passenger aircraft over the Israeli-occupied Sinai Desert. The third episode involved Korean Air (KAL) Flight 902 that was downed over Soviet territory in 1978, and the fourth incident likewise involved a Korean aircraft over the Soviet Union--the destruction of KAL Flight 007 in 1983.

Ibid (citations omitted); see also Brian Foont, “Shooting Down Civilian Aircraft: Is There an International Law?” (2007) 72 J Air L & Com 695 at 711–16 (recounting the 1988, U.S.S. Vincennes destruction of Iran Air Flight 655, and four other incidents); *ILC Articles on State Responsibility*, *supra* note 38 at 78 (Commentary to Art 24) (describing US incursions over Yugoslavia under distress); Foont, *supra* note at 701 (addressing the US-Yugoslav incident); “MH17 Malaysia Plane Crash: What We Know”, (16 July 2015), online: *BBC News* <<http://www.bbc.com/news/world-europe-28357880>> (outlining the limited facts surrounding the 2014 shoot down of Malaysian Airlines MH17 over an

bomber while briefly transiting over a narrow extension of Turkish airspace is but a recent example.⁴⁶ While future information about this incident may make it a notable data point in the evolution of self-defense and *jus ad bellum*, the issues are presently too cloudy to draw any such definitive conclusions.⁴⁷ However, even at this point, it serves as a powerful, cautionary example of what states *might* do in response to unwanted overflight, even an arguably *de minimis* one.

Article 2(4) does not provide a clear remedy for violation of territorial integrity. Certainly, any responsive use of force would have to be judged on a case-by-case basis, but a

embattled portion of Ukraine).

⁴⁶ See BBC News, “Turkey’s downing of Russian warplane -- what we know”, (1 December 2015), online: *BBC News* <<http://www.bbc.com/news/world-middle-east-34912581>>. Though less reported, it is also believed that Turkey downed a Russian unmanned aircraft in the prior month for a similar incursion. Phil Stewart, “U.S. suspects Turkey shot down Russian drone aircraft, official says”, *Reuters* (16 October 2015), online: <<http://www.reuters.com/article/us-mideast-crisis-syria-shootdown-idUSKCN0SA1CU20151016>>.

⁴⁷ For instance, the short window (in both distance and time) of the airspace violation, the justification asserted by Turkey, and support from Turkey’s allies suggest a strong potential right to defend territory. See BBC News, *supra* note 46; Steve Rosenberg, “Putin: Turkey ‘knew downed fighter jet was Russian’”, (26 November 2015), online: *BBC News* <<http://www.bbc.com/news/world-europe-34940109>> (Turkey asserted it did not know the jet was Russian, and “Erdogan has rejected calls by Russia to apologise, saying Turkey does not need to say sorry for the violation of its airspace.”); White House Press Office, “Remarks by President Obama and President Erdogan of the Republic of Turkey After Bilateral Meeting, 1 December 2015”, (1 December 2015), online: *whitehouse.gov* <<https://www.whitehouse.gov/the-press-office/2015/12/01/remarks-president-obama-and-president-erdogan-republic-turkey-after>> (US President Obama stating, “Along with our allies, the United States supports Turkey’s right to defend itself and its airspace and its territory. And we’re very much committed to Turkey’s security and its sovereignty.”). However, repeated prior airspace violations and the assertion that Turkey actually knew it was a Russian jet (which had a history of overflight) suggest that one incursion may not trigger a self-defense right. See “Turkey Letter to UNSC on Shooting Down SU-24 Plane, Nov 24, 2015 (Full Text)”, online: *Scribd.com* <<https://www.scribd.com/doc/291002800/Turkey-Letter-to-UNSC-on-Shooting-Down-SU-24-Plane-Nov-24-2015>> (Turkey asserting prior airspace incursions); Rosenberg, *supra* note. Further confusing the basis of this use of force, Turkey also made statements that “it had acted simply to defend its own security and the ‘rights of our brothers’ in Syria.” Humeyra Pamuk & Nick Tattersall, “Turkey’s Erdogan says does not want escalation after Russian jet downed”, *Reuters* (25 November 2015), online: <<http://www.reuters.com/article/mideast-crisis-syria-turkey-erdogan-idUSL8N13K19N20151125>> (emphasis added); see White House Press Office, *supra* note (Turkish President Erdogan noting, “we focused on the Turkomans, which are the Turkish descendants in Syria. We know that where the Turkomans are present, there’s no Daesh presence or ISIS presence. As I’ve said before, they are the Turkish descendants; they are the relatives of the Republic of Turkey. And that area is continuously bombed. In the last few weeks, more than 500 civilians were killed, so we would like to see the resolution of that problem as soon as possible as well.”). This raises the possibility a collective self-defense (or, even less clear, possibly a humanitarian support) theory of force.

violation of sovereignty *may* open the door to force. The violation of territorial sovereignty is a potential indicator of a threat tantamount to an armed attack, thereby warranting the use of force in self-defense in the analysis of some states.⁴⁸ In assessing the propriety of a use of force, or the likelihood of the use of force in the event of the overflight by an aircraft or space craft, whether the craft is in sovereign territory is an essential factor.

4. Why State versus Civilian Vehicles Matters

The civilian or state (particularly military) status of a craft can also be a determining factor in the use of force. Article 3*bis* of the Chicago Convention of 1944 precludes the use of force against civilian aircraft for territorial incursions.⁴⁹ But, this applies only in times of peace and does not prejudice states in the exercise of self-defense.⁵⁰ More broadly, three of the four core principles of LOAC interrelate to ensure protection of civilians and civilian objects, to include civilian air or space craft. Basically, if an object is civilian, it should not be targeted absent very unique circumstances. Military (and, generally state) objects, however, enjoy no such protections; their destruction is entirely permissible once the legal analysis reaches the *jus in bello* stage (save the few limitations imposed by humanity considerations, and considerations of collateral effects on civilians).

Also, whether a craft can be distinguished as a state vehicle or civilian one can play a role in how it is perceived as a potential threat under *jus ad bellum*.⁵¹ This would especially be the

⁴⁸ See *infra*, Chapter I.B.4 for discussion of how mere incursions by a state vehicle can be perceived as particularly threatening. Moreover, even if an incursion does not amount to an “armed attack” triggering formal self-defense, states may still elect to employ force or other actions against such an encroaching craft as a lesser form of self-help as described above.

⁴⁹ *Convention on International Civil Aviation*, 7 December 1944, 61 Stat 1180; 15 UNTS 295 (entered into force on 14 April 1947) [*Chicago Convention*] at art 3*bis*(a) (“States recognize that every State must refrain from resorting to the use of weapons against civil aircraft in flight and that, in case of interception, the lives of person on board and the safety of aircraft must not be endangered.”).

⁵⁰ *Ibid* at art 89 (“In case of war, the provisions of this Convention shall not affect the freedom of action of any of the contracting States affected, whether as belligerents or as neutrals.”), *ibid* at art 3*bis*(a); see also Michael Schmitt, “Air Law and Military Operations” in Terry Gill & Dieter Fleck, eds, *Handbook of the International Law of Military Operations* (Oxford; New York: Oxford University Press, 2010) 303 at 318 (though the Chicago Convention only in peacetime, but civilian airliners are already protected under laws of war).

⁵¹ For example, for some vehicles, particularly state ones (the focus here), there can be a presumption of aggression in noncompliance with transit norms. See George Walker, “Anticipatory Collective Self-Defense in the Charter Era: What the Treaties Have Said” (1998) 31 Cornell Int’l L J 321 at 346–347

case for states subscribing to a preemptive construction of self-defense.⁵² In general, a civilian craft operating on its own behalf and for private interests would typically be less threatening than a state vehicle (particularly military), which is possibly armed and is executing the will of another state.⁵³ This, then, alters the self-defense analysis—the lower the threat, the less likely (prudentially) and appropriate (legally) the use of force would be. Conversely, the greater the perceived threat, the more likely that force may be employed against a craft.

Therefore, it makes a significant difference from a use of force perspective, both in terms of *jus ad bellum* and *jus in bello*, whether a craft is a civilian or state craft.

C. The Analytical Framework

This paper suggests that a sovereignty-based airspace legal regime should apply to both of the above scenarios, as well as any other activities or operations below orbit. Beyond this Chapter, the analysis is divided into two primary parts.

First, this paper examines the physical, geographic, and legal distinctions between airspace and outer space, drawing attention to the area in between the two. Though air law does not define the upper limits of airspace, outer space law does not define its lower boundaries, and debate abounds about how to draw a line between the two regions, I argue that there are indeed settled minimum standards for each of these domains. As the two key factors for the use of force

(discussing the presumption that submarines not surfacing and following innocent passage norms have hostile intentions). See also John Astley & Michael Schmitt, “The Law of the Sea and Naval Operations” (1997) 42 AF L Rev 119 at 131 (“If a warship engages in non-innocent passage, the coastal State may request that it take appropriate corrective actions. Failure to do so justifies a demand that the naval vessel depart the territorial seas. Should it not, the coastal State may use minimum force to compel its departure.”); Ruys, *supra* note 36 at 174.

⁵² See *supra* Chapter I.B.1.

⁵³ Compounding this distinction are prevalence of “dual-use” craft. Solis, *supra* note 22 at 534 (a “dual-use target is one with both military and civilian functions, such as an airfield from which both civilian and military aircraft fly. Examples also include electric power grids, oil-refining facilities, and radio and television broadcasting sites.”). This topic is beyond the scope of this work, but others have addressed the use of force implications for dual use satellites and space objects. See, eg, Bourbonnière & Lee, “The Targeting of Post-Modern Military Space Assets” *supra* note 22 at 205–206 (discussing dual use satellites, and breaking their classification into three categories: (1) military hosted payloads; (2) long-term leased capacity; and (3) commercial suppliers on demand.”); Ramey, *supra* note 22 at 144 et seq (noting that the dual use analysis for space assets may be more complex due to the normal military versus civilian aspect, but also the frequent multi-state ownership or interest of space assets); Mountin, *supra* note 35 at 113 (“Almost all satellites in orbit are dual-use, that is, they can perform missions supporting both military and civilian applications.”).

are sovereignty and state versus civil craft, these criteria are the primary focus for the discussion of the respective legal regimes. Then, as a matter of contrast and to focus the discussion of aerospace (both the area, and the vehicles that operate therein), the less settled zone between the two domains will be introduced. In juxtaposition to the black-and-white nature of the settled aspects of air and outer space, this area is termed “gray space” to reflect the perceived murkiness of its borders, both physically and in the law applicable to it.

Then, the last Chapter addresses how the delimitation problem should be resolved in the context of this lack of consensus. There is a saying that one should look to the 30,000 feet view to assess a problem. But, here, a mere 30,000 feet are inadequate for proper perspective; instead the argument attempts to take a 30,000 kilometer view to look at both the settled zones of air and outer space in their entirety to examine how (and where) they transition. It takes two approaches to reach one conclusion: that orbit should be regarded as the division between the air and outer space regimes.

First, taking a positivist approach, the argument builds upon the discussions of the origins and history of and the interactions between the airspace and outer space regimes, and argues 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; a cap on the extent of sovereignty. But, it is an exception that must be narrowly construed.⁵⁴ Second, this section will address the potential commensurability of the airspace and outer space regimes. They seem diametrically opposed, but when viewed in the proper context—sovereignty and security—they actually fall on a consistent continuum designed to maximize state power and avoid a third World War. This further supports the finding that airspace (and sovereignty) is the baseline or default regime, and should be applied to

⁵⁴ The narrow construction of exceptions to a rule is a common canon of interpretation. See Natasha Balendra, “Defining Armed Conflict” (2008) 29 *Cardozo L Rev* 2461 at 2490. Though frequently cited by common law courts, the canon applies to analyses of international law as well as assessments of how *lex specialis* interfaces with general rules. See *ibid* at 2491 (“because a special law that derogates from a general one operates identically to an exception, in the absence of indications to the contrary, a special law too (a) must be triggered only in a narrow set of circumstances, and (b) once activated, must be interpreted to minimize the deviation from the rule.”); see also William Bradford, “The Changing Laws of War: Do We Need a New Legal Regime after September 11?: ‘The Duty to Defend Them’: A Natural Law Justification for the Bush Doctrine of Preventive War” (2004) 79 *Notre Dame L Rev* 1365 at 1378 (demonstrating the narrow construction with the “restrictivist camp” for the use of force, which narrowly reads Article 51 of the UN Charter as a deviation from Article 2(4), the general rule). Narrow construction is particularly important to a positivist approach, as taken here, which defers states as the ultimate authorities in international law. See *supra* Chapter III.C.1.

emerging activities that do not clearly fall under an outer space regime.

D. Methodology, Terminology, Assumptions, and Disclaimers

1. Legal methodology—A Doctrinal Approach with Historical Perspective

Discussions of history, policy, and politics are inherent and appropriate in a work focused on international law, but this work is written with a legal focus. Thus, the legal methodology is best described as doctrinal, focusing on primary and secondary legal sources. To the degree that history and political science are implicated, the focus is on reporting and incorporating the works of others and not creating a new study under the framework of those independent disciplines; it is not intended as an exhaustive history of the positions on delimitation of air and space, either from legal publicists or states.

That said, central to the thesis of this work is the notion that there is existing legal (and policy) precedent for the new developments in aerospace technology. The factual context for the application of law may change, but the law does not automatically or necessarily have to change. If there is change, such as after *Sputnik*, it is affirmatively done by authorities competent to alter the law (states); it does not occur due to the mere existence of a new technology. To accentuate that the specifics of technology may change but that the thinking does not necessarily need to, instead of using only the most recent articulations of the law or legal thinking, I have incorporated historical (or simply older) articulations when available, appropriate, and instructive for the discussion of the current state of air and outer space. Also, in divining the legal status of the gray area, I have relied on historical accounts of the development of outer space law as a regime distinct from airspace law. This historical perspective will demonstrate the baseline of thinking from which new issues are to be tackled, as well as provide the context for the formation of the laws that this work argues remain applicable today. That is, the differences between the two, and how outer space law grew from—and in opposition to—the dispositions of air law then guide the analysis of where aerospace stands.

2. Aerospace, Aerospace Vehicles, and Gray Space

The term *aerospace* should be addressed.⁵⁵ Herein, it is meant to encompass both the geographic (spatial) area and functional capacity of vehicles, generally referring to operational areas and operations beyond that of normal aircraft (higher altitudes than airplanes) but generally below orbital outer space. As will be developed further below, this area is also termed “gray space” throughout this work, as it represents a legal gray area in between the more settled—or black-and-white—aspects of airspace and outer space.

For the physical or geographic zone (*aerospace*), the term will be applied specifically to draw focus on the area that is not clearly airspace (with full oxygen and atmosphere needed for traditional engine combustion and aerodynamic lift) and not clearly orbital outer space and beyond. While in many contexts—legal, commercial, and otherwise—the term *aerospace* is intended broadly to encompass both air and space applications,⁵⁶ here it is intended to focus on the area between the two. The spatial definition is generally guided by physical, scientific, or natural attributes, but it must be noted that this work is a legal (and policy) endeavor—not a scientific one. So, the concept of *aerospace* here merely uses scientific and engineering information in the search of legal clarity; it does not seek to rearticulate or redefine any laws of physics or astro- or aeronautical phenomena. This *aerospace* zone should be read as overlapping

⁵⁵ With the above note in mind, there is little improvement to be made on a definition of *aerospace* introduced in a security context in 1962:

The reader might be interested to know the meaning and derivation of the term *aerospace*. The following definitions apply to the present study:

AERONAUTICS: the science and technology of locomotion in the atmosphere.

ASTRONAUTICS: the science and technology of locomotion outside the terrestrial atmosphere.

The definitions are simple and clear, but they do not cover the intermediate types of vehicles and devices circulating on the outer fringes of the atmosphere. Even at heights of several hundred miles traces of air are still present and the word *astronautics* is not strictly applicable; therefore, the term *aerospace* will be used to indicate the region where aerodynamics and ballistics interact or closely succeed each other as parts of a combined pattern.

Michael Golovine, *Conflict in Space: A Pattern of War in a New Dimension* (New York: St Martin’s Press, 1962) at xiii (emphasis in original). While Golovine offers the above definition, his text (written before any formal prohibition on weapons of mass destruction in outer space) primarily addresses orbital weapons systems.

⁵⁶ John C Cooper, “Aerospace Law--Subject Matter and Terminology” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 43 at 44 (advocating that what is commonly regarded as the two disciplines of “*Air Law*” and “*Space Law*” should really be a unified “*Aerospace Law*” branch of law, a sentiment with which this author agrees). See also *infra* Chapter III.D.3.

or generally encompassing what other works term near space, proto-space, suborbital space, or other high-altitude applications.⁵⁷

For vehicles (*aerospace vehicles*) the term is to be construed inclusively. It is intended to include all vehicles that can reasonably operate in this zone, but may be intended *primarily* for outer space (or airspace) activities.⁵⁸ If read exclusively—including only vehicles designed to operate in the zone between what is clearly air and outer space—the definition would not only be nearly impossible to meet (as one must transit *through* the air to reach any intermediary zone above it, so some functionality in the air must be practically assumed), but it would also exclude the future developments at which this work is directed: vehicles that can smoothly operate in nearly any environment (air or space). Thus, the term should be read with some breadth, or at least not defined in an overly narrow fashion.

3. International Consensus

This thesis is contingent upon the notion that there is a lack of international consensus as to the delimitation of airspace and outer space; the assertion that airspace sovereignty is the default position is only valid *unless* or *until* states agree to a regime applicable to such vehicles, activities, and geographic zones—as they did with the UN Convention(s) on the Law of the Sea,⁵⁹ the Outer Space Treaty of 1967,⁶⁰ or other documents.⁶¹ To be clear, the notion that the

⁵⁷ These terms are generally found throughout relevant literature term, except “proto-space” and “protozone,” used in the works of Dr. Joseph Pelton. See, eg, Pelton, *supra* note 10; Joseph Pelton, *Inclusiveness in the New Space & Protozone Transportation Services* (ICAO Headquarters, Montreal, QC, 2015).

⁵⁸ For instance, the now-retired US Space Shuttle, which launched directly into orbit attached to a multi-stage rocket system, but returned to Earth (typically Houston, Texas) as a gliding aircraft upon atmospheric reentry, would be considered an aerospace vehicle. See Jamie Noguchi, *supra* note 5. The same would apply to the X-37B discussed above. However, for purposes of this work, a rocket that merely transits airspace and enters outer space would not be considered an aerospace vehicle; nor would a traditional airplane.

⁵⁹ See *United Nations Convention on the Law of the Sea*, 10 December 1982, 1833 UNTS 3; 21 ILM 1261 (entered into force on 16 November 1994) [UNCLOS]; see also *Geneva Convention on the High Seas*, 29 April 1958, 450 UNTS 11; 13 UST 2312 (entered into force on 30 September 1962) [Convention on the High Seas].

⁶⁰ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, 27 January 1967, 18 UST 2410, 610 UNTS 205 (entered into force on 10 October 1967) [Outer Space Treaty].

⁶¹ The status of sovereignty as the “default” position is developed further below. See *infra* Chapter III.B.

sovereignty paradigm exists until states affirmatively change it by consent should not be read to require a convention or treaty, to the exclusion of a properly realized custom of international law.⁶² However, the ongoing debate about the proper regime for these vehicles strongly suggests that no adequately clear consistent state practice, guided by *opinio juris*, has emerged. And, there is no great indication that such consensus will emerge, particularly as states explore different approaches to security in space and as long as disparities in space capabilities persist.

Accordingly, this work is not an argument against consensus among states, space-faring or otherwise, on the issue of delimitation and the use of force in aerospace. (In fact, a clear treaty or norm of international law would be the clearest and most efficient way to address the problems for aerospace vehicles vis-à-vis sovereignty expressed herein.) However, this work recognizes that there may come instances of necessity of action in the gray areas of the law, and seeks to address the appropriate legal default in this lack of an obvious regime of clear and controlling law.

4. A Note on Technology

This is not intended as a technical or scientific work. While current and emerging technologies, particularly with regard to new aerospace vehicles, form an important factual basis for the legal analysis herein, the underlying assumption is that regardless of what exists today the technologies will improve tomorrow. Therefore, while this work's factual landscape does not envision that simply *anything* from the imagination of science fiction writers is possible, it does take a broad view of what vehicles and modes of transport for air, space, and in between will be available in the reasonably foreseeable future.

5. A Note on Measurements

Throughout this work, altitude matters. For ease of reference, altitudes will typically be given in both feet (commonly used in airspace altitudes) and kilometers (commonly used in high-altitude airspace and outer space altitudes). Many authors and states use miles (both statute and

⁶² See *Statute of the International Court of Justice*, 26 June 1945, Can TS 1945 No 7, 59 Stat 1055 [*ICJ Statute*] at art 38(1)(b). Regarding the development of customary international law, including the concept of “instant custom” see Bin Cheng, *Studies in International Space Law* (Oxford; New York: Clarendon Press; Oxford University Press, 1997) at 125 et seq., 191 et seq.; see also Michael P Scharf, “Accelerated Formation of Customary International Law” (2013) 20 ILSA J Int’l & Comp L 305 at 306.

nautical) as well, but for consistency and ease such measurements will typically be omitted herein. Where distances are not provided in a desired measurement (and when they were calculated by the author from other metrics), the below conversion table is instructive:⁶³

Nautical Miles (NM)	Statue Miles (M or mi)	Kilometers (km)	Feet (ft)
1	1.15	1.85	6080
.87	1	1.61	5280
.54	.62	1	3281

⁶³ Recreated from UK Ministry of Defence, *The UK Military Space Primer* (Shrivenham, UK: Development, Concepts and Doctrine Centre, 2010) at 1–3.

CHAPTER II

The Black and White: Legal Frameworks in the Air and Outer Space—Sovereignty and State Vehicles

The debate over where the air ends and outer space begins is as old as space exploration itself, and even predates the bulk of the international outer space law.⁶⁴ With the foundational public international air law documents, the Paris Convention of 1919⁶⁵ and the Chicago Convention of 1944,⁶⁶ states never defined the “vertical limit”⁶⁷ of the concept of airspace. Instead, with the establishment of the International Civil Aviation Organization (ICAO),⁶⁸ they focused on creating a mechanism by which international civil aviation—which functioned squarely and clearly in airspace—could be managed.⁶⁹ Similarly, the Outer Space Treaty does not define the borders of outer space; instead, in that document states focused on the principles

⁶⁴ See Manfred Lachs, *The Law of Outer Space: An Experience in Contemporary Law-Making* (Leiden; Boston: Martinus Nijhoff Publishers, 2010) at 53. See also Nicholas Katzenbach, “Law and Lawyers in Space” (1958) XIV:6 Bulletin of the Atomic Scientists 220 at 220 (addressing the delimitation debate, and noting in June 1958 that “[l]awyers have published over two hundred articles on Space Law, most of them in the last six months.”).

However, just because the question existed has not meant that states felt compelled to answer it. Lachs noted the 1959 finding of the *ad hoc* UN Committee on the Peaceful Uses of Outer Space (UN COPUOS) that “[i]t was generally believed that the determination of precise limits for air space and outer space did not present a legal problem calling for priority consideration at this moment.” Report of the *Ad Hoc* Committee on the Peaceful Uses of Outer Space, A/4141, 14 July 1959. See also, *Historical summary on the consideration of the question on the definition and delimitation of outer space*, Report of the Secretariat A/AC.105/769 (Annex II) (Vienna: UN Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, 2002) at 3 (tracing the delimitation question as a recurring, formal agenda item for the UN COPUOS back to its 1966 session).

⁶⁵ *Convention Relating to the Regulation of Aerial Navigation*, 13 October 1919, XI LNTS 173 [*Paris Convention*] (no longer in force). Available at XXX-Part I Annals of Air and Space Law 4-15 (2005), or John C Cooper, *The Right to Fly* (New York: Henry Holt and Co, 1947) at 291 (Appendix 1).

⁶⁶ *Chicago Convention*, *supra* note 49.

⁶⁷ See Reinhardt, *supra* note 4.

⁶⁸ *Chicago Convention*, *supra* note 49 at art 43 (Part II, Articles 43 to 66, goes on to define the objectives and inner mechanisms of ICAO, in addition to the substantive and reporting requirements contained in the remainder of the Convention). See also *Paris Convention*, *supra* note 65 at art 34 (creating the International Commission for Air Navigation (or CINA, abbreviated from French) under the League of Nations, generally the predecessor to ICAO with similar goals of creating uniformity in civil aviation); Michael Milde, *International Air Law and ICAO*, 2nd ed, Essential Air and Space Law v. 10 (Hague, The Netherlands; Portland, OR: Eleven International Pub., 2012) at 11.

⁶⁹ *Chicago Convention*, *supra* note 49 at art 44 (listing the objectives of ICAO, which generally focus on safety and development of civil aviation).

guiding the uses of space, the Moon, and celestial bodies for space objects.⁷⁰ So, the general rules that apply while operating in air or outer space are a fairly black-and-white matter; the scope (physical or functional) of these legal regimes, though, is more of a gray area.

This Chapter discusses the fundamental aspects, physical and legal, of the space and air domains with particular emphasis on two aspects relevant to the use of force against vehicles in these domains: state sovereignty and distinction between state and civilian craft. The goal is to establish that there are indeed some areas of accepted definition for both air and outer space law, and within these areas of accepted definition are clear legal rules relevant to the application of force. Airspace is addressed first, followed by a discussion of outer space. The third section then briefly addresses the area of ambiguity between the well-defined portions of these two more established regimes, the legal gray area. While this section demonstrates a degree of possible legal uncertainty, discussion of the zone of ambiguity also helps draw focus to the fact that there are indeed settled areas of law from which the discussion of using force against vehicles operating between the zones will proceed.

A. Airspace: Sovereign Territory

The zone known as airspace is defined both by its physical, geographic aspects as well as through its use by aircraft. The result is a widely accepted area that extends at least to 21 kilometers or 70,500 feet. In this domain, states can exercise exclusive sovereignty over their territorial airspace. This assertion of control, though, is limited by various agreements, most importantly the Chicago Convention, which distinguishes between state and civil aircraft.⁷¹ The

⁷⁰ See *Outer Space Treaty*, *supra* note 60.

⁷¹ Further limitations on sovereign authority may be self-imposed by states, under their internal laws and regulations relating to domestic control of airspace. For instance, since 1926 the US government has asserted federal control over its domestic airspace, to the exclusion of individual property or control interests. See Paul Stephen Dempsey, *Aviation Liability Law*, 2nd ed (Markham, ON: LexisNexis, 2013), sec 5.11 et seq; David Loth & Morris Ernst, *How High is Up* (Indianapolis: Bobbs-Merrill Company, 1964) at 2–3; see also Paul Stephen Dempsey, *Public International Air Law* (Montreal: McGill University Institute and Centre for Research in Air and Space Law, 2008) at 109 et seq (discussing the general framework for domestic Civil Aviation Authorities). The focus of this work, however, involves international law; that is, the issues of sovereignty and rights among states (not internal to them). For an early discussion of the vertical boundaries of sovereignty and rights for individuals vis-à-vis national authorities, see Loth & Ernst, *supra*; Terrence Benshoof, “Air Law--The Memory Lingers On: *Ad Coelum* in the 1970’s--Some New Approaches” (1970) XX:2 DePaul L Rev 525 at 528 (discussing the rejection of *cujus est solum ejus est usque ad coelum* as a basis for individual property rights in US domestic jurisprudence).

nature of the airspace domain, the role of sovereignty therein, and the importance of the distinction between state and civil aircraft are discussed in this section.

1. The Physical Nature of Airspace: The Domain of Aircraft

Perhaps the most succinct definition of this area comes from Cheng, who stated “*Airspace* is space where air is normally to be found and is, therefore, identical with atmospheric space.”⁷² Of course, this seemingly straightforward definition disguises many unclear areas, both technical and legal.⁷³ But, at its core, it expresses the black-and-white of airspace: certainly, it is where there is air and where traditional aircraft can fly.

The legal regime for airspace, therefore, is primarily designed for the flight of such “aircraft.” ICAO defines aircraft as “[a]ny machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth’s surface.”⁷⁴ Regarding this definition, ICAO states that “[y]ears of considerable effort permit the classification of aircraft to be as simple as possible, and yet encompass as many types of flying machines as the human mind can devise.”⁷⁵ As such, the purposefully expansive definition includes airplanes, gliders, balloons, helicopters, and a host of other lighter- and heavier-than-air vehicles.⁷⁶ The notable exclusions from “aircraft” are rockets, missiles, or other similarly thrust-

⁷² Cheng, *supra* note 62 at 18.

⁷³ For instance, “trace amounts of atmospheric gases can still be detected as high as 10,000 kilometers (6,200 miles) above sea level, far above many orbiting spacecraft.” Matthew J Kleiman, Jenifer Lamie & Maria-Vittoria Carminati, *The Laws of Spaceflight: A Guidebook for New Space Lawyers* (Chicago: American Bar Association, Section of Science & Technology Law, 2012) at 3; see also Nicolas Matte, ed, *Space Activities and Emerging International Law* (Montreal: Centre for Research in Air and Space Law, 1984) at 375 (“establishing a point of delineation predicated on the atmosphere is quite unsuitable if it is considered that some hydrogen atoms are believed to be orbiting the earth at distances of 50,000 kilometers.”). So, the question of airspace is not just a matter of where one can technically claim to find “air” or “atmosphere.”

⁷⁴ ICAO, *Annex 7 to the Chicago Convention, Aircraft Nationality and Registration Marks* at 1 (Definitions). This definition has been in effect since 1968. *Ibid* at vi.

⁷⁵ ICAO, “Annexes Booklet”, online: ICAO <http://www.icao.int/safety/airnavigation/NationalityMarks/annexes_booklet_en.pdf> at 12.

⁷⁶ See ICAO, *supra* note 74 at 2 (Table 1) (establishing a detailed taxonomy of aircraft, classified into subcategories based on whether they are heavier- or lighter-than-air, powered or non-powered, and other distinctions).

driven flying machines.⁷⁷ Hovercraft are also excluded, based on a 1968 amendment to the Annex.⁷⁸ Though hovercraft do not directly impact the aerospace domain and the definition has not been altered since 1968, this modification does demonstrate that the aircraft definition is not entirely static, and ICAO—when member states desire—can modify the Annexes to clarify the vehicles that do and do not fall under its purview. However, while there are present calls to expand the definition of “aircraft” to encompass more objects (particularly rocket-like thrust-driven conveyances) in order to bring them into the ICAO traffic management, security, and safety regimes, the existing, current definition is limited to the named vehicles and craft.⁷⁹

⁷⁷ ICAO’s position on rockets, generally and in the context of suborbital travel, is captured in the discussion of SpaceShipOne, a vehicle that is carried by an aircraft to 50,000 feet, dropped, and then uses a rocket motor to reach approximately 100 kilometers, after which it travels back to Earth like a glider:

SpaceShipOne, strictly speaking, does not operate as an aeroplane *or even as an aircraft during the ballistic portion of the flight while it is not supported by the reactions of the air, even though some degree of aerodynamic control exists* throughout the trajectory from launch altitude until the craft enters the upper reaches of the atmosphere where the air density is no longer sufficient for aerodynamic flight.

ICAO Council Working Paper, “Concept of Suborbital Flights,” C-WP/12436, at 2 in COPUOS LSC, “Concept of Suborbital Flights: Information from the International Civil Aviation Organization (ICAO), A/AC.105/C.2/2010/CRP.9”, (19 March 2010), online: *UN Office for Outer Space Affairs* <http://www.unoosa.org/pdf/limited/c2/AC105_C2_2010_CRP09E.pdf> (emphasis added). However, the ICAO Working Paper goes on to state that, “After apogee, during re-entry into the atmosphere the vehicle transitions to unpowered aerodynamic (gliding) flight for the return to earth. Consequently, depending upon some design and operational aspects, it could be considered operating as an aircraft in flight during this latter portion of the journey.” *Ibid.* Thus, the nature of a craft can change throughout its operation; however, in the “rocket” portions it is not subject to the regime of aircraft. See also Milde, *supra* note 68 at 61 (noting that “rockets also travel through the air space but do not derive support from the reactions of the air.”). But see I H Ph Diederiks-Verschoor & M A Butler, *An Introduction to Air Law*, 8th rev. ed (Alphen aan den Rijn; Frederick, MD: Kluwer Law International; Aspen Publishers, 2006) at 6 (arguing that a rocket can meet the ICAO definition).

⁷⁸ ICAO, *supra* note 75 at 12 (noting that the 1968 amendment “implemented a decision that all air-cushion-type vehicles, such as hovercraft and other ground-effect machines, should not be classified as aircraft.”); see also Milde, *supra* note 68 at 61.

⁷⁹ See Ram Jakhu, Tommaso Sgobba & Paul Stephen Dempsey, eds, *The Need for an Integrated Regulatory Regime for Aviation and Space: ICAO for Space?*, Studies in Space Policy v.7 (Wien; New York: Springer, 2011) at 64 (“as the United Nations arm for air transportation, ICAO should provide clarification on the issues of what is contemplated by aircraft, and what is contemplated by airspace, and then proffer standards of harmonization as SARPs, which member States would be obliged to follow.”). The authors note that ICAO has already begun to examine whether its regulations would impact any suborbital flights that cross international borders, and advocate:

It is therefore reasonable to predict that, in due course, ICAO not only should but would expand its jurisdiction to cover space-related matters by slowly starting with those space activities that affect the safety of civil aviation. The Chicago Convention vests in ICAO

The required “reactions of the air” for aircraft have a vertical limit. As an aircraft moves forward, due to the shape and angle of the wing “the static air pressure above the wing decreases while it remains substantially stable below it due to the shape of the wing ... [and this] difference in pressure causes the aerodynamic lift.”⁸⁰ This lift effect requires adequate density of the air, which decreases as altitude rises. Additionally, air affects the amount of power (and forward motion, thus lift) a plane can produce—again, as altitude raises, the air thins and engines cannot produce adequate momentum.⁸¹ Given these requirements, it has been concluded “[i]t is unlikely ... that an aircraft will ever fly above 60 kilometers with an air-breathing engine.”⁸²

As the defining feature of airspace, the effective vertical geographic range of current aircraft must be discussed. As a baseline, at the dawn of aviation planes such as those operated by the Wright Brothers⁸³ or Alberto Santos-Dumont⁸⁴ flew only a few feet off the ground but are certainly considered aircraft. On the upper tier of aircraft operation are specialized (typically

ample jurisdiction to address these critical issues. Article 37 authorizes the promulgation of SARPs addressing “such other matters concerned with the safety, regularity, and efficiency of air navigation as may from time to time appear appropriate”. Under this provision, for example, ICAO has promulgated Annexes addressing environmental issues and aviation security, areas not contemplated when the Chicago Convention was originally drafted in 1944. It is manifestly desirable for the same essential rules of safety and navigation to be applied to all users of common airspace – aircraft and aerospace vehicles and space objects on launch and re-entry, as a first step. The extension of these regulations to the geosynchronous orbit would be a desirable second step.

Ibid at 42-43.

⁸⁰ Benkö & Plescher, *supra* note 5 at 7.

⁸¹ *Ibid*.

⁸² *Ibid* at 8.

⁸³ Daniel Haulman, *One Hundred Years of Flight: USAF Chronology of Significant Air and Space Events, 1903-2002* (Maxwell AFB, AL: Air University Press, 2003) at 1 (detailing the first flights, piloted by Orville and Wilbur Wright on 17 December 1903). The famous image of the flight shows it was at best only a few feet off the ground. Wilbur Wright, Orville Wright & John T Daniels, “Image [First flight, 120 feet in 12 seconds, 10:35 a.m.; Kitty Hawk, North Carolina]”, (1903), online: <<http://www.loc.gov/pictures/resource/ppprs.00626/>>. While some debate whether the Wright Brothers were actually the first to fly, there is no indication that any other pilots achieved significantly superior altitude in an airplane. See Linda Shiner, “Not the First?”, (18 March 2013), online: *Air & Space Magazine* <<http://www.airspacemag.com/daily-planet/not-the-first-3384507/>> (discussing claims that Gustave Whitehead of Connecticut was actually the first to fly an airplane).

⁸⁴ Perry Turner, “10 Milestone Flights”, (March 2003), online: *Air & Space Magazine* <<http://www.airspacemag.com/history-of-flight/10-milestone-flights-4056259/>> (in the first public flight of an airplane, Santos-Dumont is estimated to have flown at an altitude of two feet for a distance of 23 feet).

military) aircraft such as the U-2⁸⁵ and SR-71⁸⁶ which fly at altitudes up to 85,000 feet (or approximately 26 kilometers or 16 miles). While typically described as aircraft, these vehicles push the limits of what is black-and-white airspace, and venture into the gray areas of altitude discussed below.⁸⁷ More squarely in airspace are civilian aircraft, which typically operate with a ceiling of approximately 40,000 feet (12 kilometers),⁸⁸ with a high end of 51,000 feet (under 16 kilometers).⁸⁹

Perhaps the best demonstration of the vertical extent of airspace came with the 1960 shoot down of a US U-2 plane by the Soviet Union. The CIA plane, on a spy mission over Soviet airspace, was shot down at 70,500 feet (over 21 kilometers).⁹⁰ As will be discussed further below, national airspace is sovereign and therefore its incursion potentially triggers hostile action—which is just what the Soviet Union did, downing the plane. Had the shoot down been over free airspace (such as over the high seas, or another sovereign’s territory with permission), the US could have protested the use of force. However, the US government did not assert legality of overflight; instead it initially prepared a more defensible cover story—that the

⁸⁵ See “U-2S/TU-2S, Fact Sheet Display”, (25 May 2005), online: *US Air Force* <<http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104560/u-2stu-2s.aspx>> (listing the aircraft ceiling as “Above 70,000 feet”).

⁸⁶ “NASA Armstrong Fact Sheet: SR-71 Blackbird”, (28 February 2014), online: *NASA.gov* <<http://www.nasa.gov/centers/armstrong/news/FactSheets/FS-030-DFRC.html#.VVOMU5MYOzI>> (describing an 85,000 feet ceiling).

⁸⁷ See “Factsheets : Lockheed SR-71A”, (16 March 2015), online: *National Museum of the US Air Force* <<http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=395>> (noting that despite its technology, the SR-71 is still an aircraft: “Throughout its nearly 24-year career, the SR-71 remained the world’s fastest and highest-flying operational aircraft.”). Further beyond the U-2 and SR-71, in both altitude and rocket-like technology, are the X-15 and MiG E-266M (achieving well over 100,000 feet in altitude). See Rebecca Maksel, “Who holds the altitude record for an airplane?”, (28 May 2009), online: *Air & Space Magazine (Smithsonian)* <<http://www.airspacemag.com/need-to-know/who-holds-the-altitude-record-for-an-airplane-141522931/>>. Even the MiG E-266M’s 123,523 feet, though, only translates to under 38 kilometers of altitude.

⁸⁸ See Trepczynski, *supra* note 4 at 38; “Ceiling (aeronautics)”, (29 April 2015), online: *Wikipedia* <[http://en.wikipedia.org/w/index.php?title=Ceiling_\(aeronautics\)&oldid=659862810](http://en.wikipedia.org/w/index.php?title=Ceiling_(aeronautics)&oldid=659862810)>; see also Kevin Fong, *Extreme Medicine: How Exploration Transformed Medicine in the Twentieth Century* (New York: The Penguin Press, 2014) at 183 (“A typical commercial jet airliner cruises at around 36,000 feet.”).

⁸⁹ See, eg, “Learjet 75”, online: *Bombardier.com* <<http://businessaircraft.bombardier.com/en/aircraft/learjet/learjet75.html>>.

⁹⁰ Gregory Pedlow & Donald Welzenbach, *The CIA and the U-2 Program, 1954-1974 [unclassified]* (US Central Intelligence Agency, 1998) at 176.

plane was a NASA weather plane off course and in distress.⁹¹ This incident reflects acceptance by both the Soviet Union (which acted) and the US (which did not protest the action) that vertical airspace sovereignty extends at least to 70,500 feet (21 kilometers).⁹² Writing shortly after the incident, Cheng noted “that the U-2 flight constituted a violation of Soviet territorial sovereignty is so elementary a point in international law that it would be merely flogging a dead horse to labour it here.”⁹³

2. The Legal Nature of Airspace: Sovereign Territory

The assertion of state sovereignty over airspace has a long history. At the dawn of aviation there was academic and political debate over whether the skies should be free.⁹⁴ However, by 1919 (with the Paris Convention) and consistently thereafter, states had asserted sovereign control over their airspace. As stated in Article 1 of the Chicago Convention, “The contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory.”⁹⁵ This echoes the sovereignty asserted in the Paris Convention of 1919.⁹⁶ From this fundamental premise emerges the relevant legal scheme for operations in airspace, specifically that the air is sovereign territory.

Addressing the spatial extent of territorial sovereignty, Lachs noted that the notion of *cuius est solum eius est usque ad coelum et ad sidera* was “inherited from Roman law, [and] was

⁹¹ *Ibid* at 178. For more on the politics of the incident and the failed cover-up by the US, see generally Pedlow & Welzenbach, *supra* note 90; Cheng, *supra* note 62 at 105–06.

⁹² See also *infra* Chapter III.B.2.c (discussing a 1956 incident between the US and Soviet Union involving overflight of weather balloons, which similarly demonstrated a high-altitude assertion of territorial sovereignty, though with a less defined height and less definitive response).

⁹³ Cheng, *supra* note 62 at 105 (extracted from a 1961 article by Cheng).

⁹⁴ See Dempsey, *supra* note 16 at 11 (noting that in 1900, French jurist Paul Fauchille argued that “[b]ecause the air cannot be appropriated, ... , real property of the air is impossible, and the same principle prescribes State assertions of dominance over it; airspace therefore is *res communes*, and *l’air est libre*.”). For a thorough history of the development of the present air regime, see Reinhardt, *supra* note 4 at 70 et seq; Dempsey, *supra* note 71 at 9 et seq; Milde, *supra* note 68 at 5 et seq; Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) at 104–155 (including three articles by Cooper regarding the Paris Convention and its history). See also *infra* Chapter III.B.1 (further discussing the debate over air sovereignty and its effect on air and space delimitation).

⁹⁵ *Chicago Convention*, *supra* note 49 at art 1.

⁹⁶ *Paris Convention*, *supra* note 65 at art 1 (“The High Contracting Parties recognise that every Power has complete and exclusive sovereignty over the air space above its territory.”).

accepted by international law and adapted to its needs.”⁹⁷ The oft-cited phrase (and its varying articulations) essentially means “whoever owns the land owns it all the way to the sky and to the stars.”⁹⁸ While the precise language may not have originated in Rome, the concept did.⁹⁹ And, its present applicability is clear as an articulation of air sovereignty, such as that *recognized* (and not *created*) in the Paris and Chicago Conventions with their respective first articles.¹⁰⁰ More

⁹⁷ Lachs, *supra* note 64 at 41; see also Dempsey, *supra* note 71 at 746.

⁹⁸ Abramovitch notes:

This rule means: “Whose is the soil, his it is up to the sky”, or in a more simple explanation “He who possesses the land possesses also that which is above it”. Other elucidations are: “He who owns the soil owns everything above (and below) from heaven (to hell)”, and “He who owns the land owns up to the sky”.

Yehuda Abramovitch, “The Maxim ‘Cujus Est Solum Ejus Usque ad Coelum’ as Applied in Aviation” (1962) 8:4 McGill L J 247 at 247 (citations omitted). See also Milde, *supra* note 68 at 5 (translating the related phrase *cuius est solum eius est usque ad coelum et ad inferos*); John C Cooper, “Roman Law and the Maxim ‘Cujus est solum’ in International Air Law” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 54; Ian Brownlie, *Principles of Public International Law*, 7th ed (Oxford; New York: Oxford University Press, 2008) at 115; Katzenbach, *supra* note 64 at 220 (noting that *ad coelum* can be translated to mean both “to the sky” or “to the heavens”).

⁹⁹ Michael Milde disputes that this is actually “Roman law” as it is often described. While the Latin is the popular text for the phrasing of the concept, he found no actual link to the Romans or Byzantine *Corpus Iuris Civilis*. Milde, *supra* note 68 at 5; see also Vlasic, *supra* note 94 at 55 (Editor’s Note). Instead, its first use appears to be in the 13th century, in a commentary on Roman texts. *Ibid.* However, while Cooper agrees that this terminology did not appear in Roman text, “[w]hen the maxim is carefully analyzed, however, and reasonably construed, it is apparent that it must have sprung originally from principles of Roman law—though stated in a non-Roman manner.” Cooper, *supra* note 98 at 85. Cooper goes on to note that overly-extensive articulations of sovereignty based on this notion may exceed the Roman roots, but are grounded in later English statements “of the existence of present ownership of space to infinity.” *Ibid.*

¹⁰⁰ See Milde, *supra* note 68 at 10 (discussing the 1919 Paris Convention provision in the context of then-existing customary international law).

The *ad coelum* expression had its more practical legal origins in property rights and authorities, frequently in an individual-to-state context in the early stages of aviation law. See Loth & Ernst, *supra* note 71; Benschopf, *supra* note 71. However, Brierly notes that these private law concepts are directly applicable to assessments of sovereignty (and authority) among equal states:

Territorial sovereignty bears an obvious resemblance to ownership in private law.... As a result of this resemblance early international law borrowed the Roman rules for the acquisition of property and adapted them to the acquisition of territory, and these rules are still the foundation of the law on the subject.

J L Brierly, *The Law of Nations: An Introduction to the International Law of Peace [1st ed]* (Oxford: Clarendon Press, 1928) at 91–92 (Brierly’s position is echoed through the sixth edition of this work in

recently, the sovereignty of airspace has been affirmed by the International Court of Justice in the *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States)* case¹⁰¹ and the *Frontier Dispute (Benin/Niger)* case.¹⁰²

This exclusive state sovereignty applies to “the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of such State.”¹⁰³ The extension of sovereignty over the territorial sea, then, implicates the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which sets 12 nautical miles from the baseline as the maximum limit of territorial waters.¹⁰⁴ It further defines, and limits, the horizontal extent of sovereignty by way of rights of passage for aircraft. For instance, littoral states cannot assert full air sovereignty over international straits¹⁰⁵ or archipelagic sea lanes.¹⁰⁶ The broader exception of innocent passage through territorial seas does not apply to aircraft.¹⁰⁷ These rules apply for both civilian and state (including military) aircraft. Also, airspace sovereignty can be limited under unique

1963). As Cooper explains, for states to convey or (allow assertion of rights over) property to their citizens, they must have right to it in the first place. Cooper, *supra* note 98 at 56.

¹⁰¹ *Paramilitary Activities Case*, *supra* note 25, para 251 (“The principle of respect for territorial sovereignty is also directly infringed by the unauthorized overflight of a State’s territory by aircraft belonging to or under the control of the government of another State.”). The ICJ also notes that the Chicago Convention “reproduces the established principle of the complete and exclusive sovereignty of a State over the air space above its territory,” as opposed to creating the right. *Ibid*, para 212 (emphasis added).

¹⁰² *Frontier Dispute (Benin/Niger), Judgment (Jul 12)*, [2005] ICJ Rep 90 (International Court of Justice), para 124 (in resolving a river-based border dispute, the Court noted “a boundary represents the line of separation between areas of State sovereignty, not only on the earth’s surface but also in the subsoil and in the superjacent column of air.”); see Jinyuan Su, “The Delimitation Between Airspace and Outer Space and the Emergence of Aerospace Objects” (2013) 78 J Air L & Com 355 at 357–58.

¹⁰³ *Chicago Convention*, *supra* note 49 at art 2. This represents no significant deviation from the effect of the Paris Convention. *Paris Convention*, *supra* note 65 at art 1 (“For the purpose of the present Convention the territory of a State shall be understood as including the national territory, both that of the mother country and of the colonies, and the territorial waters adjacent thereto.”).

¹⁰⁴ *UNCLOS*, *supra* note 59 at art 3.

¹⁰⁵ *Ibid* at art 38 (Right of transit passage); see Astley & Schmitt, *supra* note 51 at 133.

¹⁰⁶ *UNCLOS*, *supra* note 59 at art 53 (Right of archipelagic sea lanes passage); see Astley & Schmitt, *supra* note 51 at 135.

¹⁰⁷ See *UNCLOS*, *supra* note 59 at art 17 (“Subject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.”); Astley & Schmitt, *supra* note 51 at 130.

circumstances such as distress.¹⁰⁸

It should be noted that while China, India, Japan, Russia and other space-faring states have ratified UNCLOS, two major space actors, the US and Kazakhstan,¹⁰⁹ are not signatories.¹¹⁰ This is germane to the degree that its effect on airspace sovereignty and navigation regimes is relevant to the launch and return of vehicles, however termed, that can operate in or near outer space as well as in airspace (aerospace vehicles). However, for the purposes of this work, the relevant UNCLOS regime will be treated as binding on all states as a matter of customary international law. The US formally follows the UNCLOS air and sea navigation regimes as customary international law, a position spanning both time and various administrations.¹¹¹

¹⁰⁸ See *UNCLOS*, *supra* note 59 at art 18 (providing an exception to innocent passage for aircraft rescues), *ibid* at arts 39 and 54 (providing an exception during transit passage and in archipelagic sea lanes); Astley & Schmitt, *supra* note 51 at 132 (regarding the right of assistance entry, “[a]s to the use of aircraft and helicopters, which are otherwise forbidden from entering another State’s national airspace without consent, US policy is to employ them when needed in life-threatening situations.”); Schmitt, *supra* note 50 at 320–321 (addressing military aircraft, particularly medical craft, over a neutral state’s territory).

¹⁰⁹ While Kazakhstan does not have a major space program of its own, its Baikonur Cosmodrome is a major launch facility for Russian and other international space programs. As the launch site of a space object, Kazakhstan bears potential international responsibility and liability as a “launching state.” See *Outer Space Treaty*, *supra* note 60 at art VII (“each State party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.”); *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 24 UST 2389, 961 UNTS 187 (entered into force on 1 September 1972) [*Liability Convention*] at art I(c) (“The term ‘launching State’ means: ...(ii) A State from whose territory or facility a space object is launched”).

¹¹⁰ See UN Oceans & Law of the Sea, “Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements as at 3 October 2014”, (7 January 2015), online: *UN Division for Ocean Affairs and the Law of the Sea* <http://www.un.org/depts/los/reference_files/chronological_lists_of_ratifications.htm>.

¹¹¹ See President of the United States (Ronald Reagan), *supra* note 17. While the decree does not explicitly describe the UNCLOS as reflecting customary international law, subsequent US statements do. See William H. Taft IV, Legal Advisor, U.S. Department of State, “Written Statement Before the Senate Armed Services Committee on 8 April 2004, Concerning Accession to the 1982 Law of the Sea Convention and Ratification of the 1994 Agreement Amending Part XI of the Law of the Sea Convention”, online: *US Dept of State* <<http://iipdigital.usembassy.gov/st/english/texttrans/2004/04/200404131333172xtkcollub0.3148462.html#axzz3aszK2DxR>>; US Secretary of Defense (William Cohen), “2001 Annual Report to the President and Congress, Appendix G (National Security and the Law of the Sea Convention)”, (1 January 2001), online: *available at* <<http://www.iwar.org.uk/military/resources/us-defense-report/2001/G.pdf>> (“Since 1983, the U.S. has acknowledged that the Law of the Sea Convention reflects, for the most part, customary international law. Since that time, the U.S. has abided by that international law, and has,

Similarly, Kazakhstan, though landlocked except for Caspian Sea access, seems to call upon the UNCLOS for territorial matters as well.¹¹²

The exclusive sovereignty of states over their airspace is endorsed throughout the Chicago Convention, as well. Beyond Article 1's recognition of sovereignty, Articles 6 (*Scheduled air services*) and 7 (*Cabotage*) confirm that international carriers may not operate in or over a state without that state's permission.¹¹³ Additionally, Articles 11 (*Applicability of air regulations*), 13 (*Entry and clearance regulations*), and 16 (*Search of aircraft*) further "confirm the complete jurisdiction of the State within its territorial airspace."¹¹⁴ These convention principles are effectuated and translated into practical guidance through ICAO and its promulgation of Standards and Recommended Practices (SARPs) as Annexes to the Convention and other procedural guides and requirements.¹¹⁵ Of course, the territorial sovereignty is not without limits or exception. For instance, aircraft in distress must be accommodated to a degree.¹¹⁶

Thus, in current law (the Chicago Convention, and the long-standing custom of sovereignty) and in practice (as established by ICAO in executing the Chicago Convention, as well as states in incidents such as the 1960 U-2 shoot down), the airspace above a state and its territorial waters is sovereign.

through its Freedom of Navigation Program, sought to encourage other nations to respect the balance of rights contained within the Convention.").

¹¹² See Kazakhstan Ministry of Foreign Affairs, "Legal Status of Caspian Sea", (30 January 2015), online: *Ministry of Foreign Affairs, Republic of Kazakhstan* <<http://www.mfa.kz/index.php/en/foreign-policy/current-issues-of-kazakhstan-s-foreign-policy/legal-status-of-caspian-sea>>.

¹¹³ *Chicago Convention*, *supra* note 49 at art 6 ("No scheduled international air service may be operated over or into the territory of a contracting State, except with the special permission or other authorization of that State, and in accordance with the terms of such permission or authorization.") , *ibid* at art 7 ("Each contracting State shall have the right to refuse permission to the aircraft of other contracting States... to take on passengers and cargo); see also Milde, *supra* note 68 at 43 (noting that Article 6's "'special permission or other authorization' is usually exchanged between States in the form of a bilateral air services agreement (BASA).").

¹¹⁴ Milde, *supra* note 68 at 46.

¹¹⁵ See Dempsey, *supra* note 71 at 51–52 (discussing "ICAO's quasi-legislative authority" and its various rule-making mechanisms).

¹¹⁶ *Chicago Convention*, *supra* note 49 at art 25 (Aircraft in distress); see also Michel Bourbonnière & Louis Haeck, "Military Aircraft and International Law: Chicago Opus 3" (2000) 66 J Air L & Com 885 at 916.

3. The Legal Nature of Airspace: Civil and State Aircraft

While the recognition of sovereignty over the airspace found in Article 1 of the Chicago Convention is absolute, it is not without exceptions. Reflecting the desire of early proponents of “open skies” for commercial aviation, Article 5 carves an exception to allow for non-scheduled aircraft (that is, not in regular passenger business) “to make flights into or in transit non-stop across [a State’s] territory and to make stops for non-traffic purposes without the necessity of obtaining prior permission....”¹¹⁷ Similarly, Article 6 sets the foundation for the creation of bilateral and multilateral agreements between states to allow for entry, stoppage, and traditional international air services, which most states have adopted.¹¹⁸

However, the scope of the Chicago Convention’s exemptions and exclusions are far narrower than its confirmation of sovereignty. Aside from Article 1, the rules and exceptions for flight of Chicago Convention apply only to civil aircraft, not state craft.¹¹⁹ Article 3 (*Civil and state aircraft*) distinguishes between the two:

- (a) This Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft.
- (b) Aircraft used in military, customs and police services shall be deemed to be state aircraft.
- (c) No state aircraft of a contracting State shall fly over the territory of another State or land thereon without authorization by special agreement or otherwise, and in accordance with the terms thereof.
- (d) The contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety and navigation of civil aircraft.

Article 3(b) is a departure from the Paris Convention, which further subdivided state craft into military craft and aircraft “exclusively employed in State service, such as posts, customs, police.”¹²⁰ This allowed for further subdivision of rights of passage, and a framework geared

¹¹⁷ *Chicago Convention*, *supra* note 49 at art 5 (though such flights are subject to limitations imposed by the territorial state); Dempsey, *supra* note 71 at 49.

¹¹⁸ See Dempsey, *supra* note 71 at 520 et seq.

¹¹⁹ *Chicago Convention*, *supra* note 49 at art 3.

¹²⁰ *Paris Convention*, *supra* note 65 at art 30. While the Paris Convention deemed “every aircraft commanded by a person in military service” to be “military aircraft” (Article 31), it did not give any further definition. Milde, *supra* note 68 at 64.

towards allowing non-military state vehicles rights akin to those enjoyed by civil craft in the Chicago Convention.¹²¹

Overall, the practical effect, vis-à-vis territorial sovereignty, is that state vehicles enjoy less freedom of movement over territorial airspace; there is no grant of innocent or transit passage, and specific rights have to be explicitly negotiated.

4. Airspace: Conclusion

In conclusion, there is a core, black and white understanding of airspace—it includes, at a minimum, the range of operation of aircraft at least to 70,500 feet (21 kilometers). In airspace, territorial sovereignty can be asserted by subjacent states, and must be respected by other states. While the Chicago Convention allows for overflight for civilian craft, the airspace regime shows no such deference to state craft—they are distinct from civilian aircraft. This means that overflight options are limited if an area is regarded as airspace, and aerospace (or other) vehicles doing so run the risk of committing a territorial incursion and provoking a hostile response.

B. Outer Space: Free Use and Exploration (The Province of All Humankind)

The zone known as outer space has no outward boundaries; it extends beyond Earth as far as exploration can take our law. On the lower end, however, the widely accepted notion of outer space (and outer space law) extends at least to 150 kilometers (approximately 492,100 feet or 93 miles). In outer space, states cannot assert or exercise any territorial sovereignty over the space, the Moon, or other celestial bodies, but are free to use and explore the domain. This use and exploration is open to state and civil craft without distinction, though states are required to assert responsibility and control over the craft of their nationals and organizations in outer space. The nature of the outer space domain, its status regarding state sovereignty, and the lack of distinction between state and civil aircraft are discussed in this section.

1. The Physical Nature of Outer Space: The Domain of Space Objects in Orbit and Beyond

¹²¹ *Paris Convention*, *supra* note 65 at art 32; Milde, *supra* note 68 at 64.

Perhaps the most fitting definition (or lack thereof) for space is found in the glossary portion of the US Department of Defense publication on *Space Operations*: “**space**. None.”¹²² While it goes on to define many other aspects of space use and operations, the guide cannot clearly define the domain itself.

Defining space by the craft that operate in it is equally unavailing. The outer space treaties use the terms “space objects” and “national activities in outer space” but neither of those are clearly defined or delimited in scope. The Liability Convention of 1972 and Registration Convention of 1975 merely state that the “space object” term “includes component parts of a space object as well as its launch vehicle and parts thereof.”¹²³ Dempsey noted that, “[p]resumably, a spacecraft should be capable of moving in outer space (either orbital or suborbital) without any support from the air, and it would have a power source not dependent upon external oxygen.”¹²⁴ But, the parenthetical caveat of “(either orbital or suborbital)” reveals the difficulty of using craft to define what is clearly “outer space.” To state the obvious, humans are terrestrial beings and airspace lies between Earth and outer space; similarly, the suborbital area (however defined) lies below orbit. Therefore, to reach outer space, the farthest zone from Earth, a vehicle must pass through (and be able to function, to some degree at least) in all zones.¹²⁵ So, the nature or capacity of a space-bound vehicle and where it *can* operate should not be a determining factor for where “outer space” exists. With the further development of vehicles that can more seamlessly operate in outer space and airspace, this distinction is becoming even less useful as a discriminating criterion.

Further, while the outer space treaties extend jurisdiction and responsibility over “national activities in outer space,”¹²⁶ one cannot definitively declare what the notion of “space activities” includes.¹²⁷ This is a new topic being addressed by the UN Committee on Peaceful

¹²² US Department of Defense, *Joint Publication 3-14, Space Operations* (2013) at GL–7.

¹²³ *Convention on Registration of Objects Launched into Outer Space*, 14 January 1975, 28 UST 695, 1023 UNTS 15 (entered into force on 15 September 1976) at art I(d), *ibid* at art I(b).

¹²⁴ Dempsey, *supra* note 71 at 755. Compare ICAO, *supra* note 74 (Annex 7, defining aircraft by its capacity to derive support from the air).

¹²⁵ For instance, while a rocket is not particularly maneuverable as an airspace vehicle, it has the capacity to cut through the air to reach beyond airspace.

¹²⁶ See *Outer Space Treaty*, *supra* note 60 at art VI.

¹²⁷ In much of the “national activities” analysis, the discussion tends to focus on the “national” portion (that is, attribution to the state) and less on the matter of what constitutes activity in space. See, eg, Bin

Uses of Outer Space (COPUOS), as of 2014, with no headway as yet.¹²⁸

The fragility of human life does not help define outer space, either. Even at civilian airliner cruising altitudes (36,000 feet, or 11 kilometers—far below the limits of what is clearly accepted as airspace), without cabin pressurization, passengers and crew would fall victim to persistent unconsciousness “as a prelude to death from oxygen starvation.”¹²⁹ Once a human reaches 60,000 feet (just over 18 kilometers, still well below the line established by the U-2 incident), the liquids in a human body would begin to boil.¹³⁰ Certainly, a major aspect of space flight and exploration is that “bubbles of life support must be artificially created, maintained, and sealed against the exterior.”¹³¹ But, this alone is not a determining factor for when one reaches outer space.

The most effective definition for when one is in outer space, and clearly subject to outer space law, may be reached by a negative definition—what it is not.¹³² The often discussed idea of “near space” encompasses areas that may or may not be outer space. So, that which is clearly outer space must be beyond near space, which can be “defined as space above where commercial airliners fly but below orbiting satellites.”¹³³

Cheng, “Article VI of the 1967 Space Treaty Revisited: ‘International Responsibility’, National Activities’, and ‘the Appropriate State’” (1998) 26:1 J of Space L 7.

¹²⁸ See COPUOS LSC, *Report of the Chair of the Working Group on the Definition and Delimitation of Outer Space (Vienna, 13-24 April 2015)*, A/AC.105/C.2/2015/DEF/L.1 (Vienna: UN Committee on the Peaceful Uses of Outer Space, Legal Sub-Committee, 2015) at 1; “Daily Journal No. 11, Legal Subcommittee: 2015, Fifty-fourth session (13-24 April 2015)”, (24 April 2015), online: *UN Office for Outer Space Affairs* <<http://www.unoosa.org/oosa/en/COPUOS/lsc/2015/journal.html>> (the Legal Subcommittee adopted the report as a whole at its 913th Meeting).

¹²⁹ Fong, *supra* note 88 at 183.

¹³⁰ *Ibid* at 185 (describing the Armstrong Line, at which--due to low pressure--the boiling point of water falls below the normal core body temperature of a human (98.6 degrees F)).

¹³¹ *Ibid* at 191.

¹³² This incremental approach is reflected in the thinking of Bin Cheng, who commented, “outer space can be said to begin arguably at an altitude of 96 kilometres above the earth, clearly so at 110 kilometres and definitely so at 130 kilometres.” Bin Cheng, ““Space Objects”, “Astronauts” and Related Expressions,” (1991) 34 Proc Colloq L Outer Space 17 at 26, quoted in Katherine M Gorove, “Delimitation of Outerspace and the Aerospace Object - Where is the Law” (2000) 28 J Space L 11 at 12; see also Cheng, *supra* note 62 at 450–451 (“Above this height [110 km] one is definitely in outer space, according to *lex lata*.”).

¹³³ Taro Kuusiholma & Ram Jakhu, *The Need for International Approach and Framework for Operations in Near-Space* (Vienna, 2015) at 2; see also Leonard David, “Sky Trek to the ‘Near Space’ Neighborhood”, (9 November 2005), online: *Space.com* <<http://www.space.com/1761-sky-trek-space->

An object reaches orbit when it achieves a balance between its velocity (pushing out) and the gravitational pull of the Earth (pulling it in) such that it is continually in state of free-fall.¹³⁴ Orbits come in numerous varieties, but all reflect this balance of outward velocity and the gravitational effect of Earth.¹³⁵ The lowest altitude of natural¹³⁶ orbit is called Low Earth Orbit. This typically extends to 1000 kilometers, but like much of outer space law, it lacks any fixed lower definition.¹³⁷ The “lowest known sustained orbital altitude” was held by the Soviet

neighborhood.html> (“Near Space is between 65,000 feet (20 kilometers) and 325,000 feet (99 kilometers) above sea level.”). However, near space is a zone without a fixed legal definition; so, it may encompass areas that may be considered otherwise part of airspace or outer space.

¹³⁴ Benkö & Plescher, *supra* note 5 at 8. For a simple, but effective, explanation of orbits from early in the space age, see The White House (Eisenhower), *Introduction to Outer Space* (US Government Printing Office, 1958) at 2–3. The document invites the reader to imagine throwing a stone; the harder it is thrown, the further it flies. If it was thrown at 18,000 miles per hour, though:

It would travel so far that it would overshoot the earth, so to speak, and keep falling until it was back where it started. Since in this imaginary example there is no atmospheric resistance to slow the stone down, it would be travelling at the original speed, 18,000 m.p.h., when it had got back to its starting point. So around the earth it goes again. From the stone’s point of view, it is continuously falling, except that its very slight downward arc exactly matches the curvature of the earth, and so it stays aloft—or as the scientist would say, “in orbit”—indefinitely.

Since the earth has an atmosphere, of course, neither stones nor satellites can be sent whizzing around the earth at tree-top level. Satellites must first be lifted beyond the reach of atmospheric resistance.

¹³⁵ For a more substantial discussion of orbits, see Kleiman, Lamie & Carminati, *supra* note 73 at 3–11 (with a practical explanation of orbits geared towards legal thinkers); Lucy Rogers, *It’s ONLY Rocket Science: An Introduction in Plain English*, Astronomers’ Universe (New York: Springer, 2008) at 84 et seq (for a more technical explanation of orbits).

¹³⁶ Parenthetically, for purposes of this work, the idea of orbits include only natural orbits, or those driven primarily by physics and limited propulsion. Certainly, one can argue that there is nothing “natural” about terrestrially-bound humans flying anywhere, let alone past where our bodies can survive exposure to the environment. But, there must be a distinction between orbits discussed above (which are driven by physics—velocity versus gravity) and the mere capacity to indefinitely circle the Earth in a predictable pattern. For instance, if fuel and thrust capacity were no issue, a vehicle could theoretically circle the Earth at any altitude independent of gravitational forces. Thus, the term “natural orbit” is used for the former category, and the latter is not regarded or discussed as an “orbit.”

¹³⁷ See Kleiman, Lamie & Carminati, *supra* note 73 at 29 (assigning 160 to 1000 kilometers as LEO); US Department of Defense, *supra* note 122 at G–6 (defining LEO as no more than 1000 kilometers); Holli Riebeek, “Catalog of Earth Satellite Orbits”, (4 September 2009), online: [NASA.gov](http://earthobservatory.nasa.gov/Features/OrbitsCatalog/) <<http://earthobservatory.nasa.gov/Features/OrbitsCatalog/>> (placing LEO between 180 and 2000 kilometers); Rogers, *supra* note 135 at 89 (extending LEO down to 100 kilometers).

“Zenit” series satellite, at 150 kilometers (approximately 492,100 feet or 93 miles).¹³⁸ However, not all orbits have a consistent eccentricity; that is, they are not perfect circles that maintain the same altitude over Earth throughout an orbital rotation. At their lowest orbital point, or perigee, some satellites have operated at around 100 kilometers (328,000 feet or 62 miles).¹³⁹ Of note, this is also the approximate altitude known as the von Kármán line, a popular reference point for air-space demarcation and the point at which it is believed an aircraft would have to reach orbital velocity in order to produce enough lift to remain aloft.¹⁴⁰ But, like orbit, there is debate as to the exact altitude of this line.¹⁴¹

In conclusion, space has been defined to a degree. There are no outer limits of space—the domain extends *ad infinitum* to cover use and exploration beyond Earth, in outer space and on the moon and other celestial bodies.¹⁴² Fine tuning the outward limits or creating exemptions for an age of possible colonization is certainly a future possibility, but beyond the scope of this work. On the lower limits, it can reasonably be argued as accepted that space extends down to 100 kilometers as a matter of broad acceptance. So, craft in orbit should fairly comfortably be

¹³⁸ UK Ministry of Defence, *supra* note 63 at 1–3. See also, Cheng, *supra* note 11 at 38 (“The initial perigees and apogees of the orbits of Sputnik I, Discoverers I, II, V, VII, XI and the Soviet Space Ship are, respectively, 142-588, 99-605, 142-220, 136-450, 100-520, 109-380 and 193-230 miles.”).

¹³⁹ See Cheng, *supra* note 62 at 396 (citing a UN COPUOS Study on Altitudes of Artificial Earth Satellites, A/AC.105/164).

¹⁴⁰ Dennis Jenkins, “Extra Feature: A word about the definition of space”, (21 October 2005), online: NASA.gov, Dryden Flight Research Center <http://www.nasa.gov/centers/dryden/news/X-Press/stories/2005/102105_Schneider.html>; Dempsey, *supra* note 71 at 750 (noting the line, and its popularity as a possible point of demarcation); Gbenga Oduntan, “The Never Ending Dispute: Legal Theories on the Spatial Demarcation Boundary Plane between Airspace and Outer Space” (2003) 1:2 Hertfordshire L J 64 at 72–73.

¹⁴¹ Frans von der Dunk, “International Space Law” in Frans von der Dunk & Fabio Tronchetti, eds, *Handbook of Space Law*, Research Handbooks in International Law (Cheltenham, England: Edward Elgar Publishing, 2015) 29 at 65–66 (noting some deviations in the generally-accepted 100 km or 62 mile line).

¹⁴² See generally *Outer Space Treaty*, *supra* note 60 at art I; Lachs, *supra* note 64 at 53 (“One may safely postulate that the realm of the law of outer space extends to infinity.”). The one exception to this came in 1976, when eight equatorial states asserted territorial claims to the geosynchronous orbit (at approximately 36,000 kilometers, or 118 million feet) in what came to be known as the Bogota Declaration. *Declaration of the First Meeting of Equatorial Countries*, adopted 3 December 1976 (available at http://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html) [*Bogota Declaration*]. However, this assertion has been overwhelmingly rejected by the international community. See Cheng, *supra* note 62 at 455; Oduntan, *supra* note 140 at 76.

considered as operating in outer space, from both a scientific perspective and a legal one.¹⁴³

Below 100 kilometers, however, whether one has reached space (and outer space law) would be a matter of significant debate on law and policy.

2. The Legal Nature of Outer Space: *Res Communis*

Early in the space age, states rejected the assertion of territorial sovereignty in outer space—however defined—in the UN General Assembly with Resolution 1962:

2. Outer space and celestial bodies are free for exploration and use by all States on a basis of equality and in accordance with international law.
3. Outer space and celestial bodies are not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.¹⁴⁴

While this Resolution was non-binding and aspirational,¹⁴⁵ its mandates for free use and exploration and non-appropriation were solidified with the Outer Space Treaty of 1967, which remains the primary governing document of outer space law relevant to the analysis of territorial sovereignty.¹⁴⁶

¹⁴³ Kleiman, Lamie & Carminati, *supra* note 73 at 3 (writing for space law practitioners, noting the Karman “line has become the de facto demarcation accepted by most people in the space community.”); Gorove, *supra* note 132 at 11–12 (“What appears to have emerged as international customary law is that the lowest perigee orbit of artificial earth satellites (currently, that would be approximately 100–110 km above sea level) lies at a point in outer space”).

¹⁴⁴ *Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space*, 13 December 1963, UN General Assembly Res 1962 (XVIII) [*Declaration of Legal Principles*]. These principles were adopted unanimously. *Outer Space Treaty*, *supra* note 60 at preamble. See also Gbenga Oduntan, “The Never Ending Dispute: Legal Theories on the Spatial Demarcation Boundary Plane between Airspace and Outer Space” (2003) 1:2 *Hertfordshire L J* 64 at 64 (stating that “it makes no sense in conventional terms to speak of sovereignty in outer space ... because *ab initio* international legislation developed to govern outer space has been unequivocal on the prohibition of the application of state sovereignty in outer space.”).

¹⁴⁵ *Declaration of Legal Principles*, *supra* note 76 at preamble (“The General Assembly ... [*s*]olemnly declares that in the exploration and use of outer space States should be guided by the following principles.”) (emphasis added). For greater discussion of the international law of outer space as a regime largely governed by “soft law” (as opposed to conventional or customary dictates of “hard law”), see Ram Jakhu & Steven Freeland, “The Sources of International Space Law” in Corinne Jorgenson, ed, *Proceedings of the International Institute of Space Law 2013* (The Hague: Eleven International Publishing, 2014) 461.

¹⁴⁶ The Outer Space Treaty has 103 ratifications and an additional 25 signatories. COPUOS LSC, *Status of International Agreements relating to activities in outer space as of 1 January 2015*, A/AC.105/C.2/2015/CRP.8 (Vienna: UN Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, 2015). These include major and emerging space-faring states, such as Brazil, Canada, China, India, Japan, Russia, South Africa, and the US.

Two key provisions of the Outer Space Treaty establish outer space as an area free of territorial sovereignty. First, Article I states in relevant part:

The exploration and use of outer space, including the moon and other celestial bodies, ... shall be the province of all mankind.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.¹⁴⁷

According to Jakhu, the second paragraph of Article I alone “categorically and unambiguously denied any and all claims of national sovereignty, especially traditional territorial sovereignty, to outer space and celestial bodies.”¹⁴⁸

However, Article II continues, “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹⁴⁹ This explicitly precludes states from assertions of territorial sovereignty in outer space. Demonstrating the breadth of this prohibition, it precludes the traditional means of states under other legal regimes (such as formal claims or actual occupation), and it forecloses assertions “by any other means” as well.

While Article I and particularly Article II eliminate assertions of state sovereignty over outer space, the Outer Space Treaty does not establish outer space as a legal vacuum. The treaty institutes guiding principles, and creates obligations for states to govern their own space activities (both state activities and those of their nationals). So, outer space law works on two levels – international and domestic (applied through states to space actors).¹⁵⁰ The lack of sovereignty and ownership (appropriation) is so firm that even commercial ventures in outer space are legally unclear due to concerns of property rights for natural resources mined or otherwise extracted from celestial bodies. This shows the degree to which states regard outer space as both the territory of no one and the property of all humanity.

¹⁴⁷ *Outer Space Treaty*, *supra* note 60 at art I.

¹⁴⁸ Ram Jakhu, “Legal Issues Relating to the Global Public Interest in Outer Space” (2006) 32 J Space L 31 at 39.

¹⁴⁹ *Outer Space Treaty*, *supra* note 60 at art II.

¹⁵⁰ See Cheng, *supra* note 62 at 429 (discussing the division between international space law and municipal space law, but noting that “in the matter of boundaries between airspace and outer space it is international law which is controlling.”). This is similar to the divide between international and domestic air law noted *supra* at note 71 and *infra* at note 255.

Thus, outer space cannot be claimed by any state, and all states are free to operate in space—in stark contrast to the sovereignty regime of airspace. In this regard, according to Brownlie, outer space resembles the high seas as a *res communis*.¹⁵¹ However, the term *res communis* carries with it no particular legal regime; it is more descriptive (providing a term for outer space’s nature) than proscriptive (which would suggest it provides legal guidance on how outer space is governed).¹⁵²

This departure from the air regime was established early in the era of space exploration. As Judge Lachs noted:

[T]he first instruments that men sent into outer space traversed the air space of States and circled above them in outer space, yet the launching States sought no permission, nor did the other States protest. This is how the freedom of movement into outer space, and in it, came to be established and recognized as law within a remarkably short period of time.¹⁵³

It must be noted that this passage is dicta from a discussion of the potential for rapid formation of customary international law, in a case not involving outer space law. However, the aspects relating to freedom of movement in outer space were certainly endorsed with Articles I and II of the Outer Space Treaty and the preceding *Declaration of Legal Principles*, as discussed above. Further, while the Outer Space Treaty and *Declaration of Legal Principles* were agreed upon by consensus at the UN COPUOS and in the General Assembly, the key two parties were the US and the Soviet Union—at the time, the world’s two superpowers and the two primary space-faring states. And, the drafting history of the Outer Space Treaty demonstrates the close coordination and general agreement of these powers with regard to the free use and exploration (that is, lack of sovereignty) in space.¹⁵⁴

¹⁵¹ Brownlie, *supra* note 98 at 255 (describing outer space as similar to the high seas due to the free use).

¹⁵² See *ibid* at 169.

¹⁵³ *North Sea Continental Shelf Cases (Fed Rep of Germany v Denmark, Fed Rep Germany v Netherlands)*, *Merits* (Feb 20), [1969] ICJ Rep 3 (International Court of Justice) at 230 (dissenting opinion of Judge Lachs). For further discussion of how the outer space regime emerged (not just what it presently is), see *infra* Chapter III.B.3.

¹⁵⁴ See Arthur Goldberg, *Letter Dated 16 June 1966 from the Permanent Representative of the United States of America addressed to the Chairman of the Committee on the Peaceful Uses of Outer Space*, A/AC.105/32 (1966) (noting close coordination with the USSR, and advocating freedom in space); P Morozov, *Letter Dated 11 July 1966 Addressed to the Chairman of the Legal Sub-Committee by the Representative of the USSR*, A/AC.105/C.2/L.13 (1966).

3. The Legal Nature of Outer Space: Civil and State Vehicles

Quite the opposite of the private, civilian efforts of the Wright Brothers, Santos-Dumont, and other aviation pioneers, space flight and exploration was a state enterprise from its inception. It was the US and Soviet Union, through their national space programs, that launched the first unmanned and manned missions into space.¹⁵⁵ Moreover, it was not just states (specifically the Soviet Union and US), but military missions by states—though for peaceful purposes—with military members at the helm.¹⁵⁶ One amalgamation of astronaut data found that, “[u]ntil 2004, astronauts were sponsored and trained exclusively by governments, either by military agencies or by civilian space agencies.”¹⁵⁷ At the dawn of space exploration, US President Dwight Eisenhower intended the US space program to be civilian-run and for scientific purposes. But, after *Sputnik*, that changed as reaching space became perceived as a matter of exigency for the US to preserve both prestige and security.¹⁵⁸ Unlike the Paris Convention for aircraft, however, the distinction between military and other state operation has no legal bearing on the status of spacecraft.¹⁵⁹ In fact, not even the civil versus state distinction from the Chicago Convention was included.

The international law of outer space makes no distinction between civil and state vehicles. They are grouped together under Article VI of the Outer Space Treaty:

¹⁵⁵ See Dempsey, *supra* note 71 at 753 (noting that because the space launches were state craft, ICAO had no basis for jurisdiction over them).

¹⁵⁶ StarChild Team, “Yuri Gagarin”, online: *NASA.gov* <http://starchild.gsfc.nasa.gov/docs/StarChild/whos_who_level2/gagarin.html> (noting that Gagarin, the first human in space, was drawn from the Soviet Air Force (where he was a fighter pilot) for cosmonaut training); NASA, *Astronaut Fact Book*, NP-2013-04-003-JSC (NASA, 2013) at 1–2 (noting that the entire first cadre of US astronauts were military members); *ibid* at 10–1 (providing basic service data for all US military astronauts).

¹⁵⁷ “List of Astronauts by Name”, (25 May 2015), online: *Wikipedia* <http://en.wikipedia.org/w/index.php?title=List_of_astronauts_by_name&oldid=663957240>.

¹⁵⁸ See Roy F Houchin, *US Hypersonic Research and Development: The Rise and Fall of Dyna-Soar, 1944-1963*, Space Power and Politics (London; New York, NY: Routledge, 2006) at 81 (“Indeed, the president would not compromise his position on launching a civilian satellite with a civilian (not a military) booster until after *Sputnik* and the failure of the Vanguard in December 1957. Following these events, he openly conceded the need for studies of military space programs.”). See also *supra* Chapter III.D.4.

¹⁵⁹ Of course, as a matter of fact and perception the line between military and non-military activities in outer space can make a great deal of difference in the context of the debate over the meaning of “peaceful” uses of outer space. See *supra* Chapter III.D.5.a.

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.

Thus, a state is responsible for all activities of its nationals in outer space (state or civil), and for assuring they adhere to the Outer Space Treaty.¹⁶⁰ Such “international responsibility” suggests that states would desire to assert control over national activities; but, Article VI goes on to make this obligation explicit: “The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall *require authorization and continuing supervision* by the appropriate State Party to the Treaty.”¹⁶¹ Thus, the Outer Space Treaty assigns responsibility to and requires significant and active oversight (“authorization and continuing supervision”) by states for civil activities in outer space.¹⁶² This obligatorily close relationship can largely blur the distinction between state and civil activities.¹⁶³

¹⁶⁰ Article VI also assigns states responsibility for the activities of international organizations of which they are part. *Outer Space Treaty*, *supra* note 60 at art VI (“When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.”).

¹⁶¹ *Ibid* (emphasis added). The requirement to create controlling domestic legislation was accentuated in the UN General Assembly in 2013 with Resolution 68/74, which accentuates the Outer Space Treaty requirements and stresses the importance of state involvement “in view of the increasing participation of non-governmental entities in space activities” and other modern developments and problems with the expanded use of outer space. *Recommendations on national legislation relevant to the peaceful exploration and use of outer space*, 11 December 2013, UN General Assembly Res 68/74, A/RES/68/74 [UN Res 68/74].

¹⁶² Additionally, Article VIII of the Outer Space Treaty ensures that jurisdiction and control remains with a state throughout the duration of space activities, through the registration process:

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.

Outer Space Treaty, *supra* note 60 at art VIII.

¹⁶³ This blur is the case, at least, in the view of parties external to the state. Internally, a state may create whatever regime it finds appropriate to manage civil space activities; the requirements can be the same as those for state activities, or more onerous. See generally Cheng, *supra* note 62 at 429.

This is “radically different”¹⁶⁴ than general norms of international law, and certainly a departure from the airspace regime. For instance, the commentary to the UN International Law Commission (ILC) *Articles on State Responsibility* notes the requirement of attribution to a state before responsibility can be assigned:

Thus, the general rule is that the only conduct attributed to the State at the international level is that of its organs of government, or of others who have acted under the direction, instigation or control of those organs, i.e. as agents of the State. ... As a corollary, the conduct of private persons is not as such attributable to the State.¹⁶⁵

Under air law, every aircraft must have a nationality and a flag.¹⁶⁶ Through the Tokyo Convention of 1963¹⁶⁷ and other agreements, a degree of jurisdiction and control flies along with that flag. From this stems a general ability to control (or regulate) one’s citizens and activities. But, short of properly demonstrated attribution to a state actor or activities, there is no requirement that a state is responsible for its aircraft such as in the outer space legal regime.¹⁶⁸

This unique relationship between space-faring states and their national actors is particularly significant for non-governmental activities, in that Article VI of the Treaty mandates all activities be carried out in conformity with the Treaty; and Article III mandates that states “shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.”¹⁶⁹ So, reading these two requirements together, it dictates the acceptable limits and legitimate interests of civil activity, i.e. “maintaining peace and security and promoting international co-operation and understanding.”¹⁷⁰ This is a fairly early case of public international law potentially reaching beyond states to govern the actions of

¹⁶⁴ Cheng, *supra* note 127 at 13 (discussing the unique Article VI requirement that states “assure” compliance, saying it “assumes an air of guarantee by the State of such compliance.”).

¹⁶⁵ *ILC Articles on State Responsibility*, *supra* note 38 at 39 (commentary), see also *ibid* at Chapter II, arts 4–11.

¹⁶⁶ *Chicago Convention*, *supra* note 49 at art 17.

¹⁶⁷ *Convention on Offenses and Certain Other Acts Committed on Board Aircraft*, 14 September 1963, 704 UNTS 220 (entered into force on 4 December 1969) [*Tokyo Convention*] (addressing jurisdiction for crimes and other acts on board aircraft that prejudice the good order and discipline of aviation).

¹⁶⁸ See *Outer Space Treaty*, *supra* note 60 at arts VI–VIII.

¹⁶⁹ *Ibid* at art III.

¹⁷⁰ *Ibid*.

individuals (assuming states adhere to their Outer Space Treaty obligations and actually enact rules to adequately authorize and supervise their national actors in space). If states are required to meet this standard, and their national activities are expected to adhere to state standards, then the private and civil activities must therefore meet these international standards.¹⁷¹

4. Outer Space: Conclusion

In conclusion, there is a core, black and white understanding of outer space—it includes the space and vehicles in natural orbit around Earth, and beyond.¹⁷² This limit can be safely read to extend at least down to 150 kilometers (or 492,000 feet), and likely down to 100 kilometers (328,000 feet) in the thoughts of most writers. Further, outer space law establishes that it is the sovereign territory of no state, and instead its use and exploration is “the province of all mankind.”¹⁷³ Further, outer space law is a unified regime for state and civilian vehicles—there is no legal distinction between the two, at least with regard to international obligations.

C. The Legal Gray Area between Air and Space: Gray Space

Reconciling the widely settled zones of airspace and the outer space leaves question as to what law governs the area between 70,500 feet (21 kilometers) and 100-150 kilometers. This represents the gray area in the law: the zone of ambiguity at the edges of both air and outer space, herein referred to as “gray space.” Many writers talk of the delimitation problem, and

¹⁷¹ Further, it could be argued that there is no need to distinguish between state and civil craft in outer space, because the lack of territorial sovereignty and guarantees of free use and exploration mean any craft (civil or state) may fly freely, or at least without discrimination due to state/civilian status. Also, the Article VI responsibility, supervision, and control mandates create a construct by which everything launched into space can, in effect, be construed as a state (or state-affiliated) craft. The liability regime for space objects similarly ignores any distinction between state and civil craft in the case of damages caused—in either case, the state is obligated to make reparations as required by the relevant conventions. See *ibid* at art VII; *Liability Convention*, *supra* note 109 at arts II and III; Valérie Kayser, *Launching Space Objects: Issues of Liability and Future Prospects*, Space Regulations Library (New York; Boston: Kluwer Academic Publishers, 2001) at 40 (discussing liability of non-governmental entities in outer space). Compare *ILC Articles on State Responsibility*, *supra* note 38 at Chapter II (discussing the bases for attribution to a state, including actions by, inter alia, an organ of the state (Article 4); those exercising governmental authority (Article 5); and those acting under direction or control of a state (Article 8)).

¹⁷² See John Bellflower, “The Influence of Law on Command of Space” (2010) 65 AF L Rev 107 at 141 (“In fact, there is no controversy that all current satellite orbits transit within the space domain.”).

¹⁷³ *Outer Space Treaty*, *supra* note 60 at art I; see also Jakhu, Sgobba, & Dempsey, *supra* note 79 at 53 (“Freedom of the use of space is a fundamental principle of the space law regime.”).

many make proposals on how best to resolve it; but, there is no overall consensus. As Lyall and Larsen, noted “there is uncertainty—not that space law exists, but as to the exact location of its application. Needless to say there have been many suggestions.”¹⁷⁴ More importantly, there is similarly no consensus among states.¹⁷⁵

Two primary schools of thought have emerged on the issue of air and space delimitation: spatialism and functionalism. Spatialism essentially argues for a fixed line, at a set altitude, for the division of airspace and outer space. Under a strict spatialist analysis, if a craft, regardless of its nature and capabilities, is below the line it is in airspace; when it is above the line, it is in outer space.¹⁷⁶ Conversely, functionalism focuses on the nature of the craft in question. If it serves outer space functions, outer space law applies wherever it is operating; if it is an aircraft, airspace law applies to its flight.¹⁷⁷ In effect, this “approach would render it unnecessary to solve the theoretical dispute whether there is a boundary between airspace and outer space and where it should be located.”¹⁷⁸ Of course, even within these broad schools are more particular and inconsistent theories of delimitation.¹⁷⁹ Further, some thinkers and space-faring states believe there is no need to decide the issue.¹⁸⁰

¹⁷⁴ Francis Lyall & Paul Larsen, *Space Law: A Treatise* (Farnham, Surrey, England; Burlington, VT: Ashgate, 2009) at 153; see also *ibid* at 11–30 (providing a thorough outline of the development of the institutions--academic, governmental, and other--that study and address space law).

¹⁷⁵ For discussion of state positions in UN COPUOS, see Benkö & Plescher, *supra* note 5; Su, *supra* note 102 at 371; Kayser, *supra* note 171 at 45, n.97. For greater development of this issue, see *infra* Chapter III.C.3.b.

¹⁷⁶ See, eg, Dempsey, *supra* note 71 at 746.

¹⁷⁷ See, eg, Lyall & Larsen, *supra* note 174 at 169–70.

¹⁷⁸ Benkö & Plescher, *supra* note 5 at 35.

¹⁷⁹ See Su, *supra* note 102 at 363 (noting the lack of consensus within spatialism); Cheng, *supra* note 62 at 444–45 (noting inconsistency in the functionalist approaches). Matte and Oduntun provide thorough outlines of many of these more particular schools of thought. See Matte, *supra* note 73 at 357 et seq; Oduntun, *supra* note 140.

¹⁸⁰ For instance, the US has stated:

With respect to the question of the definition and delimitation of outer space, we have examined this issue carefully and have listened to the various statements delivered at this session. Our position continues to be that defining or delimiting outer space is not necessary. No legal or practical problems have arisen in the absence of such a definition. On the contrary, the differing legal regimes applicable in respect of airspace and outer space have operated well in their respective spheres. The lack of a definition or delimitation of outer space has not impeded the development of activities in either sphere.

The emergence of hybrid aerospace vehicles challenges these theories, and compounds the lack of consensus. Their ability to operate in either airspace or outer space, straddling any line established between the two, can make their control and regulation ambiguous and inconsistent if spatially-based. Further, their function is novel; on any given flight, they may operate both as an aircraft and space craft. As one description of the functional approach explained, “one way to answer the question as to which regime of law applies is to ask what type of vehicle is being considered—is it an aircraft, or a spacecraft, or an aerospace vehicle?”¹⁸¹ But, the extant legal regimes present just a binary option—only airspace or outer space law can apply; there is presently no established regime for aerospace vehicles. The existing theories provide no definitive or universal guidance for the operation of aerospace vehicles, particularly in the gray area between air and space law.

In the current state of world tensions and provocative actions, there may come a moment where an answer is needed; where, at least in one state, a conclusion *will* be drawn as to whether an overflight at high-altitude either is or is not a territorial incursion. And, if the decision is that the gray area is sovereign and the foreign craft is a potential threat, the subjacent state might act with force.

This scenario is part of what makes the use of force context unique as a mode of analysis for delimitation. In a liability case, for example, the law follows the facts; that is, the aerospace vehicle would have crashed independent of its legal status or what regime applied to it. It would potentially be for litigators, judges, and insurance companies—years later—to determine whether the space regime or air regime applied. For the use of force, however, the legal status of the craft is likely a determining factor in the decision. Thus, states would benefit from clear definition of the extent of sovereignty, so it can be incorporated into rules of engagement and operating procedures related to aerospace vehicles.

D. Conclusion

US Department of State, “US Statement, Definition and Delimitation of Outer Space And The Character And Utilization Of The Geostationary Orbit, Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space at its 40th Session in Vienna from April”, (April 2001), online: *US Department of State* <<http://www.state.gov/s/l/22718.htm>>. See also Oduntan, *supra* note 140 at 66 (discussing what he terms “The No Present Need Theory” of delimitation).

¹⁸¹ Jakhu, Sgobba, & Dempsey, *supra* note 79 at 50.

This Chapter sought to demonstrate that—despite the lack of clarity as to the edges—there are settled (black-and-white) aspects of the air and outer space domains. That is, while there is no clear edge of the airspace or no precise lower border for outer space, these domains are universally acknowledged as both *existing* and *possessing* a fairly straightforward legal regime (vis-à-vis sovereignty and state vehicles). This discussion of the more settled law then supplies the context and forms the basis for the later analysis of how vehicles that can transcend these zones, operating in the gray areas, should be treated under the law.

CHAPTER III

Addressing the Gray Space

To prove a negative is nearly impossible, but this argument asserts (and this section demonstrates) that there is inadequate conventional law or state practice to *lower* the cap on sovereignty, and correspondingly the line between air and space, below orbit. Space, like the airspace below it, is not a legal vacuum—something has to (and had to from the dawn of the space age) be the law there.¹⁸² The same is true for the gray area at the edges of the two domains. The question, then, is how does one determine the law that applies at a given location? But, to ask what is perhaps a natural follow-on question to this, “How do you *choose* which law applies?” would be a misstep here. This Chapter does not purport to propose a solution for gray space; it seeks to argue that one is already there, through the practice of states and their existing legal disposition towards the assertion of sovereignty.

The first section of this Chapter addresses this issue, and sets the stage for the legal approach taken below with a discussion of the troubles posed by normative and non-binding prescriptions for a legal regime.

Then, in what is termed here a conservative, state-based, approach,¹⁸³ this Chapter argues that one should look at the status of sovereignty in airspace, and in general, at the time of the dawn of the space age. This establishes the general rule with regard to assertions of sovereignty by states. Then, one should examine how space became free for use and exploration, as outlined in the *Declaration of Legal Principles* and the Outer Space Treaty. This establishes a deviation from, or exception to, the rule. From there, one should narrowly construe the exception to the general rule to find the limits of where the exception applies. When this is done, it reveals that orbit is the lowest clear deviation from the general disposition of sovereignty. As such, the regime shifts at that point—airspace (with sovereignty and limited craft access) below, and outer

¹⁸² Lachs, *supra* note 64 at 125 (“Thus it was necessary to agree that outer space never had been a lawless area or legal vacuum, but had been subject to international law, though the matter could never have been put to the test before.”).

¹⁸³ “Conservative” is not meant in any political context, but as a method of proceeding with legal analysis in a restrained manner with deference to the known, existing law. The approach presupposes a perspective consistent with the Statute of the International Court of Justice and other sources of interpretive guidance—that states are the primary actors in international law. See *infra* Chapter III.C.1.

space (with freedom and non-distinction of craft) in and above orbit. In essence, one should apply the baseline rule (sovereignty) until it is clear that the rule no longer applies—the first place this is true is orbit. Conversely, the matter can be articulated as applying the exceptional rule only so far as its regime allows, at which point it no longer applies—again, the lowest zone in which outer space law clearly applies is orbit. This analysis comprises the second and third sections of the Chapter.

Finally, the fourth section of this Chapter examines the issue from another perspective—that of a commensurability argument. Operating on the basis that the airspace and outer space regimes are comparable and commensurable, the section seeks to read them in harmony. When this is done, it reveals that national security is an overriding interest of states that unifies the development of the disparate rules affecting the use of force (sovereignty and the distinction of state and civilian craft), and that these regimes have a logical separation point at orbit. Thus, the delineation at orbit makes further sense when examined in the context of the use of force and aerospace vehicles.

A. What *Is* and What *Ought* to Be

One legal writer has noted that “[t]he lack of codified definitions of airspace and outer space makes the role of international scholars necessary, taking into account that a demarcation point is still an open question within the air and space law branch.”¹⁸⁴ Certainly, this approach is, generally speaking, consistent with international rules of interpretation found in Article 38 of the ICJ Statute.¹⁸⁵ However, the application of an academic solution for the regime applicable to aerospace vehicles fails for two reasons.

First, reference can be made to “the most highly qualified publicists” only “as a subsidiary means” of interpretation.¹⁸⁶ When the law is clear, there is no need to seek out the opinions of publicists. Instead, the extant conventional or customary international law, or the

¹⁸⁴ Francesco Gaspari, “Space Transportation and International Air Transportation: The Transition Towards a Common Legal System” in Ram Jakhu & Kuan-Wei Chen, eds, *Regulation of Emerging Modes of Aerospace Transportation* (Montreal: Centre for Research in Air and Space Law, 2014) 141 at 147.

¹⁸⁵ See *ICJ Statute*, *supra* note 62 at art 38(1)(d) (In resolution of cases before it the Court will consider, among other sources, “judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.”).

¹⁸⁶ *Ibid.*

accepted general principles of law should be applied.¹⁸⁷ Thus, the matter for sovereignty over the aerospace comes down, to a degree, to a framing issue. That is, while there is ambiguity as to where the precise line (spatial or functional) between air and outer space may lie, that does not mean that there is *no* law that applies in this zone. In many ways, the perceived ambiguity in the law applicable to aerospace activities is a created phenomenon. This is not a critique of the current writers on delimitation—they point to many problems created by the fact that there are divergent regimes for air and outer space, and this work itself does the same with its focus on matters of security and potential use of force. However, just because the law causes problems for operations does not mean that the law is unclear or nonexistent.¹⁸⁸ A problematic rule of a law is a rule nonetheless.¹⁸⁹

Second, even if publicists are an appropriate consideration for resolution of this matter, there is no adequate consensus on the issue of what law should be applicable to aerospace operations. There are many ideas circulating through the legal literature, and many are very wise and practical. However, they typically reflect what the law *should be*; they do not reveal what the law *is*. Some of the most highly qualified publicists, and certainly one of the most prolific, Cheng, address this issue directly, devoting large sections of his outer space writings to the distinction of *lex lata* (what the law is) and *lex ferenda* (future law, or what the law should be).¹⁹⁰

¹⁸⁷ *Ibid.* at art 38(1)(a)–(c).

¹⁸⁸ Of course, this also does not mean that the law should not be rewritten or readdressed to better accommodate the coming reality of aerospace vehicles. However, the question is who has the power to rewrite the law.

¹⁸⁹ One may assert that unsatisfactory outcomes militate against such a rule actually being the operative interpretation of an international law. This may be based on a reading of Article 32 of the *Vienna Convention on the Law of Treaties*, May 23, 1969, 1155 UNTS 311 (entered into force on 27 January 1980) [VCLT] (“Recourse may be had to supplementary means of interpretation, ...when the interpretation according to article 31: (a) Leaves the meaning ambiguous or obscure; or (b) Leads to a result which is manifestly absurd or unreasonable.”). But, this fails for two reasons here. First, the notion of extensive airspace is not a treaty provision, albeit best articulated in the Paris and Chicago Conventions. Instead, it is an articulation of the customs of international law derived from state practice. This not only undermines the absurdity argument (if absurd, why do states practice maximum sovereignty?), but it also removes it from the VCLT’s purview. Second, and more importantly, the assertion of broad sovereignty is not “absurd” or “unreasonable” at all. Reasonable minds may differ as to the overall *best* approach to delimitation, but as discussed below, there are numerous practical bases for the broad (though not infinite) assertion of an airspace regime, even beyond the more legalistic ones.

¹⁹⁰ See Cheng, *supra* note 62 at 191 et seq, 677 et seq. Lachs commented that “not even of my heroes, could I say: ‘this man made law.’ For teachers are not legislators, nor lawmakers in international relations.” Quoted in Jakhu & Freeland, *supra* note 145 at 471 (discussing the limitations, in general and

Of course, asserting that this work can exclusively and purely articulate what the law *is*—devoid of perspective, predisposition, or unconscious bias—would be folly; there is inherently some degree of what an author thinks *ought to be* in the description of what presently is.¹⁹¹ However, the goal here is to strip down the issue of vertical territorial sovereignty to its core, and from there expose the essential disposition of states regarding the existing law of how high sovereignty can be (or has been) extended, and what limits (if any) have been placed to cap such assertions.

B. The Importance of Context: History of Sovereignty in Air and Space

In the state-based approach taken here, it is vital to address the history of the development of the two relevant legal regimes. The legal literature provides no shortage of perspectives on the status of sovereignty at any given time. But, upon review of the publicists and their works, an inescapable context for the discussion of both air law and outer space law is the potential for war and concern over national security—World Wars I and II for airspace and the Cold War for outer space. This concern drives the rights of state vehicles found in the regimes, and particularly the extent to which sovereignty is asserted by states. This section examines assertions of vertical sovereignty in general (in the pre-air and early air periods), as well as the notions of vertical sovereignty at the dawn of the space age. While there is a degree of fluidity among these categories, it is generally set out in three parts—sovereignty before space, at the dawn of the space age, and after *Sputnik*. Overall, this section demonstrates that states are predisposed to maximal assertions of territorial sovereignty, up to a limit of where

as a practical source of outer space law, of the writings of publicists).

¹⁹¹ In this regard, David Hume noted:

In every system of morality, which I have hitherto met with, I have always remark'd, that the author proceeds for some time in the ordinary way of reasoning...; when of a sudden I am surpriz'd to find, that instead of the usual copulations of propositions, *is*, and *is not*, I meet with no proposition that is not connected with an *ought*, or an *ought not*. This change is imperceptible; but is, however, of the last consequence.

David Hume, *A Treatise of Human Nature: Being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects* (1740), L.A. Selby-Bigge, ed. (Oxford: Clarendon Press, 1896) at 469 (emphasis in original). As with morality, the same seems to hold true to articulations of law.

other interests are better served by freedom of use and exploration.

1. Sovereignty before Space Applications

The concerns over avoiding future wars and the extent of a state's "right to fly" is evident in the opening of John Cobb Cooper's *The Right to Fly*.¹⁹² Having examined the early debates over airspace sovereignty, including the preclusion of military craft from state airspace, a few years later he concluded:

[I]t is apparent that by the outbreak of World War I the principle of sovereignty in usable space over national lands and waters had been accepted by the international community as a customary rule. None questioned the right of each state to control at its discretion all flight over its surface territories and to prohibit the entry into its usable space of any foreign aircraft.¹⁹³

But, the operative question for this work is whether this sovereignty notion can be expanded beyond what is exclusively airspace. Above, Cooper speaks broadly of "usable space over national lands" (and not airspace exclusively), but the sentiment he is discussing culminated in the Paris Convention, and recognition "that every Power has complete and exclusive sovereignty over the *air space* above its territory."¹⁹⁴

Others have stressed that the Paris Convention (and thereby the re-articulation in the Chicago Convention, operative in the space age) focused on "air space" for sovereignty. So, they express a more limited view of sovereignty, tied to what can be construed as "airspace" or "atmospheric space."¹⁹⁵

¹⁹² Cooper, *supra* note 65. See *supra* Chapter III.D.4.a (Cooper discussing the overwhelming interest in state security after World War II, advocating the demilitarization of Germany and Japan's air power capacities).

¹⁹³ John C Cooper, "State Sovereignty in Space: Developments 1910 to 1914" in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 125 at 136 (writing in 1954, drawing this conclusion from analysis of US, British, French, German, and other European state positions); see also Reinhardt, *supra* note 4 at 72–73.

¹⁹⁴ *Paris Convention*, *supra* note 65 at art 1 (emphasis added).

¹⁹⁵ Eugene Pepin, "The Legal Status of the Airspace in the Light of Progress in Aviation and Astronautics" in *Space Law: A Symposium*, Special Committee on Space and Astronautics, US Senate, Eighty-Fifth Congress, Second Session (Washington, D.C.: US Government Printing Office, 1958) 231 at 233 (comparing the Paris and Chicago Conventions and the terms of their texts in different official languages).

This strict limitation should not preclude an expansive disposition towards sovereignty for two reasons. First, there is no formal definition for either airspace or “atmospheric space” (or any of the other terms for the same concept) contained in the Paris Convention, Chicago Convention, or in customary international law. So, capping sovereignty solely on this definition is unavailing. Though a bit of an extreme example, Loftus Becker, as US Legal Advisor to the Department of State, noted in 1958:

I am informed that astronomically the earth’s atmosphere extends 10,000 miles above its surface.

It follows that it would be perfectly rational for us to maintain that under the Chicago Convention the sovereignty of the United States extends 10,000 miles from the surface of the earth, an area which would comprehend the area in which all the satellites up to this point have entered. At any rate, that type of definition would afford us enough elbowroom for discussion.¹⁹⁶

Certainly, subsequent international law caps the notion of sovereignty significantly below this level, as Article II of the Outer Space Treaty applies to orbital activities below 10,000 miles (16,000 kilometers, or over 52 million feet).¹⁹⁷ But, such cap on sovereignty does not necessarily correspond to a cap on where states *could* otherwise assert sovereignty, whether called airspace, atmospheric space, or anything else.

Second, and more importantly, such an expansive presumption against state sovereignty is on the wrong side of history and practice. The Paris Conference of 1910 and subsequent negotiations over the Paris Convention of 1919 reveal that states are inclined towards assertions of sovereignty.¹⁹⁸ Even the more restrictive state positions focused more on rights of innocent passage and the number and degree of exceptions to sovereignty in airspace; the underlying

¹⁹⁶ Loftus Becker, “Major Aspects of the Problem of Outer Space” in *Space Law: A Symposium*, Special Committee on Space and Astronautics, US Senate, Eighty-Fifth Congress, Second Session (Washington, D.C.: US Government Printing Office, 1958) 367 at 372; see also “Doc 442: NSC 5814/1: National Security Council Report (18 August 1958)” in *Foreign Relations of the United States, 1958–1960, Volume II, United Nations and General International Matters* (Washington, D.C.: US Department of State Office of the Historian, 1958) at para 9 (available at <https://history.state.gov/historicaldocuments/frus1958-60v02/d442>) (the US National Security Council internally noting that “the upper limit of air space has not been defined”).

¹⁹⁷ See *supra* Chapter II.B.1.

¹⁹⁸ The author acknowledges that, here, “states” is comprised of Western European states, which by today’s standards are a fairly homogenous block. But, they were the relevant powers in the creation of the current construct (found in the Chicago Convention), which has been very broadly adopted.

premise was that the subjacent state had a right to assert sovereignty into the zone above it.¹⁹⁹

Pepin correctly stressed that the Paris Convention explicitly used the term “air space.” However, as Cooper explained, “the Paris Convention is not to be construed as meaning that in international law States have territorial rights *only* in this airspace. The airspace was accepted as part of State territory but no international determination was made as to the regions of space above.”²⁰⁰ Therefore, the Paris and Chicago Conventions express where sovereignty extended relevant to, respectively, “Aerial Navigation” and “International Civil Aviation,” but should not be read as a constriction or limitation on state capacity to assert sovereignty in general.

Instead, one should recall the Latin articulation of sovereignty, *cuius est solum eius est usque ad coelum et ad sidera*, and that it extends indefinitely or to the stars.²⁰¹ While the sentiment may not be properly Roman, it is certainly old—and tried and true.²⁰² After an exhaustive study of the phrase and its application, Cooper noted that in the 300 years since the English case of *Bury v. Pope* (1586) and text *Coke on Littleton* (circa 1628) where the present Latin construct is first found,

a significant change had been made. The words “debet esse” (“ought to be”) of the more important glosses had become “est” (“is”). By this change the statement in the glosses that the landowner ought to have the use or enjoyment of the airspace over his property to an indefinite height had become, in the maxim (particularly as cited by Coke), a statement of the existence of present ownership of space to infinity.²⁰³

¹⁹⁹ Reinhardt, *supra* note 4 at 71–73; John C Cooper, “United States Participation in Drafting Paris Convention 1919” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 137; Cooper, *supra* note 193; John C Cooper, “The International Air Navigation Conference, Paris 1910” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 104. See also *supra* Chapter II.A.2.

²⁰⁰ John C Cooper, “High Altitude Flight and National Sovereignty” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 256 at 259 (emphasis added).

²⁰¹ Lachs, *supra* note 64 at 41. See also *supra* Chapter II.A.2, particularly notes 88-90.

²⁰² Cooper, *supra* note 98 at 83–85.

²⁰³ *Ibid* at 85. Regarding the extent of the sovereignty, Katzenbach somewhat skeptically notes that *ad coelum* can be translated to mean both “to the sky” or “to the heavens,” making an assertion beyond the sky (and strictly “airspace”) more dubious. Katzenbach, *supra* note 64 at 221. However, it should be recalled that in many articulations of the Latin *ad coelum* is juxtaposed with *ad inferos* (“to hell”). See Abramovitch, *supra* note 98 at 247; Milde, *supra* note 68 at 5. This suggests that, despite the lack of certainty as to a particular altitude or even finite plane of existence, “to the heavens” may be a more appropriate read.

Similarly, Vlasic's study of state sovereignty assertions led him to conclude that, "Thus the State asserted airspace sovereignty many centuries before the age of flight."²⁰⁴ So, upward and indefinite assertions of sovereignty are not tied to practical applications or extant technology—they reflect a baseline disposition of states towards the space above them.

2. Sovereignty at the Dawn of the Space Age

From the baseline of airspace sovereignty, and the notion that it may not be limited just there, states and scholars began considering how high sovereignty extended upwards—to what degree, and to what limit. The prior disposition of broad sovereignty held strong.

a. State Positions

For instance, the Soviet position, typically pre-*Sputnik* but even after, was for an *ad infinitum* application of sovereignty.²⁰⁵ Soviet authors stated that the issue was well-settled, and cited the 1913 thoughts of French jurist Clunet:

The right of the sovereignty of each country to its territorial atmosphere must theoretically [it was not a practical question at the time] extend *usque ad coelum* [right to the skies, that is to infinity], as they used to say in olden times. Contemporary British lawyers interpreting the expression "complete and exclusive sovereignty of the state over airspace", point out that "complete" signifies "without limit", that is, there is "no limit of height".²⁰⁶

Official Soviet legal textbooks contained similar assertions until at least 1958.²⁰⁷ This position was not long-lived, however; it changed for the Soviets with greater contemplation of the effects of the launch and orbit of *Sputnik*. Initially, they advocated a low ceiling for sovereignty

²⁰⁴ Vlasic, *supra* note 94 at 55 ("this author's research convinced him that such a rule had long existed and that its beginnings went far back into history."); see also Reinhardt, *supra* note 4 at 71 (quoting Dr. J. F. Lycklama à Nijeholt in 1910: "We therefore conclude that state sovereignty reaches quite as high as the state's interest can reach, the possibility of which but ends at the uttermost limit of the atmosphere.").

²⁰⁵ Lyall & Larsen, *supra* note 174 at 6 (discussing E. Korovin's conference presentation of "Conquest of the Stratosphere and International Law" in 1933).

²⁰⁶ JF McMahon, "Legal Aspects of Outer Space" (1964) XXXVIII Brit YB Int'l L 339 at 345 (citing Kislov and Krylov, who relied on and interpreted Clunet) (additional language by McMahon).

²⁰⁷ *Ibid.*

(generally based on the then-existing capacity of plane flight), in order to allow for free flight of satellites; but that proved problematic as well from a security perspective.²⁰⁸

Similarly, in 1958 there was evidence of doubts about the limits, *ad infinitum*, of sovereignty in the US debate. The US Senate's Special Committee on Space and Astronautics, chaired by then-Senator Lyndon B. Johnson, compiled a substantial collection of literature and testimony on the emerging issues of outer space, with particular emphasis on the delimitation question.²⁰⁹ The bulk of the writings were from US or allied positions, or at least unaffiliated writers from such states, but Soviet and other international positions and thinkers were considered as well.²¹⁰ While there was no clear consensus as to the upward bounds of state sovereignty, almost all of the asserted or proposed limits were quite high. On the lower range, thinkers capped sovereignty at the highest extent of airspace. But, the overall thrust was that sovereignty could be asserted well into what is now considered as clearly outer space.

b. Effective Control Theories

Effective control theories were popular early in the assessment of outer space legal regimes. Essentially, they assert that states can claim sovereignty as high as they can exert control over the area. The first installment of the 1958 US Senate symposium was a 1951 article by Cooper arguing that effective control should determine delimitation of air and space.²¹¹ It was similarly popular for a short time among Soviet writers.²¹²

However, the proposition was short lived in the space age for two reasons, both relating to technology. First, as Cooper even recognized as he proffered it, the doctrine lent itself to inequity among states; the more wealthy and powerful (and technologically advanced), the more

²⁰⁸ *Ibid* at 346. See also *infra* Chapter III.D.4.b.

²⁰⁹ See *Space Law: A Symposium*, Special Committee on Space and Astronautics, US Senate, Eighty-Fifth Congress, Second Session (Washington, D.C.: US Government Printing Office, 1958).

²¹⁰ See *ibid* at 485–522.

²¹¹ John C Cooper, “High Altitude Flight and National Sovereignty” in *Space Law: A Symposium*, Special Committee on Space and Astronautics, US Senate, Eighty-Fifth Congress, Second Session (Washington, D.C.: US Government Printing Office, 1958) 1 at 6 (writing in 1951, “Perhaps the rule should be, in the absence of international agreement, that the territory of every state extends upward as far into space as it is physically and scientifically possible for any one state to control the regions of space directly above it.”).

²¹² McMahon, *supra* note 206 at 346–47.

control a state could assert vertically.²¹³ This would leave less advanced states with significant territorial disadvantage. This, among other problems, let Cooper to conclude that even he was not convinced by the effective control theory for delimitation he proffered.²¹⁴ This problem, however, is not the most compelling against an effective control theory. It can be fairly easily reconciled with a universal view of where technology stands; so, the line would not be just where one particular state can assert control—it should be where a state can assert control.

A more critical difficulty with the effective control theory, though, is that it could not address advancements in technology (universal or particular to one state). Fauchille, the early freedom of the air advocate before the Paris Convention, essentially employed an effective control basis for his position.²¹⁵ He argued, among other bases, that the air should be free because states “could not exercise any powers over the atmosphere, neither modifying nor transforming it.”²¹⁶ Further, he advocated a sovereignty limit of 300 meters, corresponding to the height of the Eiffel Tower, to allow for buildings (an indicator of where states could control space above the earth).²¹⁷ This shows the limited capacity of a strict control-based line of thought in the face of new technology (architectural, as well as aeronautical).

Now, there is no reasonable limit for the geographic extent of effective control. It is believed that the Chinese military possesses ASAT technology capable of reaching geosynchronous orbit (GEO), essentially expanding the scope of potential control towards the furthest reaches of useful satellite space (nearly 36,000 km or 22,300 miles).²¹⁸ This is certainly broader than the closer reaches of orbit at 150 km or at nearest 100 km (93 or 62 miles). And, of course, for other nearer-space control issues, the US X-37B orbital spaceplane is suspected to have offensive capacity and the Russians are suspected to have a craft capable of maneuvering in

²¹³ Cooper, *supra* note 211 at 6; Oduntan, *supra* note 140 at 78–79 (critiquing the inequity of the approach).

²¹⁴ Cooper, *supra* note 211 at 7 (“Frankly, this is not put forward as a final solution.”).

²¹⁵ See *supra* Chapter II.A.2.

²¹⁶ Matte, *supra* note 73 at 162.

²¹⁷ *Ibid* at 162 n.26.

²¹⁸ See Brian Weeden, “Through a glass, darkly: Chinese, American, and Russian anti-satellite testing in space”, (17 March 2014), online: *The Space Review* <<http://www.thespacereview.com/article/2473/1>> (piecing together evidence from a recent Chinese launch to conclude the rocket likely achieved an apogee of 30,000 km).

outer space and intercepting satellites.²¹⁹ Whether the suspicions of these capabilities are accurate or not, they are all in addition to the more conventional and extant electronic and kinetic force options (including shorter range ASATs) more readily available to “negate (deceive, disrupt, degrade, deny, or destroy) an adversary’s efforts to interfere with or attack” space systems.²²⁰ Further, the premise of this paper assumes the existence in the near future of vehicles that can bridge any gaps between clear air and clear space—so effective control is, effectively, limitless.

In 1957, Wassenbergh commented on this phenomenon in the context of the law of the sea while addressing air law.²²¹ In his time, thanks to technology, the high seas could be controlled well past any reasonable limits of territorial sovereignty; and, he believed that airspace similarly had expansive bounds of potential control.²²² So, we are left with a legal limitations approach; the practical limits of effective control are no longer reasonable guideposts. Employing the high seas analogy: “[T]he sea is no longer ‘free by nature’.”²²³ That is, the seas are made free by states—by agreement—notwithstanding state capacity to control them. So, “Sovereignty can no longer be based on the effective power of a State, but ‘only’ on law.”²²⁴ In that context, states’ interests in maximizing territory for both economic and strategic ends must be considered.²²⁵ The same is true today (or will be in the near future) with aerospace and outer space capacities for control.

²¹⁹ Sam Jones, “Object 2014-28E – Space junk or Russian satellite killer?”, *Financial Times* (17 November 2014), online: <<http://www.ft.com/cms/s/2/cdd0bdb6-6c27-11e4-990f-00144feabdc0.html#axzz3XDxYKR1I>>; Mike Wall, “Is Russian Mystery Object a Space Weapon?”, (19 November 2014), online: *Space.com* <<http://www.space.com/27806-russia-mystery-object-space-weapon.html>>.

²²⁰ US Department of Defense, *supra* note 122 at GL–7; see also US Air Force, *Annex 3-14, Space Operations: Offensive Space Control* (Curtis E. LeMay Center for Doctrine Development and Education, 2012) (outlining the US approaches with greater specificity); Bhupendra Jasani, “Introduction” in Bhupendra Jasani & UNIDIR, eds, *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race* (New York: Taylor & Francis, 1991) 1 at 10–14 (outlining various types of space-oriented weapons).

²²¹ HA Wassenbergh, *Post-War International Civil Aviation Policy and the Law of the Air* (The Hague: Martinus Nijhoff, 1957) at 102–03.

²²² *Ibid* at 102–3.

²²³ *Ibid* at 102.

²²⁴ *Ibid* at 152.

²²⁵ *Ibid* at 104.

Overall, the effective control theory was well founded in historical assertions from the law of the sea's "cannon-shot rule" as well as various early aviation sovereignty positions. But, like those regimes, its utility is limited by technological advancements. Nonetheless, its underpinnings and its enduring popularity underlines and highlights the going disposition—that states get to claim as sovereign that which they can control (up to any otherwise imposed limits).

c. The 1956 "Weather" Balloon Incident: Sovereignty above Effective Control

Like the U-2 incident of 1960, a 1956 balloon incident between the US and Soviet Union helps illustrate state positions on sovereignty, particularly with regard to incursion by the aerial objects of other states.

In the mid 1950's, the US, through the US Air Force and in conjunction with Western European allies, organized a large meteorological survey involving large helium-filled balloons carrying survey equipment. Some of the balloons were expected to reach up to 90,000 feet (over 27 kilometers or 17 miles).²²⁶ More recent documents show that at least a portion of this was named project GENETRIX, a US Air Force operation to use high-altitude balloons as a mechanism for intelligence photography over the Soviet Union, the Eastern Block, and China from December 1955 to February 1956.²²⁷ In that short time, 516 balloons were launched as part of the project, but only 46 were ever recovered (and only 34 of those had "useful photographs").²²⁸ However, regardless of what the Soviets actually knew or just suspected about the project, it protested the overflight of these balloons even at this high altitude.²²⁹ Amid these protests, the program was cancelled, though the US maintained they were merely "weather research" balloons.²³⁰ The US never asserted that the overflight was appropriate or legal, even

²²⁶ Cheng, *supra* note 62 at 14 (writing in 1957).

²²⁷ Pedlow & Welzenbach, *supra* note 90 at 84–85.

²²⁸ *Ibid* at 85.

²²⁹ See Cheng, *supra* note 62 at 14–15; Pedlow & Welzenbach, *supra* note 90 at 86. By late 1956, the Soviets were also protesting the more controlled, but potentially lower-altitude flights of the U-2. *Ibid* at 126; see also *supra* Chapter II.A.2.

²³⁰ Pedlow & Welzenbach, *supra* note 90 at 86. Ironically, despite that the weather balloon designation was subterfuge for terrestrial photography, part of the limited value derived from the program (at expense to the US reputation and some degree of embarrassment over the incursion) was indeed meteorological. The US and NATO tracked the balloons via radar, and the "data provided the most accurate record to date of high-altitude wind currents, knowledge that meteorologists were later able to put to use to determine optimum flightpaths for U-2 flights." *Ibid* at 87.

under the purported weather-survey circumstances. The US agreed to stop the program, but did not acknowledge that it was illegal. At the time, “Soviet writers ha[d] not, however, been slow in pointing out that, in its official communications, the United States has not asserted any strict right of one State to fly such balloons into the airspace of another State.”²³¹

Overall, this case demonstrates that there can be assertions of sovereignty (that go essentially uncontested) even with no shoot down or other kinetic assertion of control—even without a known capacity to shoot the balloons down at that altitude with any accuracy. Even without all of these potential criteria, it is still regarded as a territorial violation. Thus, the case demonstrates that sovereignty can, and does, potentially extend beyond any bounds of “effective control.”

d. Overall View: Broad Assertions of Upward Sovereignty

Regardless of the bases, legal or practical, the general disposition at the dawn of the space age was towards expansive assertions of state territorial sovereignty upwards. Even Cooper, (who abandoned his “effective control” argument from 1951) by 1956 argued for sovereignty up to 300 miles, though advocating for a convention or treaty (like Chicago) to this effect that would also cement a transit passage regime for non-military vehicles.²³² This proposal (and the underlying premise that the assumption should be *towards* state sovereignty) became the baseline for the discussion amassed in the US Senate symposium—most authors either explicitly or tacitly commented on or critiqued Cooper’s position.²³³

²³¹ Cheng, *supra* note 62 at 15.

²³² John C Cooper, “Legal Problems of Upper Space” in Ivan Vlasic, ed, *Explorations in Aerospace Law: Selected Essays of John Cobb Cooper, 1946-1966* (Montreal: McGill University Press, 1968) 268 at 276 (writing in 1956, before the Sputnik launch). Cooper’s proposed convention would include three essential parts:

- a) Reaffirm Article I of the Chicago Convention, giving the subjacent state full sovereignty in the areas of atmospheric space above it, up the height where “aircraft” as now defined, may be operated, such areas to be designated “territorial space.”
- b) Extend the sovereignty of the subjacent state upward to 300 miles above the earth’s surface, designating this second area as “contiguous space,” and provide for a right to transit through this zone for all non-military flight instrumentalities when ascending or descending.
- c) Accept the principle that all space above “contiguous space” is free for the passage of all instrumentalities.

Ibid.

²³³ See Space Law: A Symposium, *supra* note 209.

Similarly, writing in 1960, Cheng presumed state sovereignty up to 300-500 miles (400-805 kilometers):

So far there has been little opposition to the passage of foreign artificial earth satellites over national territories. The initial perigees and apogees of the orbits of Sputnik I, Discoverers I, II, V, VII, XI and the Soviet Space Ship are, respectively, 142-588, 99-605, 142-220, 136-450, 100-520, 109-380 and 193-230 miles. These are all wholly or partly in the earth's atmosphere—at least the upper regions thereof—and, assuming that the sovereignty of States skyward is conterminous with the terrestrial atmosphere and, therefore, extends to approximately *300-500 miles, within the national airspace of the countries over which they pass.*²³⁴

While Cheng moved away from this position over the years, it shows the inclination towards upward sovereignty at the dawn of the space age (here, up to 300-500 miles above Earth). It is useful as a historical item, showing the position of a qualified publicist frozen in time.

3. Sovereignty, the Satellite (*Sputnik*), and Beyond: The Innocent Passage Exception

The preeminence of the disposition towards sovereignty is further illustrated in how it was curtailed for uses of outer space. Examining early state positions on overflight and sovereignty, it was the innocent passage concept for “mere overflights by artificial satellites”²³⁵ that was the breakthrough. Even this exception, though, was not automatically seen as assured initially. As Cheng warned:

The lack of protest about these satellites up to now hardly affects the principle of airspace sovereignty; for those States which directly or indirectly took part in the International Geophysical Year, and those now taking part in the work of COSPAR..., can be said to have given their implied consent. For the rest, *the passage of such satellites through national airspace depends on the tacit acquiescence* of the States over which their orbits pass. *It would be erroneous otherwise to conclude that a legal right of innocent passage has already arisen in favor of artificial satellites, similar to the right of innocent passage of merchant ships through foreign territorial seas.*²³⁶

As was the case with the air in the debates of 1910 and before the Paris and Chicago Conventions, an innocent passage regime could have been considered and explicitly rejected by states as they passed through this “national airspace” in orbit.²³⁷

²³⁴ Cheng, *supra* note 62 at 38 (emphasis added).

²³⁵ *Ibid* at 678.

²³⁶ *Ibid* at 38 (emphasis added).

²³⁷ See Cooper, *supra* note 199 at 123.

However, the overflight of satellites in orbit was allowed by states—they neither protested overflight, nor sought permission to overfly other states over the years of satellite flight.²³⁸ As one early US advisor put it, “the Russians having been the first with their Satellite to overfly *all* countries, they have thereby established the international characteristic of orbital space.”²³⁹ So, this rule for overflight was “established,” or *created*, contrary to the norm of sovereignty.

Some states advocated for free overflight, while others passively permitted it.²⁴⁰ Still, the freedom was not without limits or reservations, demonstrating the vestiges of sovereign assertions. For instance, the Soviet Union, after *Sputnik*, strongly advocated a freedom of orbit theory; but, they distinguished simple passage from different types of use, particularly satellite surveillance and reconnaissance. While the US position was that reconnaissance from orbit was permissible, the Soviets placed it in a class with other aerial spying, such as the U-2 incursions and a 1956 meteorological balloon incident over Russian airspace.²⁴¹ In both instances, the Soviets objected to the overflight, and in the UN General Assembly protested such a use of orbit.²⁴² So, the location was not objectionable, but the function was (and would be regardless of where it occurred), taking the objection beyond an orbital (or spatial) context. Even the US, an advocate for the free use of orbit, made only a qualified assertion about the free use of orbit, protecting the potential sovereign interests against any activities not regarded as peaceful:

Although the U.S. has not to date recognized any upper limit to its sovereignty, a principle of freedom of outer space, such as that expressed by the United Nations Ad Hoc Committee, suggests that at least in so far as peaceful exploration and use of outer space are concerned, the right of states to exclude persons and objects may not obtain. However, the full implications of a principle of freedom of outer space, in contrast with a

²³⁸ See McMahon, *supra* note 206 at 353; *North Sea Continental Shelf Cases*, *supra* note 153 (dissenting opinion of Judge Lachs); Lachs, *supra* note 64 at 125–26.

²³⁹ “Doc 347: Memorandum of a Conference, President’s Office, White House, Washington, October 8, 1957, 8:30 a.m.” in *Foreign Relations of the United States, 1955–1957, Volume XI, United Nations and General International Matters* (Washington, D.C.: US Department of State Office of the Historian, 1958) at para 5 (available at <https://history.state.gov/historicaldocuments/frus1955-57v11/d347>) (emphasis in original).

²⁴⁰ See, eg, McMahon, *supra* note 206 at 352 (collecting numerous statements at the UN General Assembly in favor of free use of outer space, including those from Argentina, Australia, Austria, Brazil, Canada, Cuba, France, Great Britain, Iran, Italy, Japan, Peru, Poland, Spain, Sweden, and Yugoslavia).

²⁴¹ *Ibid* at 371–73.

²⁴² *Ibid*.

principle of national sovereignty over outer space, remain to be fully assessed.²⁴³

But, over time, the free use and travel *in orbit* became cemented as the law—first as a custom,²⁴⁴ then in the UN *Declaration of Legal Principles*, and finally with the Outer Space Treaty.²⁴⁵ As thousands of satellites have circled the Earth since, the principle has remained consistent.

4. Conclusions: The Disposition is Sovereignty; the Exception is *Res Communis*

The history of aerial sovereignty demonstrates that it can be asserted broadly, and to great altitudes. Further, there must be a political expectation that states will make such assertions. As such, the general, or baseline position, should be that states can or have claimed territorial sovereignty over an area.

However, this default—particularly regarding vertical limits of sovereignty—can be curbed, as with the Outer Space Treaty and its reflection of agreement that space “shall be free for exploration and use by all States.”²⁴⁶ But, the limitations and reservations in this freedom further enforce that the underlying position is always a right of sovereignty.

C. A Conservative (Positivist) Approach

²⁴³ “Doc 479: Report by the National Aeronautics and Space Council (26 January 1960)” in *Foreign Relations of the United States, 1958–1960, Volume II, United Nations and General International Matters* (Washington, D.C.: US Department of State Office of the Historian, 1960) at para 24 (available at <https://history.state.gov/historicaldocuments/frus1958-60v02/d479>).

²⁴⁴ See, eg, McMahon, *supra* note 206 at 356 (“no matter where the boundary line is drawn, a customary rule of international law has now been established, giving a State the right to place a satellite in orbit for peaceful and scientific purposes.”).

²⁴⁵ See *supra* Chapter II.B.2. This broad assertion regarding the universality of freedom of orbit comes from a sovereignty perspective; there is still debate as to the potential effect of “free” use of outer space (and especially advantageous orbits) by states that reach it first with regard to the protections of the Outer Space Treaty. This may particularly include Article I (“free for exploration and use by all states without discrimination of any kind”) and Article II (“Outer space...is not subject to appropriation...by means of use or occupation, or by any other means”), which could preclude *de facto* discrimination based on lesser technology and capacity to reach space (thereby precluding use of the orbits by prior occupation by advanced states). See, eg, Jakhu, *supra* note 148 at 40; *Bogota Declaration*, *supra* note 142 (asserting sovereignty over equatorial GEO); Oduntan, *supra* note 140 at 75.

²⁴⁶ *Outer Space Treaty*, *supra* note 60 at art I, para 2.

The approach taken here gives deference to the clear and established law and regimes, asserting that clarity trumps ambiguity. In essence, states typically assert the most sovereignty possible. The cap on this reach must come from a clear limit on the ability of a state to claim sovereignty—otherwise, they are free to assert their natural disposition. The lowest that one can argue that state power has been capped, as a matter of law, is with the beginning of the outer space regime. Thus, under the approach offered here, sovereignty must be read to reach as high as the clear beginnings of the outer space regime. And, the lowest point at which there is consensus as to a lack of sovereignty (that is, the beginning of the outer space regime) is in satellite orbit. So, this should be regarded as the line between airspace and outer space, considering sovereignty as the determining factor.

This section first seeks to justify the propriety of this conservative approach and its focus on positive law in the context of outer space law. Then, it provides analysis of how the approach demonstrates that the line between air and space should be drawn to maximize the state disposition towards sovereignty. Finally, it develops why satellite orbit should form that line.

1. In Defense of a Positivist Approach

This argument is written from a generally positivist perspective.²⁴⁷ That is, it assumes that states are the drivers of international law, are its primary actors (and creators, by their consent), and are generally free to act in the absence of prohibitive rules of international law.²⁴⁸

a. The Approach is Consistent with State Behavior and International Law Norms

²⁴⁷ An opposing view to this positivist, state focused view may be that of legal pluralism:

The force of the law must be explained in some way beyond a reference to state sovereignty. Legal pluralism offers a number of insights in this context, finding law to exist in parallel and intersecting spheres beyond the state. Legal norms arise whenever communities of practices can be found, linking actors on the basis of shared interests or practices.

René Provost, “The Move to Substantive Equality in International Humanitarian Law: A Rejoinder to Marco Sassoli and Yuval Shany” (2011) 92:882 *Int’l Rev of the Red Cross* 437 at 441. But, Provost is addressing how to (effectively) ensure application and compliance of IHL to non-state actors, particularly in armed conflicts not of an international nature. Here, though, the essential matter in question involves states and their activities—so the pluralist argument does not terribly undermine this positivist approach towards states’ use of force based on state territorial sovereignty.

²⁴⁸ See Malcolm Shaw, *International Law*, 6th ed (Cambridge, UK; New York: Cambridge University Press, 2008) at 131, 215.

Created by states in 1945, the Statue of the International Court of Justice cements the primacy of states in international law with its Article 38.²⁴⁹ Often regarded as outlining the acceptable sources of international law,²⁵⁰ it demonstrates that states, through their consent and practice, create binding international law.²⁵¹

State consensus also drives the creation of law in the air and space context. For instance, the UN COPUOS operates with a consensus-based approach.²⁵² It is not a legislative body, but a mechanism by which states can express their views, and law can be derived from the intersection of those positions. This reflects a recognition that the consent of all affected states is key—not just as a matter of law or procedure, but for practical effect as well.²⁵³ Also, ICAO is a globalized forum for discussion of relevant issues; but, the power remains in the hands of states,

²⁴⁹ *ICJ Statute*, *supra* note 62 at art 38.

²⁵⁰ Jakhu & Freeland, *supra* note 145 at 461–62.

²⁵¹ Article 38 states:

1. The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:
 - a. international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
 - b. international custom, as evidence of a general practice accepted as law;
 - c. the general principles of law recognized by civilized nations

ICJ Statute, *supra* note 62 at art 38 (the article also outlines subsidiary means of determining the existence of such laws, including “judicial decisions and the teachings of the most highly qualified publicists”). Of these three sources, even the most potentially far-leaning away from open consent by state is the general principles of law; but, even those must be “recognized” by states to become binding.

²⁵² Lyall & Larsen, *supra* note 174 at 20–21.

²⁵³ See Cheng, *supra* note 62 at 184–85. Cheng quotes the Soviet delegate to COPUOS, addressing the necessity of uniform agreement (at least among the space powers) for creation of outer space law:

Twenty-six signatures on this document would have no value; there must be twenty-eight signatures [the entirety of COPUOS membership at the time]. Even if all of us, including the Soviet Union, the countries of Asia, Africa, and Latin America—which are in principle in favor of signing the declaration, sign, if there is no signature of the United States, the whole endeavour would have no result. *It is clear that without agreement of the United States it is impossible to resolve such a problem.*

Ibid at 185 (quoting A/AC.105/PV.15 (14.9.62) at 18) (emphasis and bracketed language added by author). This deference to the practical necessity of affected states being particularly accounted for in determinations of applicable law was noted by the ICJ in the *North Sea Continental Shelf Cases*, *supra* note 153 at 43 (“an indispensable requirement would be that within the period in question, short though it might be, State practice, including that of States whose interests are specially affected, should have been both extensive and virtually uniform in the sense of the provision invoked”).

which ultimately have to approve the ICAO regime through the representative Council²⁵⁴ and then domestically implement its dictates.²⁵⁵ Similarly, the International Telecommunication Union (ITU) may have numerous non-state sector members, but the essential power is held by states.²⁵⁶

The primacy of states is also evident in the substance of outer space law. For example, Article VI of the Outer Space Treaty's placement of states squarely into a position of responsibility (hence approval and control) for space activities only adds to the involvement of states in the creation of laws (municipal or international) affecting matters of outer space.²⁵⁷

Also, the context in which this issue is examined—the law of war—is largely a positivist one in its roots and construction.²⁵⁸ Provost discusses reciprocity among equal, sovereign states as a basis for the current system of IHL; and, this reciprocity notion ties directly into the importance of the consent of states as the creators of international law:

It reflects the fact that most agents will agree to be bound by a norm on the basis that they thereby obtain a benefit. In the context of public international law, states will indeed usually demand a *quid pro quo* in the exchange of rights and obligations created by a treaty or under customary law.²⁵⁹

The same positivist construct that holds true for the development of air law, space law, and the law of war should apply to the analysis of the use of force in aerospace. Overall, states

²⁵⁴ *Chicago Convention*, *supra* note 49 at arts 50–55; Dempsey, *supra* note 71 at 50.

²⁵⁵ See *Chicago Convention*, *supra* note 49 at art 37; Dempsey, *supra* note 71 at 53 (“Annexes are not self-executing, and depend upon the willingness of member States to promulgate national laws and regulations and implement and enforce them vigilantly.”). The exception to this is the ICAO regime over the high seas, which applies without subsequent promulgation. *Chicago Convention*, *supra* note 49 at art 12.

²⁵⁶ See *Constitution of the International Telecommunications Union*, 22 December 1992 (as amended 2010) (available at <http://www.itu.int/en/history/Pages/ConstitutionAndConvention.aspx>) [*ITU Constitution*] at arts 3, 7, 10.

²⁵⁷ *Outer Space Treaty*, *supra* note 60 at art VI; Cheng, *supra* note 127.

²⁵⁸ See René Provost, “Asymmetrical Reciprocity and Compliance with the Laws of War” in Benjamin Perrin, ed, *Modern Warfare: Armed Groups, Private Militaries, Humanitarian Operations, and the Law* (Vancouver: UBC Press, 2012) 17 at 18–19.

²⁵⁹ *Ibid* at 18. However, this is not an endorsement of strict positivism in IHL. Instead, he concludes that in order to bring non-state (asymmetrical) actors into the purview and control of IHL, “[t]he solution is to expose the hollowness of a state monopoly on the power to create rules... [which] then paves the way for a pluralization of the norm creation process to attract, from all classes of agents, normative commitments on the basis of understandings shared in a community of practice.” *Ibid* at 37.

are in the driver's seat of international regimes, and they recognize it.²⁶⁰

b. The Approach is Consistent with Other Examinations of International Law

The deference to states and concern not to overstep the bounds to which states have consented is present throughout the writings of relevant publicists.²⁶¹ However, major institutional examinations of the law also endorse this approach.

For instance, the International Committee of the Red Cross (ICRC) study on customary international law took a similarly state-driven, conservative approach to its examination of the law pertaining to armed conflicts.²⁶² Some dispute the ICRC's adherence to the method in practice (that is, in finding more law or prohibitions on state activity than may actually exist).²⁶³ Nonetheless, the conservative, state-driven method, if applied, appears to be sound and in keeping with one of the most credible institutions involved in the relevant issues.

Also, the ILC study on *Fragmentation of International Law* can be read consistent with this approach.²⁶⁴ That expansive study examines the interplay of legal regimes, and in particular

²⁶⁰ See, eg, Allie Malloy, "Putin Congratulates Obama on Independence Day", (5 July 2015), online: *CNN.com* <<http://www.cnn.com/2015/07/04/politics/putin-obama-independence-day/index.html>> (In a diplomatic note to President Obama, President Putin stated, "Russian-American relations remain the most important factor of international stability and security.").

²⁶¹ For instance, Lachs, in the context of discussing an innocent passage regime for reaching outer space, admonished:

It should not therefore be lightly presumed, especially where it does not result from any express declaration of will. Thus while acquiescence may create a presumption of acceptance, it precludes the assumption that States have renounced, once and for all, the right to *any* activity connected with outer space that may be carried on in their airspace.

Lachs, *supra* note 64 at 57–58. This demonstrates aversion to overstepping the bounds of state acceptance of new norms of law.

²⁶² Jean-Marie Henckaerts & Louise Doswald-Beck, *Customary International Humanitarian Law*, International Committee of the Red Cross, ed. (Cambridge; New York: Cambridge University Press, 2005) at xxxvii et seq (providing a detailed explanation of the method employed in the ICRC study of customary international law, with central focus on state practice to defend the development of rules).

²⁶³ See Claude Emanuelli, *International Humanitarian Law* (Cowansville, Québec: Éditions Y. Blais, 2009) at 37–41 (critiquing the ICRC study on three bases (essentially, declaring its findings self-serving, and criticizing the breadth of what is considered "state practice" and the lack of definition of *opinio juris*)).

²⁶⁴ See ILC Report of the Study Group on *Fragmentation of International Law: Difficulties arising from the Diversification and Expansion of International Law (Analysis)*, Martti Koskenniemi, UN Doc A/CN.4/L.682 (13 April 2006) [ILC Study on *Fragmentation--Analysis*]; ILC Report of the Study Group on *Fragmentation of International Law: Difficulties arising from the Diversification and Expansion of*

the relationship between *lex specialis* and “general international law.” It shows a preference for reading laws in harmony,²⁶⁵ but recognizes that there may be conflict in the application of norms. If the two notions of law cannot be harmonized, they must be prioritized.²⁶⁶

The ILC endorses the maxim *lex specialis derogat legi generali*, but this application is limited to the appropriate scope of the *lex specialis*. Overall, the study sanctions a narrow construction of deviations to general rules:

The scope of special laws is by definition narrower than that of general laws. It will thus frequently be the case that a matter not regulated by special law will arise in the institutions charged to administer it. In such cases, the relevant general law will apply.²⁶⁷

That is, in the prioritization of laws, *lex specialis* should not be read beyond its intended, inherently limited, bounds. What makes *lex specialis* so powerful, its specificity, is also arguably its greatest weakness when it comes to breadth of application.

c. Addressing the *Lotus* Issue

The *Lotus* case is emblematic of this conservative, positivist approach. In 1927, the Permanent Court of International Justice decided the *Lotus* case, which generally involved the assertion of national criminal jurisdiction at sea.²⁶⁸ It is perhaps best known, though, for the assertion that “[r]estrictions upon the independence of States cannot therefore be presumed.”²⁶⁹ Essentially, this means that which is not prohibited by law is allowed by states: “all that can be required of a State is that it should not overstep the limits which international law places upon

International Law (Conclusions), UN Doc A/CN.4/L.702 (18 July 2006) [*ILC Study on Fragmentation--Conclusions*].

²⁶⁵ See *ILC Study on Fragmentation--Analysis*, *supra* note 264 at 25 et seq.

²⁶⁶ See *ibid* at 24 (“legal reasoning will either have to seek to harmonize the apparently conflicting standards through interpretation or, if that seems implausible, to establish definite relationships of priority between them”).

²⁶⁷ *ILC Study on Fragmentation--Conclusions*, *supra* note 264 at 12; *ILC Study on Fragmentation--Analysis*, *supra* note 264 at 35.

²⁶⁸ *Case of the SS “Lotus” (France v Turkey)*, [1927] PCIJ Series A, No 10 1 (Permanent Court of International Justice).

²⁶⁹ *Ibid* at 18 (before this conclusion, stating that “rules of law binding upon States therefore emanate from their own free will as expressed in conventions or by usages generally accepted as expressing principles of law and established in order to regulate the relations between these co-existing independent communities or with a view to the achievement of common aims.”); compare *ICJ Statute*, *supra* note 62 at art 38(1).

[it].”²⁷⁰ While this work does not directly cite to the *Lotus* as a legal basis for the assertion of a conservative or positivist approach to regime selection, the conservative genesis is certainly the same. Therefore, attacks on the *Lotus* principle could be construed as an attack on the notion put forth here.

And, the *Lotus* assertion has its critics in the legal literature, and particularly the analysis of outer space law. One especially cogent attack on use of the *Lotus* principle (and the idea of freedom of state actions) in the context of space law comes from Jakhu.²⁷¹ He noted that “[a]s early as 1962, Christol wrote that ‘[t]he Lotus Case does not constitute a precedent in favor of unrestricted national uses and activities in outer space.’” Instead of the *Lotus* principle, he argued, state uses and applications of space must be guided (and limited) by the global public interest.²⁷² The use of force is arguably contrary to this notion.²⁷³ So, the use of force and security-based construct articulated here would run into problems in this context.

However, the concern over the application of the *Lotus* case (or requirement of state consent to any limitations on their capacity to act) does not preclude the present analysis. First, as discussed above, general international law and air and space law reveal that states are the key actors. In discussing who creates international law, Cheng noted the truism that solely

²⁷⁰ *Lotus Case*, *supra* note 268 at 19 (directly addressing the discretion to assert jurisdiction).

²⁷¹ Jakhu, *supra* note 148 at 41 (“In space law, the ‘general presumption in favor of freedom of action’ is not applicable.”); see generally *ibid* at 41–43. See also Jakhu & Freeland, *supra* note 9 at 470 (citing Brownlie, and noting that the *Lotus* was a narrow, bare majority decision).

²⁷² Jakhu, *supra* note 69 at 37 et seq (the global public interest contains many (thirteen named) facets, including that space activities must be for the benefit and in the interests of all countries (and space activities are the “province of all mankind”); there is freedom of use and exploration; there can be no national appropriation; and states will exhibit mutual respect, cooperation, and assistance where required.). The global public interest in the use and exploration of outer space is also referred to as the “common interest principle.” See *ibid* at 34; *Outer Space Treaty*, *supra* note 60 at art I.

²⁷³ See Jakhu, *supra* note 148 at 97. According to Jakhu:

It seems that, perhaps relying on the *obiter dictum* of the *Lotus* case, the U.S. Government believes that “[t]here is no blanket prohibition in international law on placing or using weapons in space, applying force from space to Earth or conducting military operations in and through space.” However, the fallacy of this position from the international law perspective is evident, not only because of inapplicability of the *Lotus* decision to outer space activities, but also in view of almost unanimous rejection by the international community of this position, expressed most recently in the December 2004 U.N. General Assembly Resolution.

Ibid at 98 (citations omitted) (alterations in original).

“international persons” have “the capacity to bear rights and duties under international law.”²⁷⁴

In addressing “international persons” he stated:

The truth is that present-day international persons are, with at most only one or two exceptions, primarily States, i.e., territorially organized political entities recognized as sovereign and independent (i.e., subject to no other earthly authority), together with a number of inter-State organizations to which international legal personality has been granted. Since membership of these organizations is normally limited to States, the basic unit of international society remains, therefore, the sovereign and independent State.²⁷⁵

Thus, the principle articulated in the *Lotus* case, that states are bound by rules only upon which they have agreed, is generally operative today.²⁷⁶ Cheng reminds us that “[i]n international law, as the Permanent Court of International Justice in the above passage quoted from the judgment in the case of *The Lotus* said, rules of international law emanate from the free will of States.”²⁷⁷

Moreover, Jakhu’s argument need not preclude state action and control (and the general requirement of state consent for binding law). To the contrary, his thesis is that states *have* agreed to certain general principles of law for the use of outer space, largely through the Outer Space Treaty and the subsequent widely accepted space treaties. So, the argument is really that states should be *held* to these general principles, to which they have already agreed (more of a *pacta sunt servanda* argument). These are not norms created by third parties or arbitrarily imposed on space-faring actors; they are in the properly constituted *corpus juris spatialis* itself—albeit not in great deal of operative detail.

Also, it must be noted that the common interest principle applies in space but not in the air—that is explicitly sovereign territory, and the defense of this sovereignty is acceptable (within the limits of the law of war, or other controlling laws such as Article 3*bis* of the Chicago Convention). In this context, perhaps for the assessment of aerospace vehicles and applications, the law of war makes more sense than an outer space law that arguably restricts all force as an affront to free use and exploration.²⁷⁸ There is an issue as to which regime applies. It is

²⁷⁴ Cheng, *supra* note 62 at 172–73.

²⁷⁵ *Ibid* at 173.

²⁷⁶ See Ramey, *supra* note 22 at 65–66.

²⁷⁷ Cheng, *supra* note 62 at 178.

²⁷⁸ While the laws of war may apply, that does not necessarily mean they are well-suited to or even adequate for outer space applications. See Freeland, *supra* note 22 at 83 (“although the laws of war do (in theory) appear to apply to activities in outer space, the principles may not be specific enough to provide appropriate regulation for the increasingly diverse ways in which outer space could be used during the

conceded that if space law applies to this gray area, so too would the common interest principles govern aerospace vehicles operating therein. But, space law (and deference towards its common principles) should not govern the issue of *whether* space law applies at all in the zone. Of course, if the Outer Space Treaty articulated where the space regime began it would be a clear how it applied to delimitation; but it does not. Therefore, one should not assume that space law with its unique modalities applies in the first place—and particularly not to assert that the deviation from more terrestrial procedures (such as the freedom of action for sovereign states absent a clear prohibition, as captured in the *Lotus* case) would apply.

2. Analysis: Sovereignty is the Rule; Free Movement the Exception

Section B of this Chapter demonstrated that there is a law, or at least a general disposition of states, regarding their vertical territorial claims: it is towards sovereignty *ad coelum*, or *to the heavens*.²⁷⁹ This baseline disposition should be respected until it is formally capped by those with the authority to do so: states.

This argument (or description of the state of the law) is proffered to suggest that sovereign airspace is the default, but that position need not be considered automatic to serve as the baseline. Though the analysis here dates to the Chicago Convention, and before that the Paris Convention of 1910 and the general disposition of Roman law, it is not necessarily a natural law—a way that things inherently are or must be. It can be considered as a construct as well. But, surely, it is a construct long-accepted and time-tested, particularly relative to outer space law. As such, it serves as a baseline or default for measuring the legal status quo when confronting a new or conflicting regime.²⁸⁰

Of course, states must recognize that their territorial claims cannot go to infinity (as a practical matter, at least); there are limits. Regarding a *usque ad infinitum* theory of sovereignty,

course of armed conflict.”). See also Bourbonnière & Lee, “The Targeting of Post-Modern Military Space Assets” *supra* note 22; Bourbonnière & Lee, “Legality of the Deployment of Conventional Weapons in Earth Orbit” *supra* note 22; Ramey, *supra* note 22.

²⁷⁹ See discussion at *supra* notes 88 and 191.

²⁸⁰ This preference for the baseline is not inconsistent with the construction norms outlined in the *ILC Study on Fragmentation--Conclusions*, *supra* note 264. A central premise of this argument is that, regarding the relevant criteria, airspace and outer space constitute distinct regimes, and apply exclusively in a given area. As such, a hierarchical approach to comparing them (that is, which one trumps the other in a situation where both apply) is unnecessary.

McMahon noted that “[s]uch a view may be more accurately characterized as *usque ad absurdum*.”²⁸¹ Oduntun expanded on this sentiment, similarly critiquing an overly-expansive assertion of sovereignty into outer space.²⁸² While it is reasonable to note the absurdity of an overly broad view of sovereignty (well into space), this critique is inapplicable here. This paper concedes that once outer space is reached, outer space law (with free movement) would be the governing regime; so, there is no projection of sovereignty *into* outer space. The question is where outer space begins—the theory Oduntun addressed and dismissed is really not one of delimitation at all; it is better construed as a denial of the application of the Outer Space Treaty in general, which is not advocated here.

So, where is the cap on assertions of sovereignty (and the airspace regime)? The clear point is at the beginning of outer space. As an early US position on air and space delimitation stated, “space is divided into two regions: ‘air space’ and ‘outer space’. ‘Outer space’ is considered as contiguous to ‘air space’, with the lower limit of ‘outer space’ being the upper limit of ‘air space’.”²⁸³ Where one ends, the other, with its unique regime for sovereignty and state craft, begins.

Outer space law was not a nascent law to be discovered—it was carved out and created in a process in the mid-1960’s through the mid to late 1970’s.²⁸⁴ The process was controlled and

²⁸¹ McMahon, *supra* note 206 at 342–43.

²⁸² In discounting what he refers to as the “*Usque Ad Infinitum* Theory” of delimitation, he stated:

It is agreed that any projection of territorial sovereignty into space infinitum will not only violate international law, but will be inconsistent with basic astronomical facts. The revolution of the Earth requires that its position in relation to space and celestial bodies is never constant for the slightest conceivable fraction of time. Such a projection into Space would give us a series of adjacent irregularly shaped cones of jurisdiction, continuously moving into themselves; with celestial bodies moving into and out of these cones ceaselessly. In these circumstances the concept of a space cone of sovereignty is both meaningless and a dangerous abstraction.

Oduntun, *supra* note 140 at 78 (citation omitted).

²⁸³ “Doc 442: NSC Report (18 August 1958)” *supra* note 196 at para 13.

²⁸⁴ The Moon Agreement was signed in 1979, but its status as a controlling space document is dubious as it has only sixteen ratifications (and an additional four signatures). See COPUOS LSC, *supra* note 146 at 10.

deliberate, largely through the mechanism of the UN COPUOS.²⁸⁵ Also, the numerous documents available from the US Department of State, Office of the Historian reveal the efforts made to *craft* outer space law, both from the US and other states' perspectives.²⁸⁶ While the assessments are from a US standpoint, they also contain assessments of other states' (particularly the Soviet Union or key US allies) positions and efforts at and motivations for creating space law. The overall conclusion is that outer space law was no accident—it was based on a series of conscious decisions by states to create it. This overall supports viewing outer space law as a carve out from the disposition; an exception to the rule and a cap on the sovereignty regime of airspace.

3. Orbit as the Line

That airspace is sovereign is well-established and well-accepted among states and scholars alike.²⁸⁷ The question, then, is at what point does the law deviate from the baseline (sovereignty) to the exceptional regime (freedom of use and exploration)? From the development of outer space freedom, it appears that the line is at orbit.

a. Affirmative Evidence of Orbit as the Line

The academic and political debate of passage of satellites dominated the discussion of outer space freedom of navigation—satellites were the breakthrough innovation that precipitated the development of the outer space regime. So, absent any further guidance from the Outer Space Treaty or other source of law, satellites (and their flight path) must be the guide point for the differentiation between the two regimes.

Recalling the oft-quoted passage from Judge Lachs:

[T]he first instruments that men sent into outer space traversed the air space of States and circled above them in outer space, yet the launching States sought no permission, nor did

²⁸⁵ See Cheng, *supra* note 62 at 151 (writing in 1985 about the process, “in the development of space law in the United Nations one witnesses in effect, in almost laboratory conditions, the birth and growth of an entirely new branch of international law.”).

²⁸⁶ See “Historical Documents: Foreign Relations of the United States”, online: *US Dept of State, Office of the Historian* <<https://history.state.gov/historicaldocuments>>.

²⁸⁷ See *supra* Chapter II.A.2. See also Vlasic, *supra* note 94 at 55.

the other States protest. This is how the freedom of movement into outer space, and in it, came to be established and recognized as law within a remarkably short period of time.²⁸⁸

He also later stated, “It seemed therefore justified to interpret their acquiescence as consent.”²⁸⁹ If sovereignty did not otherwise exist where the orbital activities were taking place, consent or acquiescence would be irrelevant. To use a law of the sea analogy, states do not have to “permit” foreign vessels to operate on the high seas (or even in exclusive economic zones)—they are free to do so because the area of operation has been determined to be free. So, through this practice of orbit, states recognized that there should be (and, therefore, after no protests, *was*) freedom of orbit.

Others have a slightly different articulation of the meaning of the lack of protest from states over which *Sputnik* circled. According to Freeland, “[t]his international (in)action confirmed that this new frontier of human activity did not possess the elements of sovereignty that had already been well established under the international law principles regulating land, sea, and air space on Earth.”²⁹⁰ Under this view, the lack of protest did not *carve out* a new area or exception to the rule; instead, it *revealed* that outer space, inherently, was not subject to state sovereignty. This may be a subtle distinction, but it could make a difference in the analysis as to the default regime (and whether they can be regarded along a spectrum or divided by a line). However, even if this view is more accurate, it must be noted that *Sputnik* only *revealed* that there is no state sovereignty down to orbit. Below orbit, there was no such revelation of freedom; and, the Outer Space Treaty ten years later did nothing to expand on that position. Thus, the analysis ends up in the same place; that is, orbit is the lowest known position of non-sovereignty—be it by its inherent nature or as an accepted exception to the rule.

From a practical perspective, the *UK Military Space Primer* analogizes orbital paths to the law of the sea and international straits passage. By their nature, satellites cannot (reasonably) maneuver out of their path, so they require a passage regime in order to operate.²⁹¹ While this is

²⁸⁸ *North Sea Continental Shelf Cases*, *supra* note 153 at 230 (dissenting opinion of Judge Lachs).

²⁸⁹ Lachs, *supra* note 64 at 126. But, Lachs is not entirely clear overall that the passage exception is a deviation from airspace law, as opposed to the discovery of a new law. See *ibid* at 125 (describing the overflight, without consent or objection, “like ‘a path across the common’.”) (citation omitted). So, the “common” notion could suggest a pre-existing *res communis*, and not a forged one.

²⁹⁰ Freeland, *supra* note 22 at 88.

²⁹¹ UK Ministry of Defence, *supra* note 63 at 2–2.

a recent articulation, it was true at the dawn of the space age as well.

Also, it is important that passage (whether considered “innocent” or “transit,” to use the law of the sea nomenclature) must be just that: passage.²⁹² Many articulations of the orbital exception that underlies the outer space regime refer to it as “innocent passage.” Under the law of the sea, this would preclude offensive maneuvers as well as espionage and a host of other activities conducted by satellites since the early years of the space age.²⁹³ And, it should be recalled that such passage for state craft (such as warships) is unique to the sea entirely—it does not generally apply to aircraft.²⁹⁴ Even if the regime is construed as more akin to “transit passage,” there are still a degree of restrictions.²⁹⁵ And, inherently, there still must be *passage* (not loitering or operations)—thus the overflight would be fleeting.

In orbit, states can generally be assured that satellites or orbital vehicles are conducting passive passage; that is, generally powered by natural forces and will only last for a short, fleeting period (depending on the size of the subjacent state and the relative speed of the craft). Regardless of whether states endorse the additional activities (remote sensing, communications, etc.) conducted while passing over, it is not controlled flight based on conscious maneuvering of the craft (aside from being placed in orbit initially). Below orbit, however, is a zone of controlled flight and purposeful, active operation. And, many of the future aerospace applications contemplated herein would involve more than mere passage. Particularly with regard to state (and especially military) craft, this is a freedom beyond what states accepted with the first overflights, and it was no further defined in the Outer Space Treaty or subsequent agreements.

Aside from just being less offensive to subjacent states, the distinction between passive and controlled flight also makes an important difference in the application of force. Even

²⁹² See *UNCLOS*, *supra* note 59 at art 18(2) (regarding innocent passage, “Passage shall be continuous and expeditious.”), *ibid* at art 38(2) (“Transit passage means the exercise...of the freedom of navigation and overflight solely for the purpose of continuous and expeditious transit”).

²⁹³ See *UNCLOS*, *supra* note 59 at arts 18–19; John Oliver, “National Security and the U.N. Convention on the Law of the Sea: U.S. Coast Guard Perspectives” (2009) 15 *ILSA J Int’l & Comp L* 573 at 585; Su, *supra* note 102 at 376. See also Rolph, *supra* note 18 at 160. Rolph addresses whether passage must be navigationally “necessary” to be innocent. In the context of provocative overflights by Russia, and the US drive to test territorial boundaries (in the sea), the issue could be ripe for friction in aerospace.

²⁹⁴ See *supra* Chapter II.A.2-3.

²⁹⁵ *UNCLOS*, *supra* note 59 at art 38–39.

assuming that shooting down an encroaching state craft (in sovereign space) would be legal under a targeting (that is, *jus in bello*) analysis in a particular circumstance, a state may have difficulty justifying force against a satellite or mere passage incursion from a *jus ad bellum* perspective (which, of course, must come first in times of peace). While operations in the gray area could constitute a threat or a sustained violation of sovereignty tantamount to force or a threat thereof,²⁹⁶ mere fleeting passage is not likely to be reasonably construed as an “armed attack” under Article 51 of the UN Charter, or a case where a “necessity of self-defense is instant, overwhelming, leaving no choice of means, and no moment for deliberation.”²⁹⁷ Thus, the distinction between that which is in orbit (creating the orbital line) and that which operates below is of prudential significance.

Finally, it should be noted that it is not just “natural” movement (like orbit) that triggers the peak of sovereign territory. Recall the 1956 balloon incident between the US and Soviet Union. There, the high-altitude balloons were set adrift to travel where the winds took them. In this regard, this is like “orbit” in that it is not really a controlled flight; it is at the beck and call of natural forces, the winds, physics, and gravity. In some ways, balloons are even more so than orbits (as there are occasional corrections by satellites to ensure maintenance of a particular orbit). But just being subject to nature did not save the balloons from being regarded (and accepted in the US silence) as violating sovereignty. Despite the changes in technology and world politics since this 1956 incident (or the 1960 U-2 shoot down), practically little has changed in the law. A 2005 US Air Force analysis of high-altitude balloons (operating in near space), as compared to satellites, supports the idea of an expansive upward extent of sovereignty, particularly from incursion by military craft:

²⁹⁶ This particularly could be the case from the perspective of a state asserting a preemptive self-defense right. See *supra* Chapter I.B.1.

²⁹⁷ See Miller, *supra* note 25 (available at http://avalon.law.yale.edu/19th_century/br-1842d.asp) (containing the exchanges between US Secretary of State Daniel Webster and Great Britain’s Lord Ashburton); see also Murphy, *supra* note 22 at 711 (discussing the Caroline incident in the context of anticipatory self-defense). But see BBC News, *supra* note 46 (Even by Turkish accounts, the incursion into Turkish territory by two Russian jets was “2.19km (1.36 miles) and 1.85km (1.15 miles) into Turkey for 17 seconds” over a small peninsula of Turkish sovereignty jutting into Syria.). This may reveal that some states are less inclined towards deference to fleeting passage, at least in the context of heightened concerns (and sensitivity) over respect for borders. See “Turkey Letter to UNSC on Shooting Down SU-24 Plane, Nov 24, 2015 (Full Text)” *supra* note 47 (noting six prior complaints by Turkey at the UN Security Council for violations of its territorial integrity).

So, if satellites are so expensive and so nonresponsive and if they are physically unable to provide persistence, why, then, do we buy them at all? The answer today is the same as it has been since the 1950s—freedom of overflight. The importance of freedom of overflight cannot be overemphasized as a positive aspect of orbital operations. Satellites are the only legal means by which overhead ISR can be performed deep inside the territory of sovereign nations during peacetime.²⁹⁸

So, only when hostilities commence (and the territorial integrity of an enemy belligerent is no longer respected) would near-space usage be appropriate under this US analysis. The 1956 incident and this more current analysis demonstrate that states are not willing to allow just any high-altitude incursion due to natural paths—the allowance is unique to orbit, making it a distinction in practice; that is, a line.

b. The Lack of Contrary Evidence

There is a dearth of evidence to contradict the assertion of orbit as the line of demarcation between air and outer space, as it pertains to sovereignty. There is no conventional law on point.²⁹⁹ Regarding state practice, there is a similar lack of activity to contradict the idea that states are entitled to sovereignty up to the point of orbit, both in international pronouncements and in state domestic laws.

Many have argued for a right of passage to and from outer space, through airspace. This could form the seeds of a functionalist mode of operation below orbit for outer space craft.

²⁹⁸ Ed Tomme & Sigfred Dahl, “Balloons in Today’s Military? An Introduction to the Near-Space Concept” (2005) XIX:4 Air & Space Power Journal 39 at 48.

²⁹⁹ In fact, a recent attempt at conventional law demonstrates the lack of consensus as to a fixed definition of outer space, and bolsters the notion of an orbital definition as a more widely acceptable one. The 2008 draft of the Treaty on the Prevention of the Placement of Weapons in Outer Space and the Threat or Use of Force against Outer Space Objects (PPWT), explicitly defined “outer space” as “the space above the Earth in excess of 100 km above sea level.” Conference on Disarmament doc. CD/1839 (29 February 2008) at art I(a) (available at “Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)”, (2008), online: *Council on Foreign Relations* <<http://www.cfr.org/space/treaty-prevention-placement-weapons-outer-space-threat-use-force-against-outer-space-objects-ppwt/p26678>>). However, the 2014 draft PPWT removed this provision, or any reference to a specific definition of “outer space.” Draft PPWT (10 June 2014) at art I(a), reprinted in Anna Jaikaran, ed, *Space Security Index 2015* (Kitchener, ON: Project Ploughshares, 2015) at 146. This omission was made in order to address “some of the criticism and concerns” with the 2008 version and to make it more widely acceptable. *Ibid* at 109. Still, in this attempt at making the 2014 PPWT more palatable, it added an orbit-based definition of “placed in outer space” at Article I(c): “a device is considered as ‘placed in outer space’ when it orbits the Earth at least once, or follows a section of such an orbit before leaving orbit, or is placed at any location in outer space or on any celestial body other than Earth.” *Ibid* at 146.

According to Lachs: the “right of innocent passage should on principle be attributed to all States without discrimination.”³⁰⁰ However, this is still an assertion of what should be, versus what is. Instead, it is at best unclear whether transit passage is allowed in airspace to reach space.³⁰¹

This is because the matter has not been tested in reality—there is no state practice. The US and European Space Agency Launches generally take place in locations that do not require overflight of sovereign territory (just the launching state, or the high seas). Further, discussing Kazakhstan (home of the primary Russian launch site) and in general, Benkö and Plescher stated:

[W]e would like to emphasize that passage through foreign territory for the purpose of *reaching* orbit is not necessary...and has never been practised without consultation of foreign States potentially affected. As to the passage of *re-entering spacecraft* no current practice is known either in this respect, since the US Space Shuttle, which has been the only operational system for decades, which could have affected passage, does not have to pass through foreign airspace under regular (*non-accident*) conditions. As to the Shuttle’s emergency landing sites on foreign territory, agreements have been concluded...so that these cases are not relevant for international practice or customary law.³⁰²

While these are typically state vehicles, making them more offensive from an airspace perspective, the rights of civilian craft remain unclear as well.³⁰³ In the 1990’s, Russia passed a law allowing for a foreign craft to “execute a single inoffensive flight through the airspace of the Russian Federation for the purpose of” reaching or returning from outer space.³⁰⁴ However, if Russia is empowered to limit it to one such flight, that is a clear indicator that they retain sovereignty over the zone vis-à-vis such space-bound craft in subsequent flights. As such, it is a one-time exception that further proves the rule. So, overall, there has been no practice from which a customary norm either lowering the spatial ceiling on sovereignty or creating a functionalist exception thereto could have emerged.

³⁰⁰ Lachs, *supra* note 64 at 57.

³⁰¹ Stephan Hobe, “Airspace” in *Max Planck Encyclopedia of Public International Law* (Oxford: Oxford University Press, 2008), para 20.

³⁰² Benkö & Plescher, *supra* note 5 at 34 (emphasis in original).

³⁰³ For instance, the Google Loon project, a commercial endeavor to provide high-altitude balloon-based internet service, is seeking clearances and approvals from states to operate at around 20 kilometers (12 miles). See “Project Loon – Google” *supra* note 10; Zacks Equity Research, “Google’s Project Loon to Beam 3G Across Sri Lanka?”, (31 July 2015), online: *Yahoo! Finance* <<http://finance.yahoo.com/news/googles-project-loon-beam-3g-195207177.html>>.

³⁰⁴ Benkö & Plescher, *supra* note 5 at 33–34; Lyall & Larsen, *supra* note 174 at 172–73, note 82.

Similarly, there is little in the way of consistency of state positions to demonstrate an inchoate *opinio juris* (which may be an indicator of how states will or would act in order to formulate a custom of international law). This is best demonstrated by the UN COPUOS questionnaires on the matter, and the responses thereto.³⁰⁵ For delimitation in general, states were asked:

- (i) Does your Government consider it necessary to define outer space and/or to delimit airspace and outer space, given the current level of space and aviation activities and technological development in space and aviation technologies?
- (ii) Does your Government consider another approach to solving this issue?
- (iii) Does your Government give consideration to the possibility of defining a lower limit of outer space and/or an upper limit of airspace, recognizing at the same time the possibility of enacting special international or national legislation relating to a mission carried out by an object in both airspace and outer space?³⁰⁶

Regarding the “possible legal issues with regard to aerospace objects,” states were asked:

Question 1. Can an aerospace object be defined as an object which is capable both of travelling through outer space and of using its aerodynamic properties to remain in airspace for a certain period of time?

Question 2. Does the regime applicable to the flight of aerospace objects differ according to whether it is located in airspace or outer space?

Question 3. Are there special procedures for aerospace objects, considering the diversity of their functional characteristics, the aerodynamic properties and space technologies used and their design features, or should a single or unified regime be developed for such objects?

Question 4. Are aerospace objects while in airspace considered as aircraft, and while in outer space as spacecraft, with all the legal consequences that follow therefrom, or does either air law or space law prevail during the flight of an aerospace craft, depending on the destination of such a flight?

Question 5. Are the take-off and landing phases specially distinguished in the regime for an aerospace object as involving a different degree of regulation from entry into airspace from outer space orbit and subsequent return to that orbit?

Question 6. Are the norms of national and international air law applicable to an aerospace object of one State while it is in the airspace of another State?

Question 7. Are there precedents with respect to the passage of aerospace objects during take-off and/or re-entry into the Earth’s atmosphere, and does customary international law exist with respect to such passage?

³⁰⁵ The COPUOS Legal Subcommittee (LSC) posts responses to its state questionnaires on delimitation, aerospace vehicles, and other matters on-line, on a rolling basis, generally grouped as responses are presented. See “UN COPUOS, Legal Subcommittee: 2015, Session Documents”, online: *UN Office for Outer Space Affairs* <<http://www.unoosa.org/oosa/en/ourwork/copuos/lsc/2015/index.html>>.

³⁰⁶ COPUOS, *Report of the Legal Subcommittee on its Fifty-Third Session, held in Vienna from 24 March to 4 April 2014*, A/AC.105/1067 (Vienna: UN Committee on the Peaceful Uses of Outer Space, 2014) at 40.

Question 8. Are there any national and/or international legal norms with respect to the passage of aerospace objects during take-off and/or re-entry into the Earth's atmosphere?
Question 9. Are the rules concerning the registration of objects launched into outer space applicable to aerospace objects?
Question 10. What are the differences between the legal regimes of airspace and outer space?³⁰⁷

A survey of state responses to each of these questionnaires reveals that states accept the distinction of airspace and outer space, and the importance of respect for sovereignty; but it also shows a great lack of consistency in substantive answers to the question of the international law with regard to delimitation.³⁰⁸ With the wide-ranging responses, the only real consensus reached in each report on delimitation and aerospace vehicles was that COPUOS would continue to address the issues.

State responses regarding domestic laws defining outer space are equally unavailing as to state consistency.³⁰⁹ The UN Office for Outer Space Affairs (UNOOSA) posts relevant legislation on-line; however, only 22 states provide national legislation at all and few of those elect to define or delimit the meaning or scope of "outer space."³¹⁰ One oft-cited domestic determination of "outer space" comes from Australia, which in various definitions of terms for

³⁰⁷ COPUOS LSC, *Analytical summary of the replies to the questionnaire on possible legal issues with regard to aerospace objects*, A/AC.105/C.2/L.249/Add.2 (Vienna: UN Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, 2007). Similarly, regarding suborbital flights and their effect, states were asked:

- (i) Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?
- (ii) Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?
- (iii) How could suborbital flights for scientific missions and/or for human transportation be defined?
- (iv) Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?
- (v) How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?
- (vi) Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

COPUOS LSC, *supra* note 128 at 3.

³⁰⁸ See also Su, *supra* note 102 at 371 (discussing lack of consensus in COPUOS on innocent passage of aerospace vehicles); Kayser, *supra* note 171 at 45, n.97; Benkö & Plescher, *supra* note 5.

³⁰⁹ See Su, *supra* note 102 at 361–63.

³¹⁰ "Space Law: National Space Law Database", online: *UN Office for Outer Space Affairs* <<http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html>>.

its Space Activities Act of 1998 refers to 100 kilometers as a line of demarcation.³¹¹ But, Australia explicitly denied that this was a definition of “outer space” and asserted that there is no international law as to delimitation; instead, the Act is said to be designed merely to provide the intended scope of domestic regulation (without external effect).³¹² Other states, such as South Africa³¹³ and Belgium,³¹⁴ focus on orbit as the trigger for outer space and outer space activities. However, while these domestic assertions bolster the validity of orbit as the line (as offered as a default, or “safe” position here), there are simply too few for them, alone, to provide evidence of an emerging norm.

Though only signed by eight states, the Bogota Declaration of 1976 presents an interesting potential counterpoint to the idea that orbit is the line as a matter of *opinio juris*.³¹⁵ The assertion of sovereignty at such a high altitude may seem odd at first, especially in the context of what is settled in the delimitation debate. But, the Bogota Declaration actually reveals a kernel of difficulty in the orbital-based analysis of the system. Geosynchronous orbit is definitely an orbit by any scientific definition; but, it is unlike an orbit in a sovereignty context.

³¹¹ [Australian] Space Activities Act of 1998, Act No. 123 of 1998 as amended, taking into account amendments up to Statute Law Revision Act 2013, Part 2, Schedule 8 (“Definitions”) (available at <https://www.comlaw.gov.au/Details/C2013C00462>) (using above 100 kilometers as the threshold for space in definitions of “launch,” “launch vehicle,” “return,” and “space object”). Similarly, European Union regulation No. 388/2012 (19 April 2012), in the context of export controls, defined “space-qualified” products as those “designed, manufactured and tested to meet the special electrical, mechanical or environmental requirements for use in the launch and deployment of satellites or high-altitude flight systems operating at altitudes of 100 km or higher.” COPUOS, *Report of the Legal Subcommittee on its Fifty-Third Session supra* note 302 at 39.

³¹² COPUOS, *National legislation and practice relating to definition and delimitation of outer space, Note by the Secretariat (Addendum)*, A/AC.105/865/Add.1 (Vienna: UN Committee on the Peaceful Uses of Outer Space, 2006) at 2 (“There is no definition of ‘outer space’ in domestic Australian law and Australia recognizes that there is no internationally accepted definition or delimitation of the term.”); *ibid* at 3 (“The 100-km altitude represents a practical clarification of where the Act applies. The 100-km altitude was not an attempt on Australia’s part to define or delimit ‘outer space’.”).

³¹³ [South African] Space Affairs Act, Statutes of the Republic of South Africa - Trade and Industry No. 84 of 1993 (assented to 23 June 1993) at art 1 (“‘outer space’ means the space above the surface of the earth from a height at which it is in practice possible to operate an object in an orbit around the earth”).

³¹⁴ [Belgian] Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects, as amended by Law of 1 December 2013 (B.O.J. of 15 January 2014) (http://www.belspo.be/belspo/space/doc/beLaw/Loi_en.pdf) at art 3(1) (“‘space object’ means, ...any object launched or intended to be launched, on an orbital trajectory around the Earth or to a destination beyond the earth orbit”).

³¹⁵ See *Bogota Declaration, supra* note 142.

That is, a satellite moving in a geostationary orbit (a GEO with zero eccentricity along the equator) appears to be stationary vis-à-vis a particular point on Earth because the speed of orbit matches the relative rotational speed of the Earth along its axis.³¹⁶ In effect, it seems like an object at any other altitude that is able to loiter in a given position.³¹⁷ This flies contrary to the disposition of orbits that steered the acceptance of the orbital exception to sovereignty, namely the inevitability of their crossing borders by their nature. From an upward projection of state borders, a satellite in GEO would not appear to be crossing any horizontal boundaries in its flight. Based on this “link” to an equatorial point on Earth, the eight equatorial states declared GEO as part of their territory and not outer space.³¹⁸

This Declaration supports the notion that state sovereignty *could*, in theory and absent contrary agreement, extend fairly deep into outer space, a major premise of this work. But, it also undermines the notion that states have actually conceded claims of sovereignty at orbit. If this was a dominant view of states, it would be problematic for the argument. However, the assertion of the Bogota Declaration has been rejected by most all other states, so it does not form any contrary or clear law.³¹⁹ Also, even if accepted, its premise is not controlling on the gray area discussion here—geographically, it falls well within the settled area of outer space law, so its application would not illuminate a line between air and space so much as undermine the entire outer space regime in general. And, that is beyond the intended argument here.

4. Conclusion: Orbit Is the Division Point

Overall, orbital passage is the exception to the rule of sovereignty; it is the starting point for the new regime, which allows free movement above sovereign airspace. In the absence of clear rules or modifications to the baseline regime of sovereignty, airspace should be assumed as the governing law. There is no known, clear exception for loitering or operating in upper

³¹⁶ See “Basics of Space Flight Section I, Chapter 5: Planetary Orbits”, online: *NASA.gov* <<http://www2.jpl.nasa.gov/basics/bsf5-1.php>>.

³¹⁷ See Pelton, *supra* note 10.

³¹⁸ *Bogota Declaration*, *supra* note 142 (“Equatorial countries declare that the geostationary synchronous orbit is a physical fact linked to the reality of our planet because its existence depends exclusively on its relation to gravitational phenomena generated by the earth, and that is why it must not be considered part of the outer space. Therefore, the segments of geostationary synchronous orbit are part of the territory over which Equatorial states exercise their national sovereignty.”).

³¹⁹ See Cheng, *supra* note 62 at 455; Oduntan, *supra* note 140 at 76; *supra* Chapter II.B.1.

airspace. The US Space Shuttle sought permission; Google Loon is seeking permission; and the US Air Force near-space balloon program is awaiting a time when sovereignty is not respected. Along these lines, emerging aerospace vehicles should seek permission to operate.

D. Commensurability and the Security Spectrum

Despite the argument above, it is possible that there simply is not a positivist solution to the problem; perhaps there is no line between air and space—both regimes coexist in aerospace, and both must be respected. The domains could be incommensurable—that is, they cannot be compared and may both exist at the same time, in the same zone of operations. Thus, there would be no clear solution for states considering the use of force to defend sovereign territory (absent creating a *sui generis* regime that contains a solution).

While this may be a legal possibility, it poses grave practical challenges. For the reasons discussed previously as to why sovereignty matters and the potential stakes of territorial overflight by state vehicles, states require clarity on which law applies. In the mind of a decision maker with a binary choice (attack or not attack), there must be a definitive answer—either an overflight is or is not a violation of sovereignty; it cannot be both legal and illegal at the same time.³²⁰

This section explores a commensurability argument for the delimitation of air and outer space, employing state security as the common metric by which the regimes are measured and integrated for assessment. This security interest is evident around the operation and applications of satellites and their orbit; so, as with the above analysis, orbit is the pivot point in the security nexus between air and space. Anything below orbit is a potential threat, and free operation is contrary to security interests. Anything in or above orbit could be a threat, but states determined that, for security, anything operating there is better off as free. Essentially, this commensurability continuum examines the means and the ends to state goals in airspace and outer space: security is the end, and the regime in a particular area is the means.

³²⁰ Certainly, one could argue that—if both regimes applied at the same time—the proper answer would be not to use force if there was question as to the actual nature of a threat or incursion; the laws of war should be read to presume that force is not appropriate in the absence of a clear armed attack or threat that is “instant, overwhelming, leaving no choice of means, and no moment for deliberation.” Miller, *supra* note 25. However, the counter to this is the argument articulated above—that in the absence of clarity as to the one ruling regime, the default position is one of state sovereignty.

This section first discusses commensurability in general, and how its use here as an analytical method. Then, it explores how law and politics intersect to create legal regimes that affect national interests (here, security). Then, it establishes the prominence of the security interest in the development of both air and space law. From there, it compares the two regimes to reveal that the break in the security interest (and hence the break in the legal order in the regimes) falls at orbit. As such, orbit should be considered the effective line between air and outer space.

1. Commensurability as an Analytical Method

Two items are incommensurable when they cannot be assessed under a common metric.³²¹ If two notions are incommensurable, “you cannot conclude anything about their respective merits” and you cannot make a normative judgement as to which is preferable or better.³²² As such, commensurability can provide the normative guidance on an issue that the strict positivist approach above may not. However, if the regimes cannot be valued properly, it may suggest that they actually coexist along separate metrics in the same place; that is, the gray area between air and space is so because it is both black and white at the same time.

This work could be viewed as an improper analysis of commensurability—it assumes that there is a conventional (not an incommensurable) answer. In particular, it assumes that there is a line between airspace and outer space, in order to provide greater explanation of where that line is.³²³ This is fair critique, which I will not dispute; indeed, the commensurability concept is used as a tool to *find* harmony in the seemingly disparate (or incompatible) regimes.³²⁴

³²¹ See Chang, “Value Incomparability and Incommensurability” in *The Oxford Handbook of Value Theory* (Oxford: Oxford University Press, 2015) 205 at 2 (electronic version with self-contained pagination) (“If two values cannot be measured by a cardinal unit, they are incommensurable.”); Cass Sunstein, “Incommensurability and Valuation in Law” (1994) 92 Mich L Rev 779 at 796 (“Incommensurability occurs when the relevant goods cannot be aligned along a single metric without doing violence to our considered judgments about how these goods are best characterized.”).

³²² H Patrick Glenn, *Legal Traditions of the World: Sustainable Diversity in Law*, Fifth edition ed (Oxford, United Kingdom; New York, NY: Oxford University Press, 2014) at 45.

³²³ This dichotomy (this or that) is what Glenn refers to as “bivalent thought,” or an issue that “involves an initial dichotomy or bivalence but is univalent in the end result.” *Ibid* at 368. While he critiques this type of thought, he also notes that it “is behind much of the construction of the western world (and is ferociously defended).” *Ibid* at 370.

³²⁴ But see Sunstein, *supra* note 321 at 803–04, 860 (warning against oversimplification of the metric or the ends of the valuation). Also, as Endicott warns, “[i]dentifying a single criterion does not eliminate

However, two points are relevant. First, as discussed below, an argument can be made that the regimes are indeed actually commensurable (that is, the assumption is valid). When two values are commensurable, the analysis provides guidance as to the normative framework for that compatible end. Second, even if some may find that they are incommensurable in a legal laboratory, practical concerns dictate that there be some fairly clear delimitation between airspace and outer space. That is because, in the context of the use of force and establishing sovereignty, states (and operational or tactical level actors) need some degree of certainty as to what actions are appropriate or authorized.³²⁵ Simply put, having no answer is not adequate. Sunstein and Endicott accept this practical consideration in their expressions of incommensurability and its uses. Even if two values are incommensurable, a decision maker must step in to reconcile them.³²⁶ In so doing, that decision maker can use a balance of competing values that best suits the people for whom he or she is deciding.³²⁷ So, whether the air and outer space regimes are commensurable, the analysis will provide guidance as to how they should inter-relate.

In this context it is useful to assume that the two regimes are commensurable, as the idea that they were formed with a unifying purpose may shed light on where the divergence between notions of sovereignty and state versus civil craft may lie. In assessing the interaction and interpretation between a regime of *lex specialis* and general law, or among potentially applicable *leges speciales*, the ILC concluded:

(4) *The principle of harmonization.* It is a generally accepted principle that when several norms bear on a single issue they should, to the extent possible, be interpreted so as to give rise to a single set of compatible obligations.³²⁸

incommensurability if the application of the criterion depends on considerations that are themselves incommensurable.” Timothy Endicott, “Proportionality and Incommensurability” in Grant Huscroft, Bradley W Miller & Grégoire C N Webber, eds, *Proportionality and the Rule of Law: Rights, Justification, Reasoning* (New York, NY: Cambridge University Press, 2014) 311 at 318.

³²⁵ See Chapter II.C. Of course, while “ground level” individuals merely execute policy, their rules of engagement and authorizations for the use of force will be governed by state-level determinations as to the status of the law of delimitation. But, the importance of not just the policy but how it is executed should not be overlooked.

³²⁶ Endicott, *supra* note 324 at 324–25 (discussing how judges must make decisions between incommensurable values, and how that is part of the rule of law (and not a departure therefrom); Sunstein, *supra* note 321 at 857.

³²⁷ Sunstein, *supra* note 321 at 857 (“choice among incommensurables is an act of interpretation, one that involves a dimension of fidelity to the past, but that is also constructive.”).

³²⁸ *ILC Study on Fragmentation--Conclusions*, *supra* note 264 at 8.

In sum, this analysis seeks out the “single set of compatible obligations” that can unify the regimes into a common interest or metric.

2. The Intersection of Politics and Law: Deriving Order from Chaos

A brief discussion of the nexus of law and politics is appropriate for the assessment of the development of the outer space regime, out of the airspace regime. This explains how the commensurability assessment contained herein is generally consistent with the conservative, positivist approach taken above, despite that the idea that an overarching regime may suggest states have ceded some degree of power for a larger (and collective) goal.³²⁹

Fawcett said that “law is at best a servant of power and at worst a mere whitewashing of policy.”³³⁰ He continued, “‘Foreign policy like all politics is in its essence a struggle for power, waged by sovereign nations for material advantage.’ Conflict must then be seen in terms of relative power, and not ‘conceived in absolute terms of peace, law and order vs. aggression, crime and anarchy.’”³³¹ This notion, particularly the view of law as an extension of political struggle among states, bears resemblance in principal to the often-quoted Clausewitz assertion that war is merely an extension of politics.³³² Also, it makes for interesting comparison to the concept of “lawfare,” where the perception of adherence to (or deviation from) laws of war can be employed by belligerents in a conflict—essentially, law as an extension of war by other means.³³³

³²⁹ See Arthur Stein, “Coordination and Collaboration: Regimes in an Anarchic World” in Stephen D Krasner, ed, *International Regimes* (Ithaca and London: Cornell University Press, 1983) 115 at 140 (“The existence of regimes is fully consistent with a realist view of international politics, in which states are seen as sovereign and self-reliant. Yet it is the very autonomy of states and their self-interests that lead them to create regimes confronting dilemmas.”).

³³⁰ James Fawcett, *Law and Power in International Relations*, Studies in international politics (London: Faber and Faber, 1982) at 35.

³³¹ *Ibid* (quoting Hans Morgenthau, *In Defense of the National Interest: A critical examination of American foreign policy* (New York: Knopf, 1951) at 101).

³³² See Clausewitz, *supra* note 32 at chap. 1 sec. 24.

³³³ See generally Charles Dunlap, *Law and Military Interventions: Preserving Humanitarian Values in 21st Century Conflicts* (Carr Center for Human Rights, John F. Kennedy Sch. of Gov’t, Harvard U., 2001); “About Lawfare: A Brief History of the Term and the Site”, online: *Lawfare Blog* <<http://www.lawfareblog.com/about-lawfare-brief-history-term-and-site>>.

Thus, as discussed above, the view of political realism, *realpolitik*, legal positivism or any other term for a focus on the primacy of states (and their self-interest) in international law seems apt for discerning the regime governing gray space, as the meeting point of air and outer space law. Where one can find *consensus*, one can draw a line.

As Fawcett stated, the international law with true potency is that which embraces rules and obligations, recognized in long practice or specific agreements, and codes of conduct or harmonization of policies serving common interests. There are particular common interests both in predictability of behaviour in international relations and in the observance of at least minimum standards; no national interest can be secured without them. ... *In sum, law cannot itself create order in international relations, but emerges as a fact of life where there are minimum degrees of order, which it may serve to rationalize and extend.*³³⁴

Law (such as the regime for outer space) derives from state consensus on substantive issues of order. As outer space law emerged (or was created—both concepts could be argued), it should be read only to have done so to the degree that it serves the common interests of states.³³⁵ To read more into the law would go beyond the consensus that drove its creation in the first place.

Schwarzenberger also reflects the need for order as a precursor to the creation of law. In writing about the law of war particularly, he stated:

In the present equilibrium between the requirements of the standard of civilisation and the destructive potentialities of war, what is needed above all is a thorough readjustment of priorities of self-interest, especially among the super-Powers. This calls, in the first place, for a measure of agreement on the identification of the chief enemies of civilisation, and two of these are surely violence and chaos on any major scale anywhere in the world.³³⁶

So, as there is an established legal order for both airspace and outer space, it must have derived from space-faring states (or all states) agreeing on what was needed—at least to prevent “violence and chaos” above the world. From those roots, perhaps greater order may grow; and

³³⁴ Fawcett, *supra* note 330 at 119 (emphasis added).

³³⁵ While Fawcett did not discuss space, the ITU and ICAO are relevant examples of this phenomenon, both substantively and topically. They create regulatory regimes in their respective areas, but only do what they have to in order to meet their goals of the regulation of the necessities. To the degree that they reach beyond their conservative pillars (essentially safety and providing an organizational structure for regulation) and into contentious zones, the less likely they will be regarded as binding on states with other options.

³³⁶ Georg Schwarzenberger, *The Dynamics of International Law* (Abingdon, England: Professional Books, 1976) at 90.

from that order more consensus (and law) will reveal itself through agreement or practice.³³⁷ As Fawcett submits, from that order there can emerge law to “rationalize and extend” it.³³⁸

Schwarzenberger cautioned that international law “is an instrument of social control” and not “a self-executing system which operates in a social vacuum. Whether it serves civilising processes or trends in the opposite direction depends on its subjects in the double meaning of the term.”³³⁹ This is somewhat more pessimistic than simply assuming the broader international order is for good purposes. It is assumed that the common interest discussed below, security, is a positive development. However, for purposes of the analysis based on what it is (and not whether it is a good or bad thing), the net effect of the shared concern is largely irrelevant.

3. A Unified Metric

Given the great focus over the years (and in this work) on the vital differences between airspace and outer space law and the push in the legal literature to divide air and space, it may seem difficult to imagine that they may fall under one common metric or regime. However, viewing air and space law with consistency and fluidity is not a new phenomenon. Cooper advocated for a unified approach to air and space law in the early 1960’s, well before the Outer Space Treaty established space as its own legal domain.³⁴⁰ These positions were not inconsistent

³³⁷ This may be evidenced in the rolling progress of the UN COPUOS through the 1960’s and mid 1970’s, with the production of the 1968 Rescue Agreement, the 1972 Liability Convention, and the 1975 Registration Convention; the lack of progress since—with the dearth of “hard law” since and the emergence of “soft law” and guidelines as the dominant mechanisms for space governance—may also be evidence of a lack of consensus and international order. See Jakhu & Freeland, *supra* note 145 at 466 and 472.

³³⁸ Fawcett, *supra* note 330 at 119.

³³⁹ Schwarzenberger, *supra* note 336 at 90.

³⁴⁰ Though the Institute over which he resided is called the Institute of Air and Space Law, Cooper advocated for a single, unified legal regime of *Aerospace Law*, “which would govern and regulate:

First:

- a) Aerospace, being the earth’s envelope of air and the space above it, the two considered as a single realm for activity in the flight of air vehicles and in the launching, guidance, and control of ballistic missiles, earth satellites, dirigible space vehicles, and the like;
- b) Its relationship to land and water areas on the surface of the earth;
- c) The extent and character of the rights of individuals and States to use or control such space, or parts thereof, or celestial bodies therein, for flight or other purposes;

Second:

- a) Flight;

with acceptance that air and outer space should be treated differently in some ways (or even delineated), as evidenced by the numerous contemporaneous writings of Cooper.³⁴¹ Similarly, early in the space age, the US Air Force Chief of Staff advocated for unified regime of *aerospace*: “Since there is no dividing line, no natural barrier separating these two areas (air and space), there can be no operational boundary between them. Thus air and space comprise a single continuous operational field in which the Air Force must continue to function. The area is aerospace.”³⁴² With the emergence of aerospace vehicles, which effectively eliminate any operational lines between air and space, the statement remains apt today.

The prevention of use of weapons of mass destruction is an example of a unified or transcendent approach as evidenced in the 1963 Nuclear Test Ban Treaty.³⁴³ This Treaty broadly precludes nuclear explosions, for tests or otherwise, in Article I:

-
- b) The instrumentalities with which flight is effected, including their nationality, ownership, use or control;
 - c) The surface facilities used in connexion with flight, such as airports, other launching or landing areas, navigation facilities and airways;

Third:

- a) The relationships of every kind affecting or between individuals, communities or States arising from the existence or use of the area of flight (aerospace), or the instrumentalities or facilities used in connexion therewith or to make flight effective.”

Cooper, *supra* note 56 at 50–51 (originally published in 1963). While this was written before the Outer Space Treaty of 1967 cemented the differences in the concepts of sovereignty in airspace and outer space, the utility of such an approach remains today as we address vehicles that only blur the purported lines between the zones.

³⁴¹ See generally Vlasic, *supra* note 94.

³⁴² See Delbert Terrill, Jr, *The Air Force Role in Developing International Outer Space Law* (Honolulu, HI: University Press of the Pacific, 2004) at 36 (quoting US Air Force Chief of Staff General Thomas White in 1959).

³⁴³ *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water*, 5 August 1963, 480 UNTS 43 (entered into force on 10 October 1963) [*1963 Partial Test Ban Treaty*]. The Treaty has 105 signatories and 126 States Parties. UN Office for Disarmament Affairs, “Disarmament Treaties Database: Partial Test Ban Treaty”, online: UN <http://disarmament.un.org/treaties/t/test_ban>. The 1996 Comprehensive Nuclear-Test-Ban Treaty contains the same prohibition, applicable to every party everywhere (no underground exceptions, or the like). See *Comprehensive Nuclear-Test-Ban Treaty*, 24 September 1996, 35 ILM 1439 (not entered into force) [*1996 CTBT*] at art I. However, while the CTBT has been even more widely adopted, with 183 signatories and 163 ratifications, it has not entered into force. CTBTO Preparatory Commission, “Who We Are”, online: *CTBT Organization* <<https://www.ctbto.org/specials/who-we-are/>> (“44 specific nuclear technology holder countries must sign and ratify before the CTBT can enter into force. Of these, eight are still missing: China, Egypt, India, Iran, Israel, North Korea, Pakistan and the USA. India, North Korea and Pakistan have yet to sign the CTBT.”).

1. Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control:
 - (a) in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or
 - (b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted. ...³⁴⁴

Thus, in the interest of the object of the treaty, states apply it to the air and outer space as a continuous zone—there is a unified regime that transcends any demarcation between air and space. Here, states elected to impose a complete ban on nuclear explosions in all relevant zones to this end. This makes sense, as the effects of nuclear explosions in air or outer space (as well as “under water” or “any place under [a state’s] jurisdiction or control”) would broadly affects states; that is, like national security, it does not only affect a state’s air or space (or sea) interests.

The unified approach does not just apply to use of force issues. Other aspects of air and space law demonstrate this fluidity. For instance, consider discussions of traffic management³⁴⁵ (seeking uniformity and fluidity between air and space, and in aerospace—because, from a safety standpoint, it does not really matter where a craft is heading if it collides with another) and criminal jurisdiction³⁴⁶ (the flag of the vessel concept dominates both regimes). Surface damage liability may be an outlier as a divided, different area, but even those regimes can be assessed and compared in a context of insurance law.³⁴⁷ The idea of diverse aspects or even different legal regimes within one broader framework is not foreign to other areas of the law, either. The Law of the Sea is one regime, but has disparate rules for territorial seas (with additional rules for

³⁴⁴ 1963 *Partial Test Ban Treaty*, *supra* note 343 at art I.

³⁴⁵ See generally Ram Jakhu & Kuan-Wei Chen, eds, *Regulation of Emerging Modes of Aerospace Transportation* (Montreal: Centre for Research in Air and Space Law, 2014); Jakhu, Sgobba, & Dempsey, *supra* note 79.

³⁴⁶ See *Tokyo Convention*, *supra* note 167; Stephen Gorove, “Criminal Jurisdiction in Outer Space” (1972) 6:2 *Int’l Lawyer* 313; Hans P Sinha, “Criminal Jurisdiction on the International Space Station” (2004) 30 *J Space L* 86; Cheng, *supra* note 62 at 478.

³⁴⁷ Compare *Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface*, 7 October 1952, 24 UST 2389, 961 UNTS 187 (entered into force on 4 February 1958) [*Liability Convention*] (calling for a complex regime with limited liability for aircraft damage); with *Liability Convention*, *supra* note 109 at art II (asserting absolute liability for surface damage caused by space objects). See also Michael Mineiro, “Assessing the Risks: Tort Liability and Risk Management in the Event of a Commercial Human Space Flight Vehicle Accident” (2009) 74 *J Air L & Com* 371; Dempsey, *supra* note 71 at 757–58 (also discussing differences in personal injury liability for passengers).

straits and archipelagic states), contiguous zones, exclusive economic zones, and the high seas. Air and space law are no exception; there are and can be lines within one system or construct.

The key aspect of a regime is that it has principles, and as long as those are consistent as to the fundamentals the regime is strong.³⁴⁸ The regime's rules or outcomes may change, but it remains true to itself as long as the underlying principles remain. However, there is a weakening (or elimination) of the regime if there is waffling in the principles and fundamentals.³⁴⁹

Certainly, air and outer space law are strikingly different with regard to sovereignty (in their current constructs), and differ with regard to concern for state versus civil craft. But, that does not mean they must be opposed or regarded as different or incommensurable on every axis. A broader context—beyond just air law or space law as niche categories—exposes that a broader interest that has guided the development of both regimes is an interest in security. And, this interest remains consistent in both. So, the issue is one of context and framing, making the commensurability based on the common security interest illustrative of the line between air and space.

4. The Common Metric: Security

Freedom of movement (through free use and exploration) and sovereignty can be looked at as opposing values, and may always be such in many contexts.³⁵⁰ But, the outer space experience demonstrates that there may be a common motivation behind the divergent airspace and outer space regimes: state security. The sovereignty and state craft rules within the regimes are the means by which states have reached (or sought to reach) the common end of security

³⁴⁸ Stephen D Krasner, "Structural Causes and Regime Consequences: Regimes as Intervening Variables" in Stephen D Krasner, ed, *International Regimes* (Ithaca and London: Cornell University Press, 1983) 1 at 4–5.

³⁴⁹ *Ibid* at 5 ("If the principles, norms, rules, and decision-making procedures of a regime become less coherent, or if actual practice is increasingly inconsistent with principles, norms, rules, and procedures, then a regime has weakened.") (emphasis omitted).

³⁵⁰ See, eg, Gunnar Beck, "Legitimation Crisis, Reifying Human Rights and the Norm-Creating Power of the Factual: Reply to 'Reifying Law: Let them be Lions'" (2008) 26 Penn State Int'l L Rev 565 at 599 ("Judicial trade-offs between incommensurable values thus remain unconstrained by rational choice because it cannot be demonstrated that the loss of liberty required by some measures is either greater or more limited than the correlative gains in security. No one can say how much security is enough and how many 'x' units of liberty should be sacrificed for 'y' gains in security.").

(actual or perceived). From this common motivation, security, one can better derive the division point. This sub-section examines the evidence of a state interest in the law of each regime.

In general, it must be recalled that air and space law are merely forms of international law; just with air and space application.³⁵¹ And, a foundation of international law is the interest of states in their own security. This is enshrined in the preamble of the UN Charter's "international peace and security" mechanism, as well as the broad practice of states.³⁵² The security interest is borne out more specifically in the underpinnings of both the air and outer space regimes, as well.

a. The Security Interest in Airspace Law

While the seeds of security may be sewn through globalization and interconnectedness, security through firm boundaries has also been a consistent concern for states in their airspace. Despite the debate over possible freedom of the air (absolute, or qualified), the unflappable status of territorial sovereignty took over airspace law early in the age of aviation. And, "[t]he main reason for this was one of security."³⁵³ One author, writing in 1933, lamented the post-World War I context in which the Paris Convention was created, noting that "[t]he influence of war mentality is specially evident in the text of the Convention."³⁵⁴ He proposed a modified regime that escaped this security context, as the perceived over-focus on sovereignty precluded

³⁵¹ See Jakhu & Freeland, *supra* note 145 at 461 ("International space law neither possesses an identity independent of general international law, nor does it come into being outside the law-making processes established by the latter. Therefore, the sources of international space law are principally the same as those of general international law."); Brownlie, *supra* note 98 at 255; Ramey, *supra* note 22 at 66.

³⁵² *UN Charter*, *supra* note 23 at preamble.

³⁵³ Matte, *supra* note 73 at 162.

³⁵⁴ Francesco Cosentini, *International Code of Aviation*, American Institute of Comparative Law and Legislation Studies and Documents, English Series No 2 (Mexico: Rivadeneyra, 1933) at 4. He additionally noted that:

The giving of an exact account of the scope, spirit and tendencies of the orientation to be accorded air law has been prevented, on the one hand, by the persistency of a certain war mentality that has sometimes influenced the legislators and the "High Contracting Parties" in the period immediately after the war [WWI]—a period that marked the greatest development of air law; and on the other hand, by the scientific tendency to analogize air law to maritime law, and to give to all the juridical acts and facts connected therewith the same solutions that have been adopted for maritime navigation and trade.

Ibid at 3-4. So, air law resembles law of the sea, with its fixed zones, but maintained the security interest with its bar on state vehicle passage and automatic rights of overflight.

international harmonization of air rules. However, the strict sovereignty regime of the Chicago Convention showed that states disagreed with this position. As Lachs stated:

With the advent of aircraft, States became anxious to protect themselves against whatever threat to their security these new flying objects might entail. This is clearly reflected in the principles and rules of aerial navigation. A State's rights over the air above its territory, as indicated earlier, were reasserted. How jealously they have been guarded and applied is illustrated by the practice of the last half-century.³⁵⁵

Cooper wrote *The Right to Fly* in the wake of the Second World War, “[f]acing as we do a future that contains atomic bombs, rocket missiles of unknown range, jet-propelled fighters of incredible speed and fire power, and enormous transports capable of carrying large numbers of air-borne troops and military equipment.”³⁵⁶ He opined:

Air power is today the most dynamic force in the life of nations. Properly used, it can be the means to better understanding among the peoples of the world. Improperly used, it can be a threat to the general security, even in time of peace. If war comes again, air power can transport the armed forces and missiles fated to destroy our civilization.³⁵⁷

So, the interest in state security pervaded the development of the airspace regime, due in no small part to concerns over major wars.

An attempt to balance free movement and openness with security is reflected in the preamble of the Chicago Convention, remarking that international civil aviation's “abuse can become a threat to the general security; and ...it is desirable to avoid friction and to promote cooperation between nations and peoples upon which the peace of the world depends.”³⁵⁸ The potential for “friction” as a threat to general security has been evidenced by numerous plane shoot downs, both civil and military (and civil mistaken for military), over the course of aviation history.³⁵⁹ This friction is even more present in the present age of terrorism, unpredictability, and weapons of mass destruction.³⁶⁰ While the details of these matters are beyond the particular

³⁵⁵ Lachs, *supra* note 64 at 55.

³⁵⁶ Cooper, *supra* note 65 at 2 (advocating the demilitarization of Germany and Japan—particularly their skies and air forces).

³⁵⁷ *Ibid* at 1 (emphasis in original).

³⁵⁸ *Chicago Convention*, *supra* note 49 at preamble.

³⁵⁹ See *supra* Chapter I.B.3-4; see generally Donahue, *supra* note 45 at 54.

³⁶⁰ See The White House (George W. Bush), *supra* note 27 at 15 (“The United States will not use force in all cases to preempt emerging threats, nor should nations use preemption as a pretext for aggression. Yet in an age where the enemies of civilization openly and actively seek the world's most destructive technologies, the United States cannot remain idle while dangers gather.”); Murphy, *supra* note 22; Yoo,

scope of this work, they do demonstrate a solid prudential reason for states to assert maximum control over airspace.³⁶¹

b. The Security Interest in Outer Space Law

Terrestrial security was an equally important concern for the development of outer space law. It can be said that cooperation among powers (particularly the US and Soviet Union) can lead to peaceful outcomes; so states finding common interests in the regulation of outer space was an important step towards systemic predictability and stability, and hence peace and security.³⁶² The mechanisms of the creation of outer space law through the UN COPUOS³⁶³ and the substance of some of the law³⁶⁴ reflect an interest in security through cooperation. However, the outer space regime more directly relates to state security interests through the prohibitions it imposes on potential aggression in or from outer space.

supra note 26.

³⁶¹ But see Reinhardt, *supra* note 4 at 129–30 (arguing that a 12 nautical mile security zone would be comparable to land and air buffers, and adequate for state security).

³⁶² See Carl Christol, *Space Law: Past, Present, and Future* (Deventer: Kluwer Law and Taxation Publishers, 1991) at 62; see also Roald Sagdeev & Susan Eisenhower, “United States-Soviet Space Cooperation during the Cold War”, (28 May 2008), online: *NASA.gov* <http://www.nasa.gov/50th/50th_magazine/coldWarCoOp.html> (highlighting attempts at space cooperation, from the beginning of the space age); US Department of State, “U.S.-Soviet Space Cooperation”, online: *US Dept of State, Office of the Historian* <<https://history.state.gov/historicaldocuments/frus1961-63v25/ch12>> (containing archives of official documents related to US-Soviet cooperation). Of course, cooperation can have a more tactical application as well; for instance, the US viewed outer space cooperation with Western Europe as a mechanism to strengthen ties amongst the anti-Soviet powers. See “Doc 375: Memorandum From the Deputy Assistant Secretary of State for European Affairs (Tyler) to Secretary of State Rusk” in *Foreign Relations of the United States, 1961–1963, Volume XXV, Organization of Foreign Policy; Information Policy; United Nations; Scientific Matters* (Washington, D.C.: US Department of State Office of the Historian, 1962) (available at <https://history.state.gov/historicaldocuments/frus1961-63v25/d375>).

³⁶³ See, eg, “Doc 104: Telegram 703 From the Mission to the United Nations to the Department of State, March 6, 1975, 2344Z” in *Foreign Relations of the United States, 1969–1976, Volume E-3, Documents on Global Issues, 1973-1976* (Washington, D.C.: US Department of State Office of the Historian) at para 1 (<http://history.state.gov/historicaldocuments/frus1969-76ve03/d104>) (“THE SOVIET DELEGATION PRIVATELY REQUESTED CLOSE US-SOVIET COOPERATION ON DEVELOPING A MUTUALLY ACCEPTABLE DEFINITION BEFORE THE NEXT SESSION OF THE LEGAL SUBCOMMITTEE”). The remainder of the Telegram shows the desire for close integration of US and Soviet positions on delimitation, in opposition to potential smaller-state proposals; this put (at least for one issue) the Cold War split in the world on a different axis than the typical US versus Soviets.

³⁶⁴ See, eg, *Outer Space Treaty*, *supra* note 60 at preamble, arts I, III, IX–XI (lauding, encouraging, and promoting international “international co-operation”).

The historical context for the creation of outer space law is important in this regard. The *Declaration of Legal Principles* came less than 20 years after the close of the Second World War, and in the middle of the Cold War—with its accompanying nuclear arms race, fears of the “domino theory” of communist spread, and anti-communist proxy wars.³⁶⁵ Even before the Cuban Missile Crisis of 1962, Soviet Premier Nikita Khrushchev openly noted his country’s capacity to strike into the US heartland, and “according to the Soviet newspaper *Red Star*, by 1970 the main weapon in the USSR aerospace arsenal will be a nuclear-armed satellite.”³⁶⁶ Of course, the threat was not one-sided; as one writer noted in 1962: “For some time now US military planners have been freely discussing the possibility of using the Moon as an early-warning station and, eventually as a *bombardment site*.”³⁶⁷ And, the US was working towards the Dyna-Soar X-20 spaceplane, which was intended to have numerous applications, to include use as a hypersonic bomber.³⁶⁸ In this context, states (in particular the US and Soviet Union) came to shape outer space law into a regime to secure their perceived security benefits (or advantages) and mitigate perceived security disadvantages.

In the US, Soviet weapons (terrestrial and space-based) were perceived as a major threat; so the US had interest in curbing their development and deployment.³⁶⁹ One way to do this was to create prohibitions on the employment of space weapons, through the “peaceful purposes” language found throughout outer space law and the limitations on weaponization found in the Outer Space Treaty.³⁷⁰ In particular, Article IV states:

States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

³⁶⁵ See Freeland, *supra* note 22 at 94 (“Many of the fundamental principles that formed the basis of the Outer Space Treaty were concluded at a time when the world was in the midst of uncertainty and mistrust, largely as a result of the prevailing geopolitical environment of the Cold War.”).

³⁶⁶ Golovine, *supra* note 55 at v (Preface to the American Edition).

³⁶⁷ *Ibid* at 106 (emphasis in original).

³⁶⁸ See Houchin, *supra* note 3.

³⁶⁹ See “Doc 103: Memorandum for President Kennedy” in *Foreign Relations of the United States, 1961–1963, Volume VIII, National Security Policy* (Washington, D.C.: US Department of State Office of the Historian) (available at <https://history.state.gov/historicaldocuments/frus1961> (memorandum signed by Secretary of State, Secretary of Defense, Director of Central Intelligence, and Chairman, Joint Chiefs of Staff)).

³⁷⁰ *Outer Space Treaty*, *supra* note 60 at art IV.

The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

Also, beginning in the Eisenhower administration and continuing onward, the US showed great interest in reconnaissance and transparency mechanisms as a means for security and arms control.³⁷¹ Eisenhower championed an “Open Skies” program, wherein both the US and Soviet Union (by mutual agreement) would allow overflight and reconnaissance to ensure compliance with arms control (particularly nuclear) agreements.³⁷² The “open” nature of the skies was very narrowly tailored to this specific purpose, but it would include overflight by any craft—in air, or as the capability developed, in outer space. While this program never came to fruition, the US maintained interest in reconnaissance overflight (sometimes with poor results, as demonstrated by the 1956 balloon incident and the 1960 U-2 shoot down). This led to a focus on outer space as a vehicle for reconnaissance, maximizing a perceived strategic advantage: “The most urgent and immediate use of space systems for military purposes is for surveillance and target reconnaissance over the land masses of the world with particular emphasis on the Sino-Soviet bloc of nations.”³⁷³ In lauding the possibility that *Sputnik* had paved the way for an assertion of a free passage regime for satellites, one US advisor stated, “[w]e believe that we can get a great deal more information out of free use of orbital space than they can.”³⁷⁴

So, at least from the US perspective, the Outer Space Treaty was a useful tool—it

³⁷¹ See “Doc 356: Report by the Ad Hoc Committee on Space to President-Elect Kennedy” in *Foreign Relations of the United States, 1961–1963, Volume XXV, Organization of Foreign Policy; Information Policy; United Nations; Scientific Matters* (Washington, D.C.: US Department of State Office of the Historian, 1961) (available at <https://history.state.gov/historicaldocuments/frus1961> (“There are important and unique uses of space for national security and in support of our treaty alliances throughout the world. There are also important uses of space systems for arms-control purposes.”)).

³⁷² See Vladlen Vereshchetin, “International Control and the Concept of ‘Open Skies’” in Edward McWhinney et al, eds, *From Coexistence to Cooperation: International Law and Organization in the Post-Cold War Era* (Dordrecht; Boston; London: M. Nijhoff Publishers, 1991) 31 at 34; John Noble, “The Open Skies Treaty Initiative: Prospects for an Agreement and Precedent” in Edward McWhinney et al, eds, *From Coexistence to Cooperation: International Law and Organization in the Post-Cold War Era* (Dordrecht; Boston; London: M. Nijhoff Publishers, 1991) 44 (tracing the history of “open skies” verification back to the Eisenhower administration).

³⁷³ “Doc 356: Report by the Ad Hoc Committee on Space to President-Elect Kennedy” *supra* note 180.

³⁷⁴ “Doc 347: Memorandum of a Conference, President’s Office” *supra* note 239 at para 5.

precluded the primary Soviet threat (orbital bombs) and allowed the perceived US advantage (surveillance and communications capacity).³⁷⁵

Security was also an explicit interest of the Soviet Union in the early space era. In 1963, McMahon surveyed the recent Soviet positions on delimitation, finding “national security” as a primary interest.³⁷⁶ For instance, in 1959, the Soviet author Osnitskaya stated that “all proposals whose adoption would restrict the sovereignty rights of a state to safeguard its own security must be rejected.”³⁷⁷ The Soviet Union’s initial mechanism to achieve this security was an effective control theory of sovereignty, largely with no limits. However, after *Sputnik*, they required a policy that would provide perceived security, but still allow the flight of *Sputnik*, a point of great state pride. Thus, the policy evolved into “deference to the realization that State security can only be guaranteed an international agreement prohibiting certain activities in space, wherever they occur, and not by an unlimited extension of State sovereignty.”³⁷⁸ This fits with Wassenbergh’s assertion that it is law, and not effective control, that secures sovereignty.³⁷⁹ Conversely, it is the law (and not a lack of capacity) that can ensure security interests in a zone such as outer space, where rival powers all have the capacity to assert force (or effective control). In this vein, the Soviets supported satellite overflight, but objected (initially) to the *use* of satellites for reconnaissance in international fora.³⁸⁰

For all states, according to Lachs:

³⁷⁵ See “Doc 365: Memorandum of Conversation (re: UN Outer Space Committee and Conference)” in *Foreign Relations of the United States, 1961–1963, Volume XXV, Organization of Foreign Policy; Information Policy; United Nations; Scientific Matters* (Washington, D.C.: US Department of State Office of the Historian, 1961) (available at <https://history.state.gov/historicaldocuments/frus1961> (available at <https://history.state.gov/historicaldocuments/frus1961-63v25/d365>) (While noting a Soviet advantage in rocket for manned flight, “Dr. Dryden [of NASA] stated that the United States clearly leads the Soviet Union with respect to scientific research in outer space and particularly in development of meteorological and communications satellites.”).

³⁷⁶ McMahon, *supra* note 206 at 346–347.

³⁷⁷ *Ibid* at 346 (quoting Osnitskaya, “International Law Problems of the Conquest of Space,” *Soviet Yearbook of International Law* (1959)).

³⁷⁸ *Ibid* at 347.

³⁷⁹ HA Wassenbergh, *Post-War International Civil Aviation Policy and the Law of the Air* (The Hague: Martinus Nijhoff, 1957) at 152 (“Sovereignty can no longer be based on the effective power of a State, but ‘only’ on law.”); see *supra* section B.2.b.

³⁸⁰ See *supra* Chapter III.B.3.

The value and interest of the frontier are linked in their turn with the basic motivation by which States have been guided in their claims to sovereignty over the area bordering with outer space. There can be little doubt that this has been, and remains, national security.

...

Now, new objects have made their appearance in space. Though much further away, circling in their orbits or shooting upwards and coming down, do they constitute a new factor affecting the security of the States below? The developments during the last few years offer an unequivocal reply. The issue of security has not only retained its decisive importance: it has acquired an even greater emphasis.³⁸¹

Cooper also explicitly cited a desire to ensure state security in his early proposal for a 300-mile sovereignty zone with a transit passage regime for non-military vehicles: “These solutions would aid future peaceful use of rockets and satellites and would seem to provide reasonable security for the subjacent state.”³⁸² Overall, security was an essential element of the development of outer space law.

5. Application of the Security Metric: Orbit Is the Division Point

If the law of airspace and outer space must be divided, and they can be assessed or valued along a single metric of security, the question becomes: where did states find the tipping point at which national security is better served by territorial sovereignty than by freedom of movement? Or, conversely, where does freedom of movement trump assertions of sovereignty in securing a state? Similarly, the question of where the change occurs between the advantages and disadvantages of distinction between state and civilian craft comes into play. If there is a common intersection for these points of departure, that means the security metric suggests a line of demarcation. Here, that line is at orbit.

The bulk of this Chapter and its prior sections have been devoted to establishing states’ interest in sovereignty—a mechanism for state security—and their inclination to maximize territorial sovereignty. So, as a starting point, the security interest suggests that the line between air and space should be at a high altitude. However, examination of the Outer Space Treaty’s

³⁸¹ Lachs, *supra* note 64 at 55. Lachs further noted that this security interest drives states’ “desire to take into account the nature of any activity carried out in the new dimension, to consider it on its merits, to judge it by its objectives and the consequences it produces within the areas of the sovereign rights of States.” *Ibid.* This further accentuates the importance of the broadest airspace regime for states, to maximize this interest in examining threats on a case-by-case basis.

³⁸² Cooper, *supra* note 232 at 276.

peaceful uses and dewaterization of space provisions, the state interest in transparency, and the practical aspects of the use of force provide further guidance on where the line should fall.

a. Peaceful Uses and De-Weaponization

Before even the first satellite launch, “in January 1957, Ambassador John Cabot Lodge, addressing the UN General Assembly on behalf of the United States, expressed the hope of his government that ‘future developments in outer space would be devoted exclusively to peaceful and scientific purposes.’”³⁸³ Peaceful uses strongly supports the idea that security was at interest—if one outlaws war or military activity in space, certainly there is a strong suggestion that peace will prevail; and, where there is peace there should be security. But, the issue of exactly what “peaceful uses” of outer space means is still unclear. Generally, there are two schools of thought on the matter—it can either mean non-military, or it can mean non-aggressive (while still allowing military activity).³⁸⁴

If space must be entirely non-militarized (and de-weaponized), it is more difficult to derive a line of demarcation between air and space from a security perspective. Essentially, space would be an extension of the airspace prohibition on state vehicles, though more like a Paris Convention construct wherein state craft were further divided into military and non-military craft (with more flight allowances for non-military).³⁸⁵

However, space has always been considered in a context of military activities.³⁸⁶ From the beginning of outer space applications, the US policy was that military does not mean non-

³⁸³ Ivan Vlasic, “The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space” in Bhupendra Jasani & UNIDIR, eds, *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race* (New York: Taylor & Francis, 1991) 37 at 38 (citation omitted).

³⁸⁴ See *ibid* at 37; Bourbonnière & Lee, “Legality of the Deployment of Conventional Weapons in Earth Orbit” *supra* note 22 at 877, 889; Freeland, *supra* note 22 at 95.

³⁸⁵ See *supra* Chapter II.A.3; *Paris Convention*, *supra* note 65 at arts 30–31.

³⁸⁶ See Freeland, *supra* note 22 at 83 (“With the benefit of hindsight, it is now clear that space has been utilized for military activities almost from the time of the very infancy of space activities.”); “Doc 479: Report by the National Aeronautics and Space Council (26 January 1960)” *supra* note 243 (assessing both the US and Soviet projections for the military applications of space); see also Bhupendra Jasani & United Nations Institute for Disarmament Research, eds, *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race* (New York: Taylor & Francis, 1991); Terrill, Jr., *supra* note 342.

peaceful (instead, the focus was on non-aggression).³⁸⁷ Further, the military use of outer space is shown through state practice as well. As noted previously, the first astronauts and craft in space were all part of the military.³⁸⁸ Article IV of the Outer Space Treaty explicitly contemplated military members in space (though participating in space use and exploration for peaceful purposes).³⁸⁹ Also, the prohibitions on weapons in Article IV are very specific, and do not generally outlaw the use or stationing of weapons in space. This state practice and the text of the Treaty led Vlasic to conclude:

Given the ambiguity of the term “peaceful” as used in the OST, as well as the overt and covert practice of the two state actors in outer space, the conclusion is inescapable that all military uses of space other than those prohibited by treaty were – since the beginning of space exploration and are still today – lawful as long as they do not violate any of the principles and rules of general international law (e.g., uses that represent the threat or employment of force).³⁹⁰

As military uses of space are generally permissible, this creates a distinction from the airspace where state and military operations are strictly prohibited, absent permission, over sovereign territory. It must be assumed that there need be no particular rules governing military actions or weaponization in foreign airspace—they are generally precluded anyway, or when allowed it is either in a time of conflict where sovereignty is not respected by the parties or under the strict agreement of involved states (presumably with specific allowances).³⁹¹ But, the

³⁸⁷ Paul Nitze et al, “Doc 421: Report by the Committee on Satellite Reconnaissance Policy (undated)” in *Foreign Relations of the United States, 1961–1963, Volume XXV, Organization of Foreign Policy; Information Policy; United Nations; Scientific Matters* (Washington, D.C.: US Department of State Office of the Historian, undated) (available at <https://history.state.gov/historicaldocuments/frus1961-63v25/d421>).

³⁸⁸ See *supra* Chapter II.B.3.

³⁸⁹ *Outer Space Treaty*, *supra* note 60 at art IV, para 2 (“The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited.”).

³⁹⁰ Vlasic, *supra* note 383 at 45; see also Bourbonnière & Lee, “Legality of the Deployment of Conventional Weapons in Earth Orbit” *supra* note 22 at 888; UK Ministry of Defence, *supra* note 63 at 2–3. But see Jakhu, *supra* note 148 at 99 (arguing that military uses and weapons in space constitute a threat to security, and therefore are broadly prohibited).

³⁹¹ See, eg, US Department of Defense, *Department of Defense Directive 4500.54E, DoD Foreign Clearance Program (FCP)* (2009) at para 4.a (“DoD aircraft shall obtain aircraft diplomatic clearance to overfly the territory of, or land in, a foreign country from that foreign country’s government.”). Absent stricter guidance, in general state craft must operate with “due regard” for civilian craft. *Chicago Convention*, *supra* note 49 at art 3(d); see also Bourbonnière & Haeck, *supra* note 116 at 926 et seq (discussing the application of the due regard standard); US Air Force Instruction 11-202, vol. 3, General

specific preclusions of military activities in outer space are telling of the reach of the outer space regime. That is, outer space law can only preclude activities that occur in outer space—so, to read the extent of its prohibitions is to read the extent of the law.

Article IV of the Outer Space Treaty contains spatially broad prohibitions against outer space weaponization.³⁹² It precludes military maneuvers on the Moon, and bans bases, installations, fortifications, military maneuvers, and weapons testing on all celestial bodies.³⁹³ Vlasic also compiled other outer space military and weapons prohibitions under international law, and none provided greater particularity as to their applicable location.³⁹⁴ While these cement that the Moon and other celestial bodies indeed fall within outer space, they do not illuminate the airspace/outer space line.

The one clause that does, however, requires states “not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction.”³⁹⁵ This clause further precludes stationing such weapons “in outer space in any other manner.” This latter blanket prohibition would have covered orbital weapons, but the Treaty draws particular attention to “orbit around the Earth” with the former clause’s explicit mention of it.

As the lowest altitude of space applications explicitly named in the Outer Space Treaty or in arms control for space generally, orbit appears as the limit to which states feel compelled to ban strategic level security-threatening weapons of mass destruction. Given the automatic preclusion of such weapons in sovereign airspace, this suggests that the shift in state security needs occurs at orbit.

b. Transparency

As discussed in the previous section, one of the primary methods for ensuring terrestrial peace was through transparency. This allows states to monitor each other’s actions, as well as

Flight Rules, (7 November 2014), para 1.4 (generally establishing the ICAO rules as the baseline guidance for Air Force operations, with the “due regard” standard as the exception).

³⁹² *Outer Space Treaty*, *supra* note 60 at art IV.

³⁹³ *Ibid* at art IV, para 2.

³⁹⁴ Vlasic, *supra* note 383 at 47–48.

³⁹⁵ *Outer Space Treaty*, *supra* note 60 at art IV, para 1.

ensure compliance with disarmament agreements such as the Nuclear Test Ban Treaty.³⁹⁶ At the dawn of the space age, US efforts to overfly the Soviet Union for remote sensing and aerial photography had failed below orbit. But, based largely on the Soviet interest in securing legal flight paths for *Sputnik* and its progeny, the US was able to secure overflight rights and the use of remote sensing satellites. So, while the freedom of overflight—a mechanism for security (particularly for the US, which perceived its capacity in this regard as an advantage)—was denied in airspace, it is allowed in outer space. And, the line in the use of this mechanism is orbit.

c. Practical Use of Force Considerations

Practical considerations in the application of force also suggest that orbit is a dividing line in state security interests. The concept of effective control has been discussed throughout this work. While it is no longer the driving force behind assertions of sovereignty rights (as the potential for effective control extends beyond what is accepted as the outer space cap on state sovereignty), it still informs where states can feel most secure with the greatest ease. Assuming states are rational actors and would perform a cost-benefit analysis prior to employing force in gray space, both the costs and benefits pivot at orbit. As to cost, while some states can project power into outer space, many more can assert control up to or near orbit through more conventional weapons and means. Even compared to suborbital or high-altitude applications, outer space activities are difficult and expensive.³⁹⁷ The likely perceived benefit also shifts at orbit, whether taken from a generalized pragmatic perspective or a “necessity” under the *jus ad bellum* view. While both US and Chinese ASAT tests suggest that there is some perceived benefit to super-orbital strikes, it is limited. As discussed above, generally speaking objects in

³⁹⁶ See Vlastic, *supra* note 383 at 51 et seq (discussing monitoring and verification of outer space uses); Bhupendra Jasani, *Commercial Systems for Military* (ICAO Headquarters, Montreal, QC: 3rd Annual Manfred Lachs Conference on Newspace Commercialization and the Law, 2015) (available at <https://www.mcgill.ca/iasl/3rd-manfred-lachs-international-conference-16-17-march-2015>) (addressing space applications for monitoring both space and terrestrial activities as a means of verification and confidence building in support of terrestrial peace agreements and arms control).

³⁹⁷ See Kleiman, Lamie & Carminati, *supra* note 73 at 51 (“achieving orbital space flight is many times more energy-intensive, and therefore much more difficult and expensive, than achieving suborbital spaceflight.”); Pelton, *supra* note 10 at 12 (comparing the lower costs of atmospheric applications versus orbital satellites).

orbit are inherently passive.³⁹⁸ They may be conducting operations to which a state may object, but typically do so in a regularized, circular, inert, and generally inoffensive manner. Aerospace vehicles operating below orbit, however, are engaged in controlled flight. This is far more offensive, purposeful, and likely more threatening to a subjacent state—making the security interest much greater in addressing such vehicles with force.³⁹⁹ So, from a practical standpoint, it makes sense to assert sovereignty only as far as it can efficiently be enforced; beyond that (beyond orbit) it makes more sense to create a legal regime that ensures peace.

Jus in bello considerations also help draw a line at orbit for targeting reasons, though this is a more modern development. In particular, the creation of orbital debris is a major concern in the use of force against objects in orbit.⁴⁰⁰ If a craft is targeted below orbit, there will certainly be debris created from its destruction; but, that is substantively no different than an attack on an airplane in airspace or even a vehicle on the ground. And, the analysis for such attacks falls squarely in the current regime for the laws of war.⁴⁰¹ The law of armed conflict, particularly the principles of distinction and proportionality, must be examined to ensure the propriety of the selected target; but, the effects are likely to be nominal.

In orbit, however, the debris will persist for an extended duration.⁴⁰² Due to the nature of satellites in orbit, they will have great difficulty in avoiding any debris that is in outer space—

³⁹⁸ See *supra* Chapter III.C.3.a-b (discussing “innocent” and continuous passage of satellites versus offensive and conscious incursions below orbit). Of course, vehicles may be able to engage in controlled flight in a pattern to simulate orbit, notwithstanding the extraordinarily high fuel costs when compared to passively operating in orbit. See *supra* Chapter II.B.1. As future technologies develop, simulated orbital paths may become a more reasonable and therefore common phenomenon. But, to the degree that such vehicles could even be distinguished from actually-orbiting craft, their use would still likely be assessed like any other vehicle. As discussed further below, the concept of “orbit” can be thought of as both a place and a function; for such future orbit-simulating craft, perhaps states would lean towards the notion of natural orbit as a zone of operation (a place) in forming a line. See *infra* Chapter III.E.

³⁹⁹ See *supra* Chapter I.B.4.

⁴⁰⁰ See, eg, Bourbonnière & Lee, “The Targeting of Post-Modern Military Space Assets” *supra* note 22 at 188 (“On this point, while ASAT weapons are not by their own nature indiscriminate, for an extraordinarily high degree of precision is required to destroy a satellite in orbit, yet it has been argued that the extensive field of space debris that results from the collision of a kinetic ASAT weapon and a satellite would render kinetic ASAT weapons indiscriminate and thus illegal.”).

⁴⁰¹ See, eg, W Hays Parks, “Air War and the Law of War” (1990) 32 AF L Rev 1 at 178.

⁴⁰² See Jaramillo, *supra* note 20 at 27 (noting that “[s]pace debris, which predominantly consists of objects generated by human activity in space, represents a growing and indiscriminate threat to all spacecraft” and describing major debris-causing events in recent history); see also “Space Debris”, online: *Secure World Foundation* <<http://swfound.org/resource-library/space-debris/>>.

exacerbating the collateral damage caused by the attack. Further, the debris will continue to destroy or otherwise affect all satellites with which it comes into contact; the persistent debris cannot discriminate between lawful or unlawful targets. So, the collateral effects of the use of force in orbit and beyond can be disproportionate to a similar strike below orbit. When states assess the potential for the use of force to ensure security, this fact significantly limits a state's ability to act (with force). When the ability to act (as a matter of self-help) is curtailed, it follows that states should seek alternative means to ensure their security such as a regime of free use and exploration for peaceful purposes. So, orbit and its inherent limitations on the legal use of force, help for a line between the regimes.

6. Conclusion

Consider the airspace and outer space regimes, though opposite in two key matters for the use of force, to be two sides of the same coin. When the coin is flipped in the air, and it rotates with great speed along its axis, and the edges are almost a blur; it even appears as though it is a small ball or spherical object. But it is not—when it falls, that coin is either heads or tails; it is one or the other. So too is the case with airspace and outer space; gray space is merely the illusion of some other zone when the coin is flipped.

Seeking out the unifying theme underlying the development of air and space law reveals that state interests in security are persistent and essential in both regimes. The seemingly gray area between what is clearly air law and outer space law can really be read as one side or the other of a line. And, the division point in the security interest, and hence the regimes, is at orbit.

E. Drawing Conclusions from these Modes of Analysis

There can be no doubt that the freedom of action of States in outer space or on celestial bodies is neither unlimited, absolute or unqualified, but is determined by the right and interest of other States. It can therefore be exercised only to the extent to which as indicated it does not conflict with those rights and interests.⁴⁰³

Lachs stated this in the context of safeguarding the rights of less powerful or scientifically advanced states, and it has been subsequently cited to bolster the depth of the Outer

⁴⁰³ Lachs, *supra* note 64 at 108.

Space Treaty's Article IX due regard requirement⁴⁰⁴ and the general necessity of furthering global public interests (particularly peaceful uses, cooperation, and equality) in outer space.⁴⁰⁵

The assertion is equally true if Lachs' "freedom of action of States" is also considered to include free movement through space, without regard to terrestrial notions of sovereignty or limitations on the flight of state craft. Here, his second sentence is key—freedom of movement and action in outer space exists "only to the extent to which as indicated it does not conflict with those rights and interests [of other states]." Such rights and interests would include territorial sovereignty and security.⁴⁰⁶

States have spoken over time on these matters. This section has demonstrated that they assert their interest in sovereignty, generally, as high as possible. Such assertions are capped, legally, only by the start of the outer space regime. And, as discussed in Chapter II, that regime can only be confidently said to reach as low as artificial satellite orbit of Earth.

The other interest is security; on this matter, states have spoken as well. With security in mind, states again drew limits on activity in space—to enhance their perceived security. And, again, the lowest reach of this is captured in Article IV of the Outer Space Treaty, precluding weapons of mass destruction in orbit.

As both of these analyses point to orbit as the line of demarcation, it is worth addressing what "orbit" means in greater detail. Much like aerospace or near space, orbit can be viewed in spatial or functional terms. It is spatial in that it refers to a generally fixed location. As discussed in Chapter II, the exact height of the lowest earth orbit is not settled among scientists (or legal thinkers). However, the general estimates range from 96 to 150 kilometers (60 to 93 miles) for the lowest orbiting satellite. Also, though, and apart from the exact geographic line,

⁴⁰⁴ *Outer Space Treaty*, *supra* note 60 at art IX ("In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.").

⁴⁰⁵ Jakhu, *supra* note 148 at 47.

⁴⁰⁶ Evidence of the legitimacy of a state's interest in its national security is found throughout international law, but certainly is found in the right of self-defense (be it under customary or conventional international law), or as articulated by the ICJ in the *Nuclear Weapons Advisory Opinion*. See Green, *supra* note 32 at 52; *Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion)*, [1996] ICJ Rep 226 (International Court of Justice) at 263, para 96 (even in the grave context of using nuclear weapons, "the Court cannot lose sight of the fundamental right of every State to survival, and thus its right to resort to self-defence, in accordance with Article 51 of the Charter when its survival is at stake.").

orbit can be viewed as an activity, or a function. When a craft orbits Earth, it is engaging in a particular, and unique, form of operation; it cannot be duplicated (with thrust or other powered flight) for any extended period of time. This is what makes orbit so desirable to those looking to take advantage of its attributes (and particularly those of GEO, which also allows for persistence over a desired location). So, orbit is not just a place; it is an end or a function in itself (albeit an intermediary one, towards a final goal of communications, scientific experimentation, remote sensing, or a host of other applications).

While orbit may be critiqued as an imprecise line of demarcation,⁴⁰⁷ it is not a fatal flaw. States may have to accept some degree of arbitrariness in how this line is drawn. But, that is no different than the assessment of a state's baseline in the law of the sea, or even where the edges of free speech or other civil liberties lie in other legal analyses. If one embraces the conservative approach to the law advocated here, states should view sovereignty as extending upwards as far as it is not clearly contradicted; the dispute over the proper altitude of orbit, then (if a state desires to put a number on it), should be construed as 150 kilometers—the lowest known orbit, as found in the *UK Military Space Primer*. However, even if there is still a range of state positions (potentially down to 96 kilometers), it will be a much more limited one; the debate has at least been narrowed to a degree that aerospace activities (particularly suborbital applications) should have an understanding of where they fit in a state sovereignty analysis. And, from this narrowing of the issue, perhaps a fixed and settled resolution can be worked out among states. It is far easier to decide on a line at 100 kilometers (or some other number) when the starting point is a range of 96 to 150 kilometers and not 25 to 36,000.

⁴⁰⁷ See Oduntan, *supra* note 140 at 80.

CONCLUSION

There is an answer to the delimitation debate in the *lex lata*: sovereignty, and therefore the airspace regime, extends as high possible until it is clearly capped. That cap comes with the lowest definitive reach of the outer space regime: orbit. Overall, where there is doubt as to state sovereignty, it should be presumed that such sovereignty exists. As put by the Canadian band Rush, “If you choose not to decide, you still have made a choice.”⁴⁰⁸ In not deciding clearly that the outer space regime reaches into aerospace, and leaving the zone as a gray area, states have effectively elected the default: airspace sovereignty.

This work has pulled air and outer space apart to assess them independently, to include their nature and their accompanying legal regimes. Then, it attempted to put them back together in order to demonstrate that a broader view—through the particular lens of the potential for the use of force against aerospace vehicles—can help demonstrate how the regimes fit together. The resulting conclusion is that the line of demarcation is at orbit.

This is not a normative prescription for what regime is best for aerospace; it is merely an argument for what is. Therefore, 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).⁴⁰⁹

The conclusion here should generally be regarded as a spatialist position on delimitation. But, 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, though, a line in space provides the greatest degree of clarity. Function ties into uses and intended uses of a craft or activity; intentions can be naturally blurry, purposefully obfuscated, or simply a matter of opinion and debate in world politics. Spatial altitude may have some difficulties in calculation, but it is much more fixed and reliable; both the aerospace vehicle and the subjacent state can know where the vehicle is relative to a line. In the context of the potential use of force, clear and mutually understood lines are beneficial. Thus, considering the need for clarity, and giving deference to an expansive read of state sovereignty, it is manifest that a fixed line is the appropriate method.

⁴⁰⁸ Rush, *Freewill* (Mercury Records, 1980).

⁴⁰⁹ See generally Jakhu, Sgobba, & Dempsey, *supra* note 79.

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. And, without consensus the cautious planner defers to the baseline. If in genuine doubt, the craft should be construed as being in sovereign territory. The functional approach leaves doubt, so it is a lesser approach in the context employed here.

Finally, just because these aerospace vehicles and usages are relatively new does not mean they are without precedent. For instance, consider submarines—they introduced new concerns for the application of force in the law of the sea, but were eventually fit into the existing self-defense and security rubric.⁴¹⁰ While the law of the sea cannot be directly imported into outer space law, it does demonstrate that new capabilities that blur old lines and have the potential to transcend boundaries can be integrated into an ordered regime. Submarines were free to operate in their unique fashion—underwater and out of sight—on the high seas. But, when this capability interfaced with state concerns of sovereignty near their coasts, states essentially negated the unique attributes of a submarine in favor of deference to the territorial sovereignty of the littoral state.⁴¹¹

Here, too, aerospace vehicles present a unique new problem for the assertion of sovereignty; but, just because there is a new threat to territorial integrity does not mean that such sovereignty is (or will be) diminished. Certainly, a convention or treaty could resolve the issue. Perhaps a passage regime for aerospace vehicles could be created; but, it is also possible that, like with the submarine and airplanes, states will favor their sovereignty over free use of a new(er) application. But, 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.

⁴¹⁰ See Walker, *supra* note 51 at 345–347; Wolff von Heinegg, “The Law of Armed Conflict at Sea” in Dieter Fleck, ed, *The Handbook of International Humanitarian Law*, 2nd ed (Oxford; New York: Oxford University Press, 2008) 475 at 535–36 (noting the early efforts of some states to outlaw submarine warfare entirely, before submarines became part of the law of the sea).

⁴¹¹ See *Convention on the Territorial Sea and the Contiguous Zone*, 29 April 1958, 516 UNTS 205 (entered into force on 10 September 1964) [*Convention on the Territorial Sea*] at art 16(6) (requiring submarines to surface and show their flag during innocent passage in territorial seas); *UNCLOS*, *supra* note 59 at art 20 (echoing the prior Convention’s Article 16).

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