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Lessons from International Relations Theory and Terrestrial History for a 21st-Century Moon Race

Julie K. Balise

A Thesis in the Field of International Relations

for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

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Abstract

Space agencies from the U.S., Europe, Japan, China, Russia, and beyond are preparing to take another giant leap for humankind: establishing permanent research stations on the Moon. These efforts raise important questions for researchers across many fields, including international relations, business, astronomy, and law.

This thesis focuses on the international relations element, and specifically two questions: How have allied and competitor countries worked together in global commons domains where progress and safety required cooperation? Based on those case studies, what lessons might be most applicable to cooperation in space, and more specifically, the Moon? In this thesis, I use theoretical and empirical approaches to address these questions. In the theoretical domain, the international relations theories of realism, liberalism, and constructivism will be used to explore how rival and allied countries, plus their agents and industries, have interacted in global commons domains before, which can provide clues about their future actions on the Moon. In the empirical domain, this thesis will use Antarctica and the high seas as analogs for this Moon and take clues from their histories to anticipate what may occur on Earth's largest satellite.

I conclude with predictive and prescriptive answers to the earlier questions, recognizing that realism is most likely to explain how actors will behave in space, but suggesting how liberalism might be a more useful framework. The implications of this understanding are significant. They are also timely, since efforts around establishing Moon stations are expected to accelerate in the coming decade.

Author's Biographical Sketch

Julie K. Balise is a degree candidate for the Master of Liberal Arts (ALM) in Extension Studies, Field: International Relations at Harvard Extension School. Her studies have explored political corruption, truth commissions, international security, and international organization. In 2010, Julie earned her Bachelor of Arts degree in Journalism, summa cum laude, from Northeastern University. A native of Westfield, Massachusetts, Julie now resides in Boston, Massachusetts.

Dedication

I dedicate this thesis to my Mom and Dad. Thank you for everything, your patience, your love, and your tireless support – especially as I navigated my master's degree and when I was a small kid with a big question: "Where's the Moon?"

This thesis is also dedicated to my brothers, Scott and Brian. I treasure our shared enthusiasm for space and sci-fi, nourished from a young age by *Star Wars*.

May the force be with you both.

To Anna and Ben, you two are out of this world. Thank you for your patience and strength every step of the way and for getting me back on track when self-doubts crept in.

To Julie, I am so grateful for our international alliance. Thank you for being my strength, my inspiration, and a fellow IR-nerd when I needed one.

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Definitions

Antarctic Treaty: An international treaty signed in 1959 asserting the importance of cooperation and sharing of scientific results in Antarctica. Furthermore, it prevents countries from asserting new territorial claims in Antarctica while the treaty is in force.

Applied history: The practice of using historical analogs and precedents to better understand current challenges.

Constructivism: An international relations theory emphasizing the importance of norms and socially constructed ideas in shaping relations between actors.

UN Convention on the Law of the High Seas (UNCLOS): An international treaty signed in 1958 asserting access to the high seas. This applies to navigation on and above the seas, as well as access for fishing.

Global commons: Areas that lie outside national jurisdiction (high seas, outer space, Antarctica, and the atmosphere) where resources are shared between states.

Hard power: The ability to coerce by force using military or economic strength.

High Seas: Part of the open sea or ocean that are not controlled by any country, as they are located outside the territorial sea, internal waters of a country, in the archipelagic waters of an archipelagic country, or the exclusive economic zone.

Liberalism: An international relations theory emphasizing cooperation and nongovernmental organizations in state relations and rejecting the zero-sum-game anarchy premise of realism.

Moon Agreement: An international treaty signed in 1979 asserting the peaceful use of the Moon and other celestial bodies, the protection of the Moon's environment, and the shared human heritage of any resources found on the Moon.

Outer Space Treaty (OST): An international treaty signed in 1967 providing a framework for international space law, asserting the freedom to explore and use space, exempting space from claims to sovereignty, prohibiting the placement of nuclear weapons in space, and stating that use of the Moon and other celestial bodies must be for peaceful purposes.

Realism: An international relations theory emphasizing the role of the state acting alone in favor of its self-interests and rejecting the power of other agents. States act within a context of anarchy.

Roscosmos State Space Corporation: A government agency based in Moscow, responsible for overseeing Russian activities in space.

Soft power: The ability to persuade, rather than coerce, actors to behave a certain way. Leverages values, norms, and culture to appeal and attract.

Acronyms

ATS	Antarctic Treaty System
CNSA	China National Space Administration
CSA	Canadian Space Agency
ESA	European Space Agency
IGY	International Geophysical Year
ILRS	International Lunar Research Station
IO	International organization
ISRO	Indian Space Research Organization
JAXA	Japan Aerospace Exploration Agency
NASA	National Aerospace and Space Administration
UN COPUOS	United Nations Committee on the Peaceful Use of Outer Space
UNOOSA	United Nations Office for Outer Space Affairs

Chapter I.

Introduction

A new space race is underway, and the Moon is again the target. Established in 2017, the United States-led Artemis Program plans to build a human-occupied base near the Moon's south pole by 2028.[1] 2020's Artemis Accords laid out a roadmap for those plans and invited international partners to come on board. Separately, China and Russia are working to establish an International Lunar Research Station (ILRS), with the human presence coming in 2030.[2] Again, the Moon's south pole is the planned location.[3] Both projects are hurdling forward at the speed of technological development, diplomacy, and financial resourcing. Most months see one or two states pick a side. In August 2023, Artemis Accords signatory India became the first state to land a spacecraft on the Moon's south pole. "This success belongs to all of humanity," Prime Minister Narendra Modi said at the time. "And it will help moon missions by other countries in the future."[4]

The Artemis and ILRS missions claim to be propelled by similar ideals: scientific progress, economic resources, and serving as inspirations for future space explorers. Those ideals are compatible with the rules for global commons endeavors. For example, while resources can be exploited within reasonable limits, no state can claim sovereignty

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[1] Patrinos, Thalia, "Artemis Moon Program Advances – the Story so Far," NASA, May 31, 2019.
[2] Tiwari, Sakshi, "China Could Set up 'Moon Base' by 2028; Lunar Station Likely to Be Powered by Nuclear Energy – Chief Designer," *Eurasian Times*, November 23, 2022.
[3] Biswas, Soutik, "Chandrayaan-3: The race to unravel the mysteries of Moon's south pole," *BBC*, August 23, 2023.
[4] Kluger, Jeffrey, "How India Became the First Country to Reach the Moon's South Pole," *Time*, August 23, 2023.

over the land and resources on the Moon, space, the atmosphere, or other commons.[5] There are key differences in the plans, beyond just the makeup and political alliances of their signatories. These include the treatment of the Moon's surface during research and mining activities, the structuring of opportunities for private industry, and the legal frameworks within which each party approaches their respective plan.

As of January 2024, there are no widely supported, binding treaties that govern behavior on the Moon. This domain is subject only to nonbinding agreements to which several powerful parties, including the United States, have not added their signature. This expands the possibilities for what could happen on the Moon and how it could affect terrestrial geopolitics. Several things are certain:

- No country plans to embark on this alone. The ability to progress will depend on each state's diplomacy skills with terrestrial neighbors.
- What happens in outer space does not stay there. Satellites, space debris, and anti-satellite technology have real implications for national security, and media reports around these topics reflect their sensitivity.
- The implications for this research are not limited to the Moon, since what occurs there could serve as a bridge for human endeavors further in space. In fact, the Artemis Accords explicitly state plans to go to Mars.

This intense competition occurs against a backdrop of very fraught, practically hostile relations between the two main actors. Is it a Cold War? Why, or why not? The answer to those questions depends on which international scholar you ask, but most agree that the U.S. and China are more often rivals than allies. In moments of turbulence,

[5] Schrijver, Nico, "Managing the global commons: common good or common sink?" *Third World Quarterly* 37, no. 7 (2016).

international relations theory can help anticipate what lurks behind the next turn.[6] It is natural to use them here. States participating in this space race are poised for confrontation, competition, or cooperation in a setting full of unique dangers.

International relations theory, combined with applied history, can help anticipate how states will and should interact on the Moon in the coming decade. These methods provide context for today's conflicts and tomorrow's opportunities. The next section will detail the ways international relations theory and applied history support this thesis.

Methodology

This thesis uses several research methods, including applied history, a close read of primary documents like project proposals and public statements, and theoretical analysis. The history sections will take turns with Antarctica, the high seas, and the Moon and outer space. These sections will focus on legislation, geopolitics, military, economics, and other activities from the 1950s through the 2010s. Starting these sections during the Cold War provides a glimpse into how states negotiated access to global commons spaces, with the threat of nuclear war as backdrop. Treaties developed during this time remain relevant in each domain. Applying history will shed light on conditions conducive to cooperation, and those that could push countries to the brink of war.

Project proposals, public statements, and media coverage will be used to understand state and agency positions and public reactions to efforts targeting the Moon now and the high seas, outer space, and Antarctica in history. Often the most sanitized,

[6] Barnett, Michael N., "What Is International Relations Theory Good For?" in *Chaos in the Liberal Order: The Trump Presidency and International Politics in the Twenty-First Century*, ed. Robert Jervis, Francis J. Gavin, Joshua Rovner, and Diane N. Labrosse (New York: Columbia University Press, 2018), 8-21.

project proposals lay out individual ambitions as states and agencies wish the public to perceive them. Public statements add color and depth. Media coverage is where truth and unvarnished opinions most often emerge, helping researchers see what states wish to hide. Alternatively, in countries where the media is tightly controlled by the state, it can also indicate how the government wants readers to perceive developments.

International relations theories serve different purposes at different times.[7] When complicated decisions are weighed, theories help check assumptions and reveal weaknesses in policies and each other.[8] Theories provide a light through chaos. "In moments of historical change and great uncertainty, we want our theories to provide some sense of what lurks around the corner," writes Michael N. Barnett. International relations theories are sometimes complementary, often contradictory, and rarely without loud and active proponents. In this thesis, realism, liberalism, and constructivism will be leveraged to better understand why states acted how they did in outer space and the Moon, Antarctica, and the high seas during the Cold War 1950s through the 2010s. From there, this theoretical toolkit will guide predictions and prescriptions for what could be coming in the next chapter of the international space race.

With applied history and theoretical foundation in hand, this thesis will return to the questions posed earlier about international efforts on the Moon. A brief overview of recent events taking U.S., China, Russia, and other states through the time of this writing will yield hints of whether cooperation or competition is dominating now. What will

[7] Barnett, "What Is International Relations Theory Good For?"
[8] Snyder, Jack, "One World, Rival Theories." *Foreign Policy* 145 (November–December 2004).

serve as the framework going forward can be deduced using clues from history and theory. The thesis concludes by weaving those threads together.

Executing the above methods requires extensive research. The next section explores areas where robust literature was readily available, plus places where gaps exist. It also notes that some literature comes from biased sources, such as government agencies, researchers, or other proponents of a particular point of view. This thesis aims to perform the above research methods meticulously, while addressing these challenges.

Literature Review

This thesis marries literature about international relations theory and literature about the history of international activities and governance in the global commons. A consensus exists on the definition of a global commons. The U.S. Department of Defense put it concisely in 2010: "The global commons are domains or areas that no one state controls but on which all rely."[9] These spaces include outer space, atmosphere, the high seas, cyberspace, and Antarctica. Any discussion of their treatment and humanity's reliance on them requires considering Garrett Hardin's 1968 *Science* article and to the "common heritage of mankind." In *Conflict and Cooperation in the Global Commons: A Comprehensive Approach for International Security*, editor Scott Jasper compiles articles that update and contextual concerns around these spaces for 21st century readers. In the book's introduction, Jasper and Scott Moreland describe the importance of the commons: "The stability of the international order and economy depends on reliable and unhindered

[9] "Quadrennial Defense Review Report," Department of Defense, February 2010.

access to the global commons."[10] They advocate for an internationally coordinated approach to dealing with these spaces, and the legal framework to support that.

Literature highlighted later illustrates the sometimes groundbreaking, sometimes experimental efforts to erect this legal framework. "The global commons have thus served as the laboratory for testing new legal principles and the rights and corollary duties emanating from them," Nico Schrijver writes.[11] The literature around global commons indicates that carefully crafted policy can support responsible, sustainable behavior in the commons.[12] How states actually behave in Antarctica, the high seas, or outer space, can look differently. International relations theory is helpful here.

This thesis assumes that realism, liberalism, and constructivism are all valid tools for explaining how states have acted, are acting, or may act in the future. To better understand each theory, it leverages key works from these spaces to summarize the arguments behind each main theory and relevant sub-theories. Stephen Walt's 1998 *Foreign Policy* article "International Relations: One World, Many Theories" provides useful explanations of each.[13] According to Walt, realism "depicts international affairs as a struggle for power among self-interested states and is generally pessimistic about the prospects for eliminating conflict and war." Liberalism emphasizes the pervasiveness of cooperation, including its economic benefits and the role of international organizations in helping states avoid "selfish" behavior. Constructivists, according to Walt, claim that

[10] Jasper, Scott, *Conflict and Cooperation in the Global Commons: A Comprehensive Approach for International Security* (Washington, DC: Georgetown University Press, 2012), 2.
[11] Schrijver, "Managing the global commons."
[12] Riddervold, Marianne, and Akasemi Newsome, "Introduction: cooperation, conflict, and interaction in the global commons," *International Relations* 35, no. 3 (August 6, 2021).
[13] Walt, Stephen M., "International Relations: One World, Many Theories," *Foreign Policy*, no. 110 (1998).

norms and ideas shape behavior and view "the interests and identities of states as a highly malleable product of specific historical processes."

Helping us understand how realism applies to cooperation versus competition in the global commons are Kenneth Waltz, Joseph M. Grieco, Marianne Riddervold, Akasemi Newsome, and Gideon Rose. Analysis suggests that competition is the likelier outcome, with even the rare cooperation taking a competitive nature.[14] "Such a Hobbesian view has great difficulty in explaining more enlightened and cooperative behavior, particularly in the absence of a hegemonic power," writes John Vogler writes in *The Global Commons.*[15] A state wants to ensure that its gains from the arrangement are relatively better than those enjoyed by its partners. "It is noteworthy that cooperation is self-interested and does not require a hegemon," Vogler writes, "neither need it be based on anything as fickle as notions of the 'common good.'"[16]

Liberalism allows a world and its commons to be harmonious without being cooperative, Robert O. Keohane writes.[17] For his part, Vogler finds liberalism "particularly appropriate" when considering how states behave toward the global commons, the regimes they form around them, and the agendas set to tackle issues relating to them. Self-interest exists here, and gains are seen as absolute, rather than the emphasis on relative gains of realism, according to Vogler. Other voices regarding liberalism include John Rawls, Stanley Hoffmann, and Joseph S. Nye.

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[14] Grieco, Joseph, "Realist Theory and the Problem of International Cooperation: Analysis with an Amended Prisoner's Dilemma Model," *The Journal of Politics* 50, no. 3 (August 1998).
[15] Vogler, John. *The Global Commons: A Regime Analysis* (West Sussex, England: John Wiley & Sons Ltd., 1995), 200.
[16] Vogler, *The Global Commons: A Regime Analysis,* 195.
[17] Keohane, Robert O., *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984).

Missing from realism and liberalism, according to Vogler, Riddervold, and Newsome, is the normative aspect of political actions in the commons. Constructivism provides an important theoretical lens. This approach leverages speeches, acts, social agreements, rules, and practices – the "building blocks of society and its international structure," according to Vendulka Kubálková, Nicholas Onuf, and Paul Kowert – to understand international actors.[18] Garcia, Riddervold, and Newsome promote constructivism as the most useful perspective for understanding why states cooperate or compete in the global commons. Existing literature includes case studies applying international relations theory and questions around competition and cooperation to global commons spaces. A gap exists in using these concepts toward the Moon, which had not re-emerged as a stage for such discussions until the past five years.

There is abundant literature on the history of outer space, Antarctica, and the high seas. Regarding outer space, Michael Roe notes the "considerable" research that has been conducted from various angles and contexts.[19] "What is more remarkable is how little has been written about the governance of outer space and even less about how little could be learned from other contexts and how little has been gleaned from outer space policy-making and governance that might contribute in return," he writes.[20] International treaties governing outer space, the Moon, and celestial bodies offer a glimpse into state priorities and negotiating power over the decades. They indicate which states were willing to

[18] Kubálková, Vendulka, Nicholas Onuf, and Paul Kowert, *International Relations in a Constructed World* (New York: Routledge, 1998).
[19] Roe, Michael, *Governance of the Global and Extra-Terrestrial Commons: What the Maritime Context Can Offer Outer Space* (New York: Springer International Publishing AG, June 28, 2023).
[20] Roe, *Governance of the Global and Extra-Terrestrial Commons: What the Maritime Context Can Offer Outer Space,* 100.

compromise on which points, and where they drew their lines. Telling are the U.S. signature on the Outer Space Treaty and its absence on the Moon Agreement.

Space is a strategic asset and should be leveraged as such, according to Joan Johnson-Freese. Several researchers note how successful the Soviet Union was illustrating the strategic value of space when it launched Sputnik and then forged a path with rocket technology. During the late 20th century, the U.S. enjoyed soft and hard power in this domain, thanks to its Apollo Program and its Moon landings. This power began waning in the Nixon years – a trend that continued until 2015. This priority shift affects those that the U.S. partners within space, creating frustration as well as opportunities to make progress alone, according to Johnson-Freese. For U.S. rivals, this spells an opportunity to seize space supremacy. Xiaodan Wu writes how China rapidly expanded its space capabilities in recent decades. Literature representing this side of the competition is more limited in quantity and harder to parse.

Antarctica and its treaty system (ATS) provide a useful case study of liberalism in the global commons. Depending on the literature, the ATS is either the "remarkably successful,"[21] best of the best when it comes to international agreements, or an outdated, exclusionary document drafted in secrecy. Supporting the first claim are government agencies (the British Antarctic Survey and Australian Antarctic Division, for example) and countless researchers. They hail the longtime peace enjoyed in Antarctica, and the enduring nature of the ATS. Critics note the exclusionary nature of the conventions at which the Antarctic Treaty was drafted, and the enduring roles established during that process. Researchers also complain how frustratingly secretive it was: unlike all other

[21] Howkins, Adrian, "Preserving Power," *Frozen Empires: An Environmental History of the Antarctic Peninsula* (New York: Oxford Academic, 2017).

treaties researched in this thesis, meeting summaries and process details relating to the creation of the Antarctic Treaty are not available. Other critics note that the enduring nature of the treaty means it is outdated.[22] Australian scholar Elizabeth Buchanan contends that Antarctica is not as peaceful as it sems. She writes that Antarctica is home to gray-zone activities, defined as coercive actions that fall between peace and war. Overwhelmingly clear from the Antarctica literature is that whether a treaty system is success or failure depends on the eye of the beholder.

The second case study explores the high seas, a region best explained by realism. Literature on high seas history shows a current of competition pushing states to a head when it comes to territorial boundaries, economic incentives, military behavior, and legal negotiations. A wealth of research is available to peek behind the curtain on negotiations that led to the UN Convention on the Law of the Seas (UNCLOS). In *The Poseidon Project*, David Bosco highlights the moment cracks began to form and the U.S. began to inch away from the third round of this treaty. Unable to get what it wanted, America refused to sign. Others followed suit. In Bosco's view, the resulting regime is one where freedom of the seas is "eroding." The South China Sea, Mediterranean, and Arctic are all settings for disagreements between states. Christian Bueger, Timothy Edmunds, Rebecca Jarvis, Tim Young, and Rögnvaldur Hannesson also contribute to the literature on the high seas. Writing about fishing, Hannesson observes that the likelihood of cooperation depends on economic factors and the number of potential participants sharing a resource – cooperation becomes less likely as party count increases.

[22] Yermakova, Yelena, "Legitimacy of the Antarctic Treaty System: is it time for a reform?" *The Polar Journal* 11, no. 2 (2021): 342-359.

Literature cited here maintains the important tradition of training an eye toward the future. There's an urgent need to frame the Moon in this in this context. Research regarding what competition and cooperation in this realm could look like must go beyond analysis of the 1960s Moon race, when the lead players, power dynamics, economics, technology, and more were different. It must analyze U.S. and Chinese proposals for the Moon, tracking stated goals to national interests and deducing implicit goals based on previous actions and public statements. How could those plans unfold in the coming years, according to existing literature around global commons history and international relations theory? As of this writing, no other scholars have attempted to answer that. Opinion writers and public figures have weighed in, and their statements will be studied. State agencies provide another voice, which should be treated with a critical eye. NASA, CNSA, ESA, JAXA, and ISRO frequently post proposals, with varying degrees of polish and pomp, while Russia's Roscosmos agency website is completely down. What does this spell for the future of Earth's largest satellite? The literature demands an answer to these questions as humans from several states prepare to walk on the Moon for the first time in decades. I am beyond honored to fill that gap.

Having established the research problem, the methods with which it will be addressed, and the literature that will be used to support those methods, this thesis will next turn to international relations theory. It will begin by considering the global commons. What are these spaces? What should states do with them? From there, it will find the lenses of liberalism, realism, and constructivism that are most useful for viewing international relations in global commons. This is a crucial prerequisite for understanding conflict and cooperation in Antarctica, the high seas, outer space, and the Moon.

Chapter II.

Theory

How should a state behave in a domain, like outer space, where it has no more or less jurisdiction than any other state? What circumstances would motivate it to operate competitively, in a way that maximizes its own gains at the expense of other states? Potential downsides include alienating allies, erecting silos around research and thus restricting the potential advantages of shared discovery and limiting options for mutual assistance in case of an emergency. Conversely, what circumstances would inspire cooperation, even when it means limiting individual gains and restricting the speed or expansion of progress? Advantages here are the opposite of the drawbacks listed above, plus aligning more closely with established international law. Different international relations theories help understand the way states behave with or against each other, and specifically as it relates to the global commons.

First, we must understand the global commons. These are regions, like outer space, the atmosphere, the high seas, cyberspace, and Antarctica, that are located outside national jurisdiction; used by state and non-state actors for their benefits; and protected by international treaties rather than traditional state mechanisms. This definition creates some challenges for international relations theory, which typically views states as the primary actors. The global commons are "closer to the analytical concept of anarchy than any other areas of the world," Marianne Riddervold and Akasemi Newsome write in

"Introduction: cooperation, conflict, and interaction in the global commons."[23] Most often, these anarchic conditions should propel states more toward conflict and resource-maximizing actions rather than behaviors of self-restraint. Exploring why these commons and their resources are historically peaceful, cooperative areas, Riddervold and Newsome gave several answers that may be instructive here: first, lack of conflict enables states to continue maximizing gains; second, lack of conflict indicates that institutions and policies built for economic success are working; and third, lack of conflict is a sign that a norms-based regime, built around institutions and non-state actors, is driving an effort to preserve these commons for the future. The first "answer" best aligns with realism, the second with liberalism, and the third with constructivism.

State goals within and outside the commons help determine which approach is followed. Of increasing importance is Chinese policy toward the commons, which tends to follow the first, realist model, with contributions from the second, economically motivated approach, according to Riddervold and Newsome. This is a challenge for states, such as the U.S. under President Biden, that would seek international regimes around the commons. When more states enter a domain, this becomes even trickier, writes Michael Roe: "Whilst the voluntary resolution of commons problems is feasible where the number of actors is very limited, when the number grows, their resolution quickly becomes less likely."[24] The legal framework protecting commons takes precedence over state sovereignty, according to Riddervold and Newsome, but challenges to the international regime could prevent it from acting effectively. "We also find that

[23] Riddervold and Newsome, "Introduction: cooperation, conflict, and interaction in the global commons."
[24] Roe, *Governance of the Global and Extra-Terrestrial Commons: What the Maritime Context Can Offer Outer Space,* 45.

non-state actors play a bigger and different role than is often acknowledged in studies of other areas of the world," they write.[25] Such actors would seek cooperation over conflict.

Researchers disagree about whether realism, liberalism, or constructivism is the most useful theoretical lens for understanding cooperation and competition in the global commons. At the center of realism is a self-interested state seeking power over its rivals. States act rationally, in ways that derive a direct benefit or obtain as actual or relative advantage over other states. This lens leans more toward the competitive, hostile approach. "The origins of hot wars lie in cold wars, and the origins of cold wars are found in the anarchic ordering of the international arena," Kenneth Waltz writes.[26] Look no further than the high seas for evidence of this warning in a global commons. However, realism does not rule out cooperation, especially when working together can bring an individual state closer to its goals. "States prefer that relative achievements of jointly produced gains not advantage partners, and their concerns about relative gains may constrain their willingness to cooperate," Joseph M. Grieco writes.[27] In fact, realism views forming alliances as one way for states to work together to improve their own strength, specifically as it relates to international security. Security is one dimension of a state's hard power. Another is economic capacity. A resource-rich global commons in a strategic location, like the high seas or the Moon, can spell opportunity to the realist.

Realism views the international system as one of independent countries without a central authority.[28] (Echoes of the global commons anarchic structure appear here.)

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[25] Riddervold and Newsome, "Introduction: cooperation, conflict, and interaction in the global commons."
[26] Waltz, Kenneth, *Realism and International Politics* (New York: Routledge, 2008), 59.
[27] Grieco, Joseph. "Realist Theory and the Problem of International Cooperation: Analysis with an Amended Prisoner's Dilemma Model," *The Journal of Politics* 50, no. 3 (August 1998).
[28] Walt, Stephen M., "The Realist Guide to World Peace," *Foreign Policy*, December 23, 2022.

Neorealism in particular views states as preoccupied with spotting dangers and finding ways to respond to them, according to Waltz. "From the vantage point of neorealist theory," he writes, "competition and conflict among states stem from the twin facts of life under anarchy: States in an anarchic order must provide for their own security, and threats or seeming threats to their security abound."[29] Again, realism is useful when considering the high seas, a domain where danger is the default, and a united front is rare.

Liberalism rejects the zero-sum game approach of realism in favor of a system in which state interests are subordinate to international law and nongovernmental organizations.[30] Proponents elevate democracy and diplomacy. "Liberal theory argues that institutions provide valuable information, and information about the distribution of gains from cooperation may be especially valuable if the relative-gains logic is correct," write Robert O. Keohane and Lisa L. Martin in "The Promise of Institutionalist Theory."[31] When it comes to human nature, cooperation is as old as competition. The emergence of international organizations (IO) to regulate those behaviors is more recent. The IO most relevant to this thesis, the United Nations, was founded in 1945, just a decade before efforts to establish treaties around outer space, Antarctica, and the high seas began to take shape. Its most relevant committee, the United Nations Committee on the Peaceful Use of Outer Space (UN COPUOS), was founded in 1959. IOs regulate state behaviors in several ways, including establishing laws and norms around economic activities (resource extraction for a global commons), international security (militarization and nuclear testing), and environmental impact and sustainability. Most

[29] Waltz, *Realism and International Politics,* 59.
[30] "7 Components of Liberalism," Norwich University Online, October 7, 2017.
[31] Keohane, Robert O., and Lisa L. Martin, "The Promise of Institutionalist Theory," *International Security* 20, no. 1 (1995).

flavors of liberalism advocate a more measured approach than realism when it comes to these norms, since the goals are shaped by free markets as well as social welfare.

When cultural norms and social ideas shape international relations, constructivism is at play. This theory states that "the manner in which the material world shapes and is shaped by human action and interaction depends on dynamic normative and epistemic interpretations of the material world," writes Emanuel Alder in "Seizing the Middle Ground: Constructivism in World Politics."[32] (This theory stands in contrast to liberalism, where norms come from IOs.) Constructivism provides the most useful theoretical lens for viewing the global commons, writes Stacey Valentine.[33] "A lens that incorporates a sense of norms is particularly important with regards to international cooperation analysis because at the international level, norms are essentially the source of law," she writes. Denise Garcia makes a similar claim in "Global commons law: norms to safeguard the planet and humanity's heritage." Garcia argues that global laws are different from other international laws, as they seek to preserve spaces for humankind, and that the norms, principles, and practices they promote help foster cooperation. Viewing the global commons through a realism lens, she argues, ignores the legal frameworks governing those regions and lacks an explanation for peace that results from states working together, despite their self-interests.[34] Resource-rich areas like the commons should inspire conflict among states only motivated by gaining power. That they don't is a sign realism is not a force in the global commons, according to Garcia.

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[32] Adler, Emanuel, "Seizing the Middle Ground: Constructivism in World Politics." *European Journal of International Relations* 3, no. 3 (September 1997).
[33] Valentine, Stacey, "The Improbability of Meaningful Climate Change Regulation: A Constructivist Understanding of the Global Commons and the Need for U.S. Leadership," *Washington and Lee Journal of Energy, Climate, and the Environment* 2, no. 1 (Fall 2011).
[34] Garcia, Denise, "Global commons law: norms to safeguard the planet and humanity's heritage," *International Relations* 35, no. 3 (September 2021).

She notes that liberalism comes closer to explaining behavior in these areas but does not go quite far enough. Rather, norms, reputational concerns, and signs of pre-existing cooperation help shape behavior in the commons.

It is tempting then to view our third global commons, outer space, through a constructivist view. While each leading space agency operates its own missions and scientific research, they use current norms of cooperation and space structures, and infrastructures, to make progress together. Take the International Space Stations (ISS), a collaboration between five space agencies that serves as much as a symbol for international team work as one for scientific advancement.[35] [36] This harmonious image suffered a blow in 2022 when Roscosmos teased an early departure from the station, which is set to be in commission through 2030.[37] Meanwhile, that agency signed onto plans to join China's lunar base. That alliance returns readers to the central conflict of this thesis: What lessons from state behavior in global commons domains are most applicable to cooperation in space, and more specifically, the Moon? To begin answering that, the following chapter explores the high seas and Antarctica.

The case studies in this thesis bring to life several of the theoretical concepts covered in this chapter. The abstract idea of a global commons becomes embodied by the cold continent and the high seas. The riddle of how to act in an anarchic, shared territory becomes a serious question for diplomats and policymakers. State behaviors that better

[35] Ruttley, T.M., Robinson, J.A. and Gerstenmaier, W.H., "The International Space Station: Collaboration, Utilization, and Commercialization," *Social Science Quarterly* 98 (2017).
[36] Walls, Heather, "The Infinite Potential of Human Collaboration," *Medium*: *Down the Rabbit Hole*, January 12, 2021.
[37] Foust, Jeff, "NASA and Roscosmos Officials Restate Intent to Operate ISS after 2024," *SpaceNews*, January 23, 2023.

align with liberalism and realism begin to emerge. By bringing those pieces together, this thesis builds a theoretical and historical foundation – before setting its sights skyward.

Chapter III.

Case studies: The High Seas and Antarctica

This thesis's two case studies begin in the 1950s, an era when the potential use and misuse of the oceans, outer space, and seas came into sharp focus. Several forces pushed countries into competitive postures and away from cooperative ones. America and the Soviet Union vied for security and technological supremacy, prestige and power. At times, diplomats from the two countries pushed each other to the brink of mutually assured destruction. At other times, they worked together, finding common ground in areas like science, trade, and the preservation of an inhabitable Earth. Rules were written regarding outer space, Antarctica, and the high seas that still hold influence today.

The third of its kind, the International Geophysical Year of 1957-58 (IGY) was a core catalyst for change and coordination in global commons. Researchers from 67 countries came together to advance scientific discovery across 11 Earth sciences, which happened to include outer space, Antarctica, and the high seas.[38] This was especially important for Antarctic, which previously had not been a major focus of research. As we'll see, a state's decision to participate in this research would determine whether it could take part in the creation of the Antarctica Treaty. (And whether it could take part in that treaty's creation would help determine a state's status as a consultative party or not, to this day.) The IGY was important for research in the high seas and outer space, as well. The seabed was explored in new ways. Space-related activities fueled developments around rocket and satellite technology that emerged during the space race.

[38] "65 Years Ago: The International Geophysical Year Begins," NASA, September 19, 2023.

The two case studies are organized using the below format:

1. History of geopolitical, military, economic activity: Starting here will illustrate efforts, cooperative and competitive, in the global commons as the public would have witnessed them. History will rely on academic research, speeches, and news coverage during the time. This section will provide an initial opportunity to apply international relations theory lenses to the applied history framework.
2. Overview of relevant international, regional, and local laws: The legal dimension will show how states positioned themselves and their priorities while shaping how cooperation and competition took place in these global commons.
3. Analysis of how international relations theories characterize activity in the commons: Applying observations and outcomes from the two previous sections, this analysis will point toward whether state behavior was most in line with realism, liberalism, or constructivism. This analysis will help guide the discuss around outer space and especially upcoming efforts targeting the Moon.

Antarctica and Antarctic Law

Geopolitics, military, and economics in Antarctic

The cold continent, Antarctica looms on the edge of most maps of Earth. It is remote, frozen, and relatively abstract for most. Antarctica has never hosted an indigenous human population. As a global commons, the continent's resources are only available for the good of mankind and its use restricted to peaceful purposes. Antarctica is a useful analog for the Moon because its distant nature and harsh environment make it a challenging place to build an infrastructure. Like outer space, Antarctica became an

international security interest during the Cold War, as states considered its utility for nuclear efforts. The Antarctica Treaty was the first arms control agreement signed during the Cold War, making this continent a good case study to start.

Signs of cooperation in Antarctica

- States restricting certain behavior (extracting oil, hunting and fishing, nuclear testing) in order to protect the common heritage of mankind
- States building joint research bases and helping each other with science

Signs of competition in Antarctica

- Several states maintaining territorial claims
- States skirting restrictions and treaties they signed
- States accelerating development in ways that others perceive as threatening, inspiring others to respond with accelerated development

Prior to the 1950s, Antarctica fit the international relations theory of anarchy. No central authority controlled the continent, and states invited themselves to use its land and resources in any ways their national interests saw fit. The result: several states made territorial claims. Some of these claims overlapped. The idea of nuclear testing and other military endeavors was broached by several states. Hunting and fishing were conducted as desired, environmental impacts be damned.

These conditions began to shift when Antarctica was included in the IGY. During this period, 12 countries conducted research at 55 Antarctic bases. In *The International Politics of Antarctica*, Peter Beck notes how this changed the trajectory of the cold continent. “The IGY had the effect of calling the international community’s attention to Antarctica as an object worthy of research and interest, and also made possible some kind

of institutional framework desirable and possible," he writes.[39] Seeing the value of Antarctica, and the danger of its usage for nuclear purposes, President Dwight D. Eisenhower invited countries involved in the IGY's Antarctic research to create a governance regime. This step put America in a position of leadership and sustaining power in the Antarctic Treaty System (ATS). The result has been twofold: successful cooperation on using Antarctica for peaceful purposes only, and resentment and competition as countries seek ways to leverage it for their own strategic interests.

Peaceful purposes permitted by the institutional framework, outlined in more detail in the next section, include science and limited fishing. Currently, Antarctica is home to about 70 permanent research stations, representing 29 countries. Many are located in Terra Nova Bay, in Antarctica's Ross Sea region.[40] These are typically run seasonally. Spring months are the most active, and researchers return to their home countries during the winter. Have they produced international cooperation in science? In 2019, Mônica Heinzalmann Portella De Aguiar explored this question by looking at international co-authorship on research papers as an indicator of collaboration. She notes the difficulty of comparing before and after the treaty, as "the internationalization of science" has a relatively brief history, developing since the end of the Cold War. "In a remote continent such as Antarctica, international cooperation helps support an abundant scientific output," De Aguiar writes. Degrees of collaboration varied based on factors including a country's proximity to the continent, relationships with other researchers, quality of research locations on Antarctica, and strategic goals. Countries like New Zealand, Argentina, South Africa, Chile, and Australia had the highest productivity rates.

[39] Beck, Peter, *The International Politics of Antarctica* (New York: St. Martin's Press, 1986), 53.
[40] "China and Antarctica," Wilson Center, May 13, 2014.

South American countries did not score highly in this category. "Our view is that science can be understood as an instrument of power and that for some States there is a political rational behind of the output of Antarctic science," De Aguiar writes. She notes that other researchers have a suggested correlation between proximity of international research locations and their scientific outputs. De Aguiar dismisses this idea as unproven.[41]

The ways states conduct scientific research in Antarctica can suggest whether they prioritize their presence on the continent and serve as a warning for how they might behave in other global commons. According to the ATS, states that do not wish to continue operating their research stations must remove all structures and return the land to its condition before the research station was established. In theory, this policy should reduce the human impact on a continent whose human impact is limited to the past two centuries. In practice, states claim that abandoned or half-used stations are still in use, resulting in a peppering of "ghost stations" across the continent, according to Leah Feiger and Mara Wilson.[42] This practice is increasingly urgent as states accelerate investment in Antarctica. China and Russia were particularly active in this domain during the COVID-19 pandemic, representing what Feiger and Wilson saw as Cold War-style great power competition.[43] Other players are ramping up efforts, and fears of competition, as the pandemic's influence wanes. In February 2022, Australian Prime Minister Scott Morrison announced A$804 million in funding, to be spent over a decade, to support "strategic and

[41] De Aguiar, Mônica Heinzalmann Portella, "The Antarctica Treaty System and the promotion of international scientific cooperation," *Estudios Internacionales* 51, no. 194 (2019): 67.
[42] Wilson, Mara, and Leah Feiger, "Antarctica Is Crammed With Abandoned 'Ghost' Stations," *The Atlantic*, March 3, 2021.
[43] Feiger, Leah, and Mara Wilson, "The Countries Taking Advantage of Antarctica During the Pandemic," *The Atlantic*, May 15, 2020.

scientific programs" in Antarctica.[44] Writing in the *Guardian*, Australian lawyer Kieran Pender highlighted the A$250 million allocation for drones, helicopters, autonomous vehicles, and other technology with potential military applications. The rest was set for science. "In Antarctic diplomacy, science is the major currency," he wrote. "But for a government that has slashed the university sector to the core during the pandemic, it is obvious that better science is not the sole motive for this funding boost."[45] Australian "strategic" projects in Antarctica would most likely be conducted with China in mind, according to Pender. China's state-run media outlet *Global Times* claimed Australia's funding "stems from its hostility toward China."[46] "Bringing the outdated Cold War mentality to Antarctica, Australia will only fall into another confrontation trap of its own making," Wang Yi wrote. For its part, China in April 2023 made news for progressing on its fifth Antarctic research station. Located on Inexpressible Island near the Ross Sea, the station could be used to support intelligence collection, according to CSIS,[47] as well as scientific research. Such use would violate the "peaceful purposes" requirement of the ATS, which China joined in 1983.

Who controls Antarctica's resources? That depends. In the cooperative column, you'll find treaties countries compiled to protect wildlife and potential mineral resources lying beneath Antarctica's ice sheets. Under competition are the many ways states have flouted those protections. Starting with the agreements:

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[44] Martin, Sarah, "Coalition pledges $804. To ensure Antarctica is 'free from conflict,'" *The Guardian*, February 21, 2022.
[45] Pender, Kieran, "Cold war on ice? Politics and science collide once more in Australia's approach to Antarctica," *The Guardian*, February 22, 2022.
[46] Yi, Wang, "Australia's Antarctica plan stems from its hostility toward China," *Global Times*, February 22, 2022.
[47] Funaiole, Matthew P., Brian Hart, Joseph S. Bermudez Jr., and Aidan Powers-Riggs, "Frozen Frontiers: China' Great Power Ambitions in the Polar Regions," CSIS, April 18, 2023.

- In 1972, the Convention for the Conservation of Antarctic Seals (CCAS) prohibited killing and capturing Antarctic seals.
- In 1982, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) addressed growing international interest in krill fishing, a practice with a side effect of harming seabirds, whales, seals, and fish that rely on the krill population for food.
- In 1991, the Protocol on Environmental Protection was added to the Antarctic Treaty to protect the environment and the flora and fauna it supports. This Madrid Protocol, named after the city where 26 states agreed on it, prohibits mining through 2048, meaning that whatever mineral resources exist below the continent's massive ice sheets will stay there for at least two more decades.

Environmental protections do not stop states from speculating about the potential for wealth and power gained from extracting resources. In 1983 and 1991, for example, U.S. government reports considered whether oil and gas existed under Antarctica's ice sheets. If petroleum reserves exist, they are most likely in West Antarctica, John C. Behrendt wrote in the 1983 report for the U.S. Department of the Interior.[48] Whether they are accessible is another question. "Antarctica has the most severe environment on Earth in which to carry out petroleum exploration or exploitation," writes Behrendt. Is it feasible? Is it worthwhile? Four decades after Behrendt's writing, technology has developed to reduce barriers to entry for governments and private industry. It is more difficult to answer whether it's worthwhile to use it. Any state that attempts mining Antarctica between now and 2048 would be acting outside the rules of the ATS and could

[48] Behrendt, John C., "Petroleum and Mineral Resources of Antarctica," U.S. Department of the Interior, 1983.

suffer reputational and legal consequences. More broadly, whether states choose to end or extend the mining prohibition beyond 2048 will indicate whether they prioritize protecting this global commons' environment.

As indicated above, several factors determine whether a state violates international agreements. On the supporting side, states can see the economic gains of acting outside the regime, the unlikelihood of getting caught, and the strengthened alliances with others that violate the agreements. On the against side are reputational costs, the ability to participate in future treaty writing, and fines, sanctions, and other civil and criminal punishments. In Antarctica, there are several times that states openly violated the ATS. For example, in 1986, the International Whaling Commission (ICW) issued a temporary moratorium on hunting whales in international waters. This applied to the seas that are technically part of Antarctica, as they're located below 60 degrees latitude. Japan responded by reframing its Antarctic whale hunting as a research program. Australia was aghast. Japan's behavior clearly violated the ATS and ICW moratorium, in Australia's view. This country spent years advocating an end to Japanese whale hunting there. After the International Criminal Court in 2014 ordered Japan to stop this program, Japan stopped whaling in the Southern Ocean near Antarctica, left the IWC, and continued whaling in its own waters. Separately, several states have balked at fishing restrictions in the ATS. Plans from Chile[49] and China to trawl Antarctica waters suggest that international regimes are not powerful enough to overcome state interests.

Disagreements over territorial claims, unresolved by the ATS, represent another area of competition in Antarctica. This setup allows for interpretation and obfuscation,

[49] Goodman, Joshua, and David Keyton, "Factory fishing in Antarctica for krill targets the cornerstone of a fragile ecosystem," *Associated Press*, October 13, 2023.

when a state's interests and actual activities straddle the law. Australia's claim is the largest, accounting for 5.9 million square kilometers, or about 42 percent of the continent.[50] Australian scientists study ice, ocean, atmospheric, and Earths systems; the impact of human presence in Antarctica; how to integrate technology into Antarctic research; and environmental conservation. According to its Antarctic Science strategic plan, Australia aims be a leader in science on the continent.[51] The second largest claim is Norway's, comprising 2.7 million square kilometers. This area is nearly seven times larger than Norway itself, and is home to research on atmospheric radiation, global warming, and ice.[52] A top provider of researchers, the U.S. reserved the right in the ATS to make a territorial claim but has not done so. It has by far the most research stations in Antarctica, followed by Argentina, Chile, the UK, and France. China and Russia also have a heavy presence and use the continent, along with the U.S., to support GPS infrastructure.[53] Since the creation of the ATS, these countries have ceased diplomatic disputes over Antarctic territory; however, disagreements over natural resources could be forthcoming. "Once you get more explicit about resource exploitation, then you raise the troubling issue of who owns Antarctica," Antarctic governance expert Klaus Dodds told the *Financial Times*. "That's the issue that haunts the Antarctic Treaty, and the Treaty System more generally."[54] Beyond extractable resources, Antarctica provides an increasingly popular venue for tourism. (More than 100,000 people visited during the

[50] "Australian Antarctic Territory," Australian Government: Department of Climate Change, Energy, the Environment and Water.
[51] "Australian Antarctic Science Strategic Plan," Australian Antarctic Science Council, April 26, 2020.
[52] "Dronning Maud Land," Norwegian Polar Institute.
[53] Hook, Leslie, and Benedict Mander, "The fight to own Antarctica," *Financial Times*, May 24, 2018.
[54] Hook and Mander. "The fight to own Antarctica."

2022-2023 season.[55]) This industry typically sends visitors to the Antarctic Peninsula during the warmer months from November to March.

Elizabeth Buchanan cautions about gray zone activities militarizing Antarctica.[56] These coercive activities, such as bolstering satellite ground stations beyond what is necessary for science, exploring prospect for mining, and "spoofing" the true location of fishing endeavors so they appear to be outside Antarctic waters, are performed to gain a strategic advantage. Importantly, these activities are technically legal for those following a loose interpretation of the ATS. "Evidently, subversion, deception and rather sophisticated interpretations of the international legal norms in Antarctica are all now hallmarks of the ATS," Buchanan writes. This is despite the celebrated status of cooperation in Antarctica, and the ever-growing number of parties to the treaty.

The geopolitical, military, economic history of Antarctica shows a continent that quickly rose in prominence as a result of a scientific push and the possibility of extractable resources. States collaborated on research. A powerful treaty system, explored more in the next section, kept most actors in line. This did not altogether eliminate state tendencies to push boundaries on what is permissible behavior in Antarctica.

Antarctic Treaty System

As mentioned above, today's Antarctic Treaty descends from efforts in the 1950s to expand knowledge of and foster international cooperation in the cold continent. The IGY was particularly influential. This event "provided the climate for discussions to

[55] Bartlett, John, "Antarctic tourism is booming – but can the continent cope?" *The Guardian*, June 25, 2023.
[56] Buchanan, Elizabeth, "Antarctica in the gray zone," *Australian Journal of International Affairs* 76, no. 3 (2022).

begin about negotiations for an Antarctic Treaty," according to Vivian Fuchs, an English scientist who led the first-known trans-Antarctic crossing in 1955 to 1958.[57] Against a background of conflicting territorial claims in Antarctica and Cold War anxieties,[58] the U.S. kicked off efforts to make sure that the peaceful use of Antarctica could continue.[59] Countries invited to craft the ATS were all actively conducting research in Antarctica at the time, suggesting the prioritization of science above all, including advocacy by states like India to get the Antarctica issue before the UN General Assembly.[60] Previously, seven of those 12 countries – Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom – had made territorial claims in Antarctica. Claims made by Britain, Chile, and Argentina overlapped. The U.S. and Soviet Union reserved the right to make similar claims. From June 1958 to May 1959, more than 60 meetings were held to negotiate the treaty.[61] Transcripts of these meetings are not available, so details on what occurred are piecemeal. On December 1, 1959, the 12 participating countries signed the treaty. It went into effect in June 1961.

The resulting Antarctic Treaty contained 14 articles, the first of which declared that Antarctica would be used "for peaceful purposes only" and prohibited the building of military bases, weapon testing, and carrying out of military efforts. It allowed the use of military personnel for peaceful purposes.[62] Article IV of the treaty states that it does not renunciate territorial claims in Antarctica; what this means in practice is interpreted

[57] Beck, *The International Politics of Antarctica,* 53.
[58] Scully, Tucker, "The Development of the Antarctic Treaty System," *Science Diplomacy: Antarctica, Science, and the Governance of International Spaces* (2011).
[59] "Compilation of Key Documents of the Antarctic Treaty System," Secretariat of the Antarctic Treaty, Buenos Aires, 2017.
[60] Molenaar, Erik J., "Participation in the Antarctic Treaty," *The Polar Journal* 11 (September 2021).
[61] Beck, *The International Politics of Antarctica,* 63.
[62] "Compilation of Key Documents of the Antarctic Treaty System."

differently by participant states. The treaty also promoted scientific exploration, requiring that participants exchange plans, personnel, and findings of scientific programs. It prohibited nuclear testing and disposal of radioactive materials in Antarctica. Supplementing the formal treaty, an environmental protocol section dictated that activities conducted in Antarctica per the treaty should be done in ways that minimize their impact on the environment. This section emphasized the importance of cooperation between parties in "programmes of scientific, technical and educational value."[63]

Several subsequent treaties clarified rules around environmental protection. The 1964 Agreed Measures for the Conservation of Antarctic Fauna and Flora prohibited killing or wounding native mammals or birds, except when a permit was issued. It also dictated that participating states avoid polluting the waters near ice shelves and the coast of Antarctica.[64] In the decades since, three additional agreements were passed to protect the environment and wildlife in and around Antarctica. Together, these works comprise the modern ATS. Participation in the ATS has grown thanks to state interest in using Antarctica for research, tourism, and resources; the ability to join debates about the ATS and its future; and the soft power that comes from being a part of such a renowned agreement.[65] In February 2023, San Marino brought the total number of parties to 56.

According to the British Antarctic Survey, the ATS "has become recognised as one of the most successful sets of international agreements, setting an example of peaceful cooperation for the rest of the world."[66] "It cannot get better than this in

[63] "Compilation of Key Documents of the Antarctic Treaty System."
[64] "United States Treaties and Other International Agreements," Department of State, Washington, DC, 1967, 1,008.
[65] Molenaar, "Participation in the Antarctic Treaty."
[66] "The Antarctic Treaty Explained," British Antarctic Survey.

international politics," Alejandra Mancilla and Julia Ann Jabour wrote in December 2022.[67] Richard Woolcott told the UN General Assembly in 1983 that, "The Treaty System has proved to be a remarkably successful, practical and dynamic arrangement and every effort should be made to preserve and maintain it."[68] The ATS also has critics. Many states denounce the two-tiered membership model, which provides consultative status to the original 12 parties and select others, and non-consultative status to other acceding states. The Malaysian government in 1984 criticized this approach for its "exclusivity, its unaccountability, and its secrecy."[69] Such secrecy around the ATS creates challenges for researchers as well as states. "Indeed, the history of the System recounted in this study is drawn from documents that seem to have slipped through the cracks," writes Jeffrey D. Myhre.[70] Others have called the ATS weak. "The Antarctic Treaty represented the product of contrasting viewpoints, and this situation gave rise to a relatively weak institutional framework," writes Peter Beck.[71] He also observes the positive aspects of this weak framework, including how it has enabled flexibility over the decades and the ability to respond to new, ever-evolving concerns.

The ATS has not undergone major updates since its last protocol was passed in 1991, making researchers question whether it is adequate to address today's challenges. Yelena Yermakova cites the system's insufficient environmental protections and measures for holding participants accountable, inadequate guidance regarding tourism,

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[67] Mancilla, Alejandra, and Julia Ann Jabour, "Turned 60, is the Antarctica treaty system in good health?" *The Geographical Journal* 189, no. 1 (December 2022).
[68] Beck, *The International Politics of Antarctica,* 177.
[69] Beck, *The International Politics of Antarctica,* 206.
[70] Myhre, Jeffrey D., *The Antarctic Treaty System: Politics, Law, and Diplomacy* (New York: Routledge, 1987).
[71] Beck, *The International Politics of Antarctica,* 176.

and exclusionary nature.[72] "Peace on the continent rests on a system that excludes the majority of states from the governance of the Antarctic," she writes. The upcoming expiration of the mining prohibition suggests that there are prospects to re-open and re-negotiate the ATS. What this means for inclusiveness, cooperation, and competition as well as Antarctica itself remains to be seen.

Equipped with an understanding of Antarctic treaties and the continent's history, the next section applies a theoretical lens. This helps weigh why states behaved within these specific conditions, and what it could mean if they encounter such conditions again.

Liberalism in Antarctica

International relations in Antarctica now are best explained by liberalism. State behaviors are limited by an international governance regime that supports peace and cooperation, moderation, and transparency. The cracks in the ATS façade do not diminish the decades of collaboration on science and exploration in the cold continent. They should be understood within a context of a treaty that has maintained a fragile peace among competitive states, while reinforcing engrained hierarchies.

Liberalism theorizes that states view their needs alongside structures created by international organizations. This dynamic is seen time and again in Antarctica, where states' military and economic interests are moderated by the governance regime. In "Antarctic governance in a climate changed world," Jeffrey McGee and Marcus Haward note the relationship between the ATS and other governance regimes directly and

[72] Yermakova, "Legitimacy of the Antarctic Treaty System: is it time for a reform?"

indirectly affecting Antarctica.[73] Examples include the UN Convention on the Law of the Sea (UNCLOS), the IWC, and the International Maritim Organization Polar Code. Rather than one international regime, Antarctica operates under a "regime complex." Such a "loosely-coupled set of specific regimes"[74] features a web of international bodies, each addressing a smattering of interests. Robert Keohane and David G. Victor observe how this structure can be more productive than those that seek broad consensus on a single agreement. "In settings of high uncertainty and policy flux, regime complexes are not just politically more realistic but they also offer some significant advantages such as flexibility and adaptability," they write. McGee and Haward see the Scientific Committee on Antarctic Research (SCAR) as a conduit directing this regime complex toward addressing climate change and the impact that could have on Antarctica.

Liberalism does not assume that all state actions and structures are altruistic. Antarctica's governance regime is an example of this. Look to the ATS: Its original participants initially and consistently structured the treaty in such a way that they would enjoy relatively more power amid a cooperative environment. Look to the way science is treated. In "An international hierarchy of science: conquest, cooperation, and the 1959 Antarctic Treaty System," Joanne Yao notes the tradition of displaying scientific progress as a way to show a society is civilized, especially in comparison to other societies that are not conducting science.[75] The ATS perpetuates the kinds of hierarchies that can emerge from such traditions, according to Yao, while maintaining peace and cooperation

[73] McGee, Jeffrey, and Marcus Haward, "Antarctic governance in a climate changed world," *Australian Journal of Maritime & Ocean Affairs* 11, no. 2 (July 7, 2019).
[74] Keohane, Robert O., and David G. Victor. "The Regime Complex for Climate Change." *Perspectives on Politics* 9, no. 1 (March 15, 2011).
[75] Yao, Joanne, "An international hierarchy of science: conquest, cooperation, and the 1959 Antarctic Treaty System," *European Journal of International Relations* 27, no. 4 (2021).

generally. This observation offers lessons for the chapters regarding outer space and the Moon, where scientific hierarchies can shape a state's ability to act and influence.

The High Seas and High Sea Law

Geopolitics, military, and economics in the high seas

What are the high seas? Answering this question requires wrestling with some international governance terminology. All parts of the ocean that are outside economic exclusion zones (EEZ) – meaning a state does not have exclusive rights to use it for seabed mining, fishing, or other activities – are the high seas.[76] These are vast spaces, accounting for about 64 percent of the ocean, according to the U.S. National Oceanic and Atmospheric Administration. Picture a coastline. The water immediately along that coastline are considered internal waters. This is part of the country neighboring it. After those internal waters, you'll find the EEZ. This extends 200 nautical miles and includes the water as well as the seabed below that water. The 12 nautical miles closest to the internal waters is considered the territorial sea. Special considerations apply here. For example, the air above this territorial sea is considered national airspace. After the territorial sea, you'll find the contiguous zone. This extends for another 12 nautical miles. We are in international airspace now. Go another 176 nautical miles and you will arrive at the end of the EEZ. This is the high seas. They are a global commons, like Antarctica and outer space, available for peaceful use by all states.

Signs of cooperation in the high seas

[76] Sapsford, Fae, "What Is High Seas Governance?" NOAA Ocean Exploration, July 20, 2022.

- States outlining peaceful purposes
- States restricting certain behavior (extracting oil, fishing, nuclear testing) in order to protect the common heritage of mankind
- States developing a "breakthrough"[77] new treaty after its existing one was ineffective

Signs of competition in high seas

- Several states abstaining from signing the major treaty they helped shape
- States skirting restrictions and treaties they signed

While human usage of the high seas significantly pre-dates its activities in Antarctica, the treaty system governing them is younger and more contentious. For centuries, the concept of "freedom of the seas" dominated this domain. In 1957 – 1958, the inclusion of oceanographic research among the IGY's 11 disciplines expanded the international community's understanding of the seabed and ocean ridges. Coinciding with this realization was a growing awareness that the sea could be used for nuclear purposes.

These conditions, paired with separate UN General Assembly questions around the seas, kicked off the long process that resulted in the UN Convention on the Law of the Sea (UNCLOS) in 1982. Where the Antarctic Treaty left vague the issue of territorial claims, UNCLOS belabored and was bogged down by questions around boundaries. The high seas are more immediately useful for states than Antarctica, so the list of peaceful purposes is better defined. Per UNCLOS I, these uses include for "coastal and land-locked States:

1. Freedom of navigation;

[77] "Who owns the ocean?" Royal Museums Greenwich.

2. Freedom of overflight;
3. Freedom to lay submarine cables and pipelines, subject to Part VI;
4. Freedom to construct artificial islands and other installations permitted under international law, subject to Part VI;
5. Freedom of fishing, subject to conditions laid down in section 2;
6. Freedom of scientific research, subject to Parts VI and XIII."[78]

Section 2 relates to protections of high seas flora and fauna. Part VI defines the continental shelf.[79] Part XIII establishes the right to conduct scientific research.

Before delving into interpretation and practical use of these principles, and how competition and cooperation appear, it is important to note that the U.S. has not ratified this agreement. This positions it at odds with other great powers in this realm. When it comes to national policy and actions with an international scope, the U.S. often upholds many UNCLOS principles. Where it tends to deviate is in its understanding of its territorial sea and maritime claims. (This is the area that inspired Congress to balk on ratifying UNCLOS.) In 2023, America signed the new law of the sea put forth by the international community. Whether this will be ratified in Congress remains to be seen.

Supporting UNCLOS means upholding freedom of navigation. States can cooperate here by not interfering when a state, coastal or landlocked, sails a ship flying its flag on the high seas. Cooperating states observe immunity of warships on the high seas. Incidents involving a ship's navigation on the high seas, such as collision with another ship, would be investigated and punished by the state represented by that ship.

[78] "United Nations Convention on the Law of the Sea," United Nations, 1982, 51.
[79] "United Nations Convention on the Law of the Sea," 47.

This seemingly straightforward principle is more complicated in practice: states often disagreed about where one state's claims end and another's begin. This matters because separate rules apply when ships travel through territorial seas.

The South China Sea provides a clear example. Chinese territorial claims in this region overlap those made by Vietnam, the Philippines, Brunei, Indonesia, Taiwan, and Malaysia. China is expanding its presence here by literally expanding islands it is using or creating completely new islands.[80] In the meantime, it leverages its claims over this territory to support complaints that other countries are violating other UNCLOS principles, such as the freedom of navigation and overflight over the high seas. This puts China in conflict not just with its regional neighbors, but with the U.S., which gains strategic value from accessing the South China Sea. (American Freedom of Navigation Operations (FONOP) in this region are conducted by its Navy[81], suggesting the country's peaceful purposes contain a military element.) High tensions and expanded militarization raise risks of "hot conflict"[82] in the region.

If its rivals are to be believed, the U.S. stands on shaky ground when criticizing other countries for exceeding their boundaries in the high seas. The country is a magnet for excessive maritime claims, most recently receiving 22 claims from 15 claimants in fiscal year 2022.[83] In a Department of Defense report on freedom of navigation, these claims against the U.S. are deemed threats to the "rules-based international order." "If left unchallenged, excessive maritime claims could limit the rights and freedoms enjoyed by

[80] Center for Preventive Action, "Territorial Disputes in the South China Sea," Council on Foreign Relations, June 26, 2023.
[81] Panter, Jonathan G., "Will Americans Die for Freedom of Navigation," *Foreign Policy*, April 6, 2021.
[82] Zhou, Laura, "China, Philippines war of words over South China Sea collisions is a 'test' raising risk of hot conflict, observer says," *South China Morning Post*, October 23, 2023.
[83] "DoD Releases Fiscal Year 2022 Freedom of Navigation Report," U.S. Department of Defense, April 21, 2023.

every nation," the DoD writes. Here, the department reinforces its right to conduct FONOPs wherever U.S. understanding of international laws deems it legal and shares the country's claimed commitment to lawful use of the sea.

The high seas are a global commons with a complex geopolitical, military, economic history. It is a stage for contention, as well as the home to significant scientific breakthroughs. This dichotomy sees states behave cooperatively and competitively, often regardless of the international treaties at hand. To better understand the legal boundaries for those actions, the next section turns to UNCLOS.

UNCLOS and other treaties of the seas

Efforts to draft the first UN Convention on the Law of the Sea (UNCLOS I) began in 1949 when the UN's International Law Commission prioritized codifying the high seas regime.[84] Seen as closely related, territorial waters were taken up as well. Eight years and many meetings later, the United Nations Conference on the Law of the Sea convened in Geneva to "examine the law of the sea, taking account not only of the legal but also of the technical, biological, economic and political aspects of the problem, and to embody the results of its work in one or more conventions or other appropriate instruments."[85] Four conventions resulted. The first explored the territorial sea and contiguous zones, the second the high seas, the third fishing and conservation, and the fourth the continental shelf. Individual resolutions also focused on nuclear tests on the high seas and pollution by radioactive materials, among other topics. Several states

[84] "Recommendation to the International Law Commission to include the regime of territorial waters to its list of topics to be given priority," United Nations, December 6, 1949.
[85] "United Nations Conference on the Law of the Sea."

supported restricting nuclear tests,[86] citing their pollution and harm to human health and the freedom of the seas. For their part, the U.S. and UK deflected ideas to restrict nuclear tests on the seas, claiming that such discussions should be kept within the conversation around disarmament, and that both countries' nuclear tests were done in a way that minimized harm. Likewise, broad agreement emerged around the dangers of radio-active waste disposal, while the United States said the topic warranted more research. In the end, the U.S. would be among the 48 states to support UNCLOS I in 1958.[87]

In 1960, work regarding the law of the sea resumed. UCNLOS II would focus on the breadth of territorial seas and fishery limits after UNCLOS I resolutions on neither topic received the required two-thirds majority support. Both "posed complex political and economic problems and revealed various conflicts of interests."[88] Regarding the breadth of the territorial sea, debates centered around six versus 12 nautical miles. A U.S.-Canada joint proposal advocated the six-mile approach and exclusive fishing rights for coastal states extending 12 miles from the baseline. Several states were skeptical. For example, Saudi Arabia's representative claimed that the "six-mile formula had been conceived as part of the cold war between major Powers, and the rest of the world had no choice in the matter."[89] States offered competing proposals and perspectives. The questions about fishery limits and the breadth of the territorial sea remained unresolved. In the end, UCNLOS II dictated that funds were allocated to publish records of the

[86] "United Nations Convention on the Law of the Sea."
[87] "Final Act of the United Nations Conference on the Law of the Sea," United Nations, Geneva, 1958.
[88] "Second United Nations Conference on the Law of the Sea: Summary Records of Plenary Meetings and of Meetings of the Committee of the Whole," United Nations, 1960.
[89] "Second United Nations Conference on the Law of the Sea."

session and that the UN and member governments provide financial help to coastal countries who need support to expand their fishing industries.[90]

In 1970, the UN called for an UNCLOS III with an ambitious agenda and a 1973 start date. This attempt would address an array of issues such as the continental shelf, the territorial seas, fishing and conservation, and scientific research. Again, countries formed blocs around their interests. There were large maritime powers who sought freedom of navigation, the "broad margin" group who believed their jurisdiction should extend to the end of the continental shelf, even if it went beyond 200 miles, landlocked countries, and those with unique interests.[91] Major powers worried about coalitions of smaller states wielding their new influence. "Decolonization had in key respects democratized international negotiations, and major powers found themselves increasingly outnumbered," David Bosco wrote in *The Poseidon Project*.[92] Progress on UNCLOS III negotiations was slow. Complexity, contentious issues, and the size of the endeavor bogged things down. "The snail's pace leaves many negotiators grumbling, doodling on their documents or roaming restlessly around the crowded meeting rooms," according to a 1976 article in *The New York Times.*[93]

In the end, UNCLOS III called for all UN member states to set "appropriate priorities" for their marine science, technology, and ocean-services developments; for developing countries to establish programs for cooperation between them; for industrialized countries to help in these efforts; for multilateral funding agencies to

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[90] "Second United Nations Conference on the Law of the Sea: Fourteenth Plenary Meeting," United Nations, 1960.
[91] Bosco, David, *The Poseidon Project: The Struggle to Govern the World's Oceans* (Oxford: Oxford University Press, 2022), 125.
[92] Bosco, *The Poseidon Project: The Struggle to Govern the World's Oceans,* 128.
[93] Teltsch, Kathleen, "Delegates Doodle as Procedural Details Slow Down Progress at the U.N.'s Law of the Sea Conference," *The New York Times*, March 28, 1976.

coordinate their assistance to developing countries; and for international organizations within the UN system to expand their programs to help developing countries in the field of marine science, technology, and ocean services.[94] The territorial sea was capped at 12 miles. An EEZ extending up to 200 miles from the coast was created. Powerful states got what they wanted regarding freedom of navigation, while the group of countries representing the developing world achieved their goals regarding fishing and seabed mining.[95] An active participant in the development of the Convention, the U.S. balked when it came to signing onto its final form. The Reagan administration bristled against restrictions on seabed mining, much to the displeasure of other Convention participants. "It is perfectly obvious the USA is now doing everything it can to impart a semblance of legality to its absolutely illegal claims in relation to the world's oceans and their riches," a Soviet spokesperson said.[96] In the end, the U.S. would sign but not ratify UNCLOS III. It has been ratified or acceded by 169 parties, including China, Russia, the European Union, and the United Kingdom.

In 1995, the "'constitution for the oceans' was finally in force," Bosco writes.[97] One of the most contested topics, seabed mining, did not become an issue in practice until the 2010s when emerging technology made it possible to exploit resources. Consequences of the U.S. decision to abstain from signing the treaty emerged, when private companies found themselves unable to participate in seabed mining. U.S. defense contractor Lockheed Martin, for example, collaborated with the British government in

[94] "Final Act on the Third United Nations Conference on the Law of the Sea," United Nations, 1982.
[95] Bosco, *The Poseidon Project: The Struggle to Govern the World's Oceans,* 129.
[96] "Soviet government statement on US refusal to sign law of the sea convention," *BBC Summary of World Broadcast*, April 25, 1983.
[97] Bosco, *The Poseidon Project: The Struggle to Govern the World's Oceans,* 174.

order to access the Pacific's Clarion-Clipperton zone.[98] Where scholars might see international cooperation, companies saw lost U.S. dollars. CEOs from Lockheed Martin, ExxonMobil, and others rallied policymakers to join UNCLOS. It wasn't enough to quell concerns about surrendering power to seabed authorities. "Big business had climbed on board, but the requisite two-thirds of the Senate had not," Bosco writes.[99]

Calls for a new or improved high seas treaty began almost immediately after UNCLOS III was enforced in 1994. The most significant one is the new High Seas Treaty adopted in 2023. While embracing the principles outlined in UNCLOS, this new treaty adds legal protection against pollution and unsustainable fishing activities in the high seas, requires parties to conduct environmental impact assessments, dictates sustainable fish stocks, offers climate change-related guidance, and puts countries on track toward the 2030 Sustainable Development Agenda.[100] Hailed in headlines as "a win for the ocean"[101] and a "the most significant multilateral environmental convention since the Paris Climate Agreement of 2015"[102] for marine biodiversity, the treaty began collecting signatures in September 2023. Dozens of nations, including the U.S., added their names. "The United States stands with the global community in committing to safeguard the health and resilience of our ocean so that it may continue to sustain us for generations to come," wrote U.S. Secretary of State Antony Blinken on the U.S. signing of the new High Seas Treaty.[103] This September 21, 2023, statement represents a departure from

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[98] Shukman, David, "UK Seabed Resources joins deep-ocean mineral mining rush," *BBC*, March 14, 2013.
[99] Bosco, *The Poseidon Project: The Struggle to Govern the World's Oceans,* 209.
[100] "Beyond borders: Why new 'high seas' treaty is critical for the world," UN News, Law and Crime Prevention, June 19, 2023.
[101] "A win for the ocean: High Seas Treaty signed at United Nations," Directorate-General for Maritime Affairs and Fisheries, September 20, 2023.
[102] Stewart, Patrick, "The High Seas Treaty Is an Extraordinary Diplomatic Achievement," Carnegie Endowment for International Peace, March 8, 2023.
[103] Blinken, Antony J., "Signing of the High Seas Treaty," Department of State, September 21, 2023.

prior American policy on the high seas. Signing the treaty commits the U.S. to take steps toward ratification. What this means for international cooperation in this domain remains to be seen – the U.S. Senate must still ratify the treaty, which contains legally binding restrictions on protecting biodiversity and conducting environmental impact studies before taking actions, such as fishing, deep sea mining, and transport, that could affect the health of the oceans. Sixty states must ratify the treaty for it to enter into force. As of January 2024, only one state, the island country of Palau, has taken this additional step.

It is possible that a page is turning in high seas international relations. Still, the broader history and existing treaties must be considered when choosing a theoretical lens for this domain. While Antarctica tipped the scale toward cooperation, the high seas are heavier on the competitive side. The next section looks at what this means for theory.

Realism in the high seas

The high seas physically and ideologically divide states in a way best understood using a realist lens. For thousands of years, humans have navigated, fished, and fought in this domain. They have proposed grand treaties, taken decades to finalize them, then acted in their own interests anyway. Like all global commons explored in this thesis, the high seas lack a central authority. This one best demonstrates what can happen when the international regime that emerges to fill that gap lacks support from one of a global superpower. By opting out of UNCLOS, the U.S. can act in its own interests in the high seas: it can mine the seabed, make excessive territorial claims, and cite the treaty when it is advantageous to highlight other states' bad behavior. Based on their actions, UNCLOS parties seem exceedingly aware of the treaty's flexible nature.

"In the realist interpretation, the seas are the plain on which superpower or regional power rivalry takes place," write Christian Bueger and Timothy Edmunds.[104] Such competition occurred in long-past times, and it continues into the decades reviewed in this thesis. The results include states extracting excessive resources or specific resource types that are restricted; states claiming territory outside the legal limits; states refusing to join each other in international treaties; and states participating in antagonistic activities against each other and non-state actors in the high seas. Settling on UCNLOS took decades of work, and the results have been lauded for drastically reducing conflict in the high seas. Yet to be seen is whether the new High Seas Treaty changes state behavior. Could a U.S. ratification put new power behind the treaty and its oversight body? Will other states get in line and act in ways that support biodiversity and research at the expense of their state interests? The ratification goal of 2025 suggests it will not be long before the first clues emerge. Right now, realism remains.

Bueger and Edmunds suggest that states are in fact heading away from maritime anarchy. "This process is pragmatic and incremental in nature, driven by innovation and change in the maritime arena itself rather than by wider structural shifts in geopolitics or international regulation," they write.[105] That is, challenges around environment, human security, sea power, and economic development are propelling states work together. A "crucible for change,"[106] according to Bueger and Edmunds, the seas may yet become a domain where liberalism prevails and new mechanism for cooperation find legs.

[104] Bueger, Christian, and Timothy Edmunds, "Beyond seablindness: a new agenda for maritime security studies," *International Affairs*, Volume 93, Issue 6 (November 2017).
[105] Bueger and Edmunds, "Beyond seablindness," 1,310.
[106] Bueger and Edmunds, "Beyond seablindness," 1,311.

Conclusions from the Case Studies

As analogs for the Moon, Antarctica and the high seas provide invaluable insights. They illustrate ways geopolitical, military, and economic priorities influenced states' decisions to work together or in opposition. In the case of the high seas, a treaty process showed how repeated conventions and tireless diplomacy were insufficient to bring America on board. With Antarctica, a treaty system created behind closed doors showed how international resentment could brew but not bring down agreed-upon principles. Both shed light on the international prioritization of scientific breakthrough.

Science and soft power both fueled the discoveries covered in the next chapter, which will begin the discussion of outer space. Another global commons domain, this is a frontier with new kinds of opportunities for cooperation and competition.

Chapter IV.

Early Moon Missions and Space Law

Outer space is the only global commons not located on Earth. It rests outside another global commons, the atmosphere, and officially starts at different places for different states. For the international community, this domain begins 100 kilometers or 62 miles above sea level, at what is known as the Kármán line.[107] NASA pins the line a little lower, at 50 miles above sea level. Within outer space, you'll find several layers of Earth "orbits," where objects circle the planet at varying distances above it. Very low Earth orbit (VLEO) begins within the thermosphere. This is a popular region for artificial satellites, including the International Space Station, the Chinese Tiangong space station, and the Starlink satellites launched by SpaceX. Above VLEO, there's Low Earth Orbit (LEO), Medium Earth Orbit (MEO), Geostationary Orbit (GEO), and finally High Earth Orbit. These different levels are used for different purposes, including, the telecommunications satellites that stay in GEO, the navigation satellites in MEO,[108] and the IBEX research satellite in High Earth Orbit.[109] Here we see the numerous ways nearby outer space can be used for the common good of mankind. In order to keep such activities peaceful, an international regime took shape over the last eight decades.

A separate regime emerged for the Moon and other celestial bodies found in space. These treaties typically use principles from the outer space regime, with special

[107] Dobrijevic, Daisy, and Andrew May, "The Kármán Line: Where does space begin?" *Space.com*, November 14, 2022.
[108] "Types of orbits," The European Space Agency, March 30, 2020.
[109] "Interstellar Boundary Explorer," Princeton University, 2020.

considerations for the objects in Earth's orbit, which may contain resources yet to be discovered. The Moon is the closest of such bodies, located 238,900 miles from Earth. Its central role in geopolitics was cemented during the space race of the 1950s and 60s. Still undecided is the exact composition of exploitable resources on the Moon. Water and Helium-3 can be found there, according to NASA[110] and the ESA,[111] as well as metals. Space agencies disagree over which metals are found there, with NASA's JPL listing a smattering of rare Earth metals (REMs) and the ESA[112] listing iron, titanium, and uranium. Scientists and entrepreneurs agree there is enormous value in mining the Moon. "Helium-3 on the moon is worth $4 billion per ton," says Gerald Kulcinski, professor emeritus at the University of Wisconsin. "It's the most valuable thing in space."[113]

Geopolitics, military, and economics on the Moon

It is not easy to get to the Moon, never mind extract its resources and bring them back to Earth for a type of nuclear fusion that is not yet used (in the case of Helium-3). Yet, states and non-state actors are planning to do just that. The core of this thesis looks at whether cooperation or competition is more likely to emerge. Like in the case studies, it will begin with a section that looks at historic geopolitics, economics, and military efforts in this domain. Following this will be a detailed overview of the international treaties governing the Moon. This chapter will close by introducing the U.S. measure that opened the Moon for business.

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[110] "The Lunar Gold Rush: How Moon Mining Could Work," NASA JPL, May 29, 2015.
[111] "Helium-3 mining on the lunar surface," The European Space Agency.
[112] "Lunar Resources," The European Space Agency.
[113] Donnelly, Claire, and Meghna Chakrabati, "Who owns the moon owns the future," *On Point*, September 25, 2023.

Signs of cooperation in outer space and the Moon

- Aspects of the space race
- Shared research on the International Space Station
- Shared technological advancements

Signs of competition in outer space and the Moon

- Aspects of the space race
- Refusal to participate in the Moon Agreement
- Unilateral decisions to conduct military actions that result in space debris
- Theft of technological advancements

The case studies highlight restrictions on exploiting seabed and Antarctic resources. As we will see in the coming pages, most powerful states did not sign nor ratify an agreement that would apply such protections to the Moon. "This is perhaps due to the general opinion that the exploitation of the manganese nodules of the deep seabed is more feasible with the current technology," writes Virgiliu Pop, "whereas that of the lunar resources pertains to a more distant future – hence in a lesser need for regulation."[114] Another possibility was an anticipation for a distant future in which such technology would exist, and the states would be ready to benefit. That distant future is nearly here. Before exploring those details, we start with competition in outer space.

The nature of a race is that it is competitive. There can only be one first, one winner who gets to enjoy the soft power of exiting Earth's atmosphere first or being the first to reach the south pole. The Space Race encapsulated this dichotomy. It started, like

[114] Pop, Virgiliu, *Who Owns the Moon?* (Berlin: Springer Dordrecht, December 2008), 125.

all other cases here, as part of the International Geophysical Year. Here states would work together to explore space, launch satellites, identify radiation belts, and deepen human understanding of Earth by observing it from above. "The most important result of the International Geophysical Year is that demonstration of the ability of peoples of all nations to work together harmoniously for the common good," President Eisenhower said.[115] In reality, states would work toward their own goals with their own supremacy in mind. This competition between the U.S. and Soviet Union saw several key moments during the 1950s and '60s, and two critical dates: October 4, 1957, and July 20, 1969. Before arriving at that first date, the Soviet Union in August 1957 became the first country to launch an intercontinental ballistic missile (ICBM). (The launch vehicle used here would later carry Sputnik into space.) At that time, the U.S. was centering its ICBM efforts around the Atlas missile program.[116] Atlas A was flight tested in June 1957. Atlas D, the first to serve as an ICBM, was flight tested in April 1959. Of significantly less consequence at the time, China on October 4, 1956, introduced its first plan for outer space in the "Long-Term Program for the Development of Science and Technology."[117]

Leveraging its earlier technological advancement, on October 4, 1957, the Soviet Union took the Earth's breath away by becoming the first country to put a human-made object into outer space. Sputnik, or "fellow traveler" in English,[118] launched from a site in Kazakhstan, then spent three weeks transmitting signals to Earth, and three months in orbit. The 23-inch diameter metal sphere burned during re-entry into the Earth's

[115] "International Geophysical Year (IGY)," Dwight D. Eisenhower Presidential Library.
[116] Missile Defense Project. "SM-65 Atlas," *Missile Threat*, Center for Strategic and International Studies, February 15, 2017.
[117] Wu, Xiaodan, *China's Ambition in Space* (Chicago: Independent Publishers Group, 2022).
[118] "Sputnik 1," NASA, October 4, 2011.

atmosphere. The diminutive device and its brief journey had an outsized impact on international affairs. President Eisenhower marked this occasion with a tempered, diplomatic statement. "As to the Soviet satellite, we congratulate Soviet scientists upon putting a satellite into orbit," he said. "The United States satellite program has been designed from its inception for maximum results in scientific research."[119] By contrasting U.S. versus Soviet goals in space, the president sought to soothe fears that America had fallen behind, while diminishing the enormity of the Soviet accomplishment. His statement did not have that effect. Americans panicked, fueled on by the media. "The underlying meaning, [experts around the world] said, was that the Soviet Union was able to deliver a great package of nuclear destruction to every part of the United States and that this could be accomplished from rocket-launching bases deep inside the Asian heartland."[120] A month later, Sputnik 2 became the first to carry a live animal, a dog named Laika, into outer space. On Jan. 31, 1958, the U.S. sent its first satellite, the Explorer I, into orbit. By then, the damage from the Soviet success had permeated the American public. "'Sputnik shock' was far more traumatic for Americans than the Eisenhower administration had anticipated," Johnson-Freese writes.[121] She notes the nuclear dimension of this fear. "More generally, the perception spread that the United States was technically inferior to, and hence potentially weaker than, the Soviet Union – an early example of a techno-nationalist appraisal," she writes. The Eisenhower administration took action. On July 29, 1958, it created the National Aeronautics and Space Administration (NASA) as an independent agency within the U.S. federal

[119] Eisenhower, Dwight D., "Statement by the President Summarizing Facts in the Development of an Earth Satellite by the United States," October 9, l957.
[120] *US on the Moon: What it means to us* (Washington, DC: U.S. News & World Report, 1969), 22.
[121] Johnson-Freese, Joan, *Space as a Strategic Asset* (New York: Columbia University Press, 2007), 55.

government.[122] "The enactment of this legislation is an historic step, further equipping the United States for leadership in the space age," Eisenhower said. A space age requires space law, the U.S. led efforts to create measures to protect space.[123]

By this time, technology had advanced. The goalpost for space supremacy had moved. A new president took office. On April 12, 1961, the Soviet Union became the first country to put a human in space. Yuri Gagarin earned this historic title during his brief ride aboard the Vostok I. The U.S. fell further behind, but vowed to not only catch up, but surpass its rival. On May 5, 1961, Alan Shephard Jr. rode the Freedom 7 space capsule into orbit, making him the first American in space.[124] (No additional country would put a human in space until 2003, when China launched the Shenzhou V.) In a May 25, 1961, speech to Congress, President John F. Kennedy declared the U.S. commitment to putting a man on the Moon. "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth," he said, before requesting the millions of dollars necessary for space activities. "No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish."[125] The Apollo Project was born.

In the background, all was not well. It was October 1962. America, the Soviet Union, and now Cuba were at odds, and the rocket technology developed to put satellites and people into space now represented an existential threat for humanity. A Cuban

[122] "National Aeronautics and Space Administration (NASA)," Dwight D. Eisenhower Presidential Library.
[123] Rusek, Ben, "The Outer Space Treaty at a Glance," Arms Control Association, October 2020.
[124] "60 Years Ago: Alan Shepard Becomes the First American in Space," NASA, May 5, 2021.
[125] Kennedy, John F., "Address to Joint Session of Congress May 25, 1961," John F. Kennedy Presidential Library and Museum, May 25, 1961.

Missile Crisis dragged on for 13 days until Soviet leader Nikita Khrushchev announced that Soviet missiles would be removed from Cuba.[126] A soft and hard power win accompanied the sigh of relief, with the Kennedy administration increasing national security in the U.S. and displaying strength in international diplomacy. It would be decades until America and Russia would join forces on the ISS, but putting nuclear conflict aside allowed both nations to move forward on other goals.

The Apollo Project

The mission to put an American on the Moon primarily served a competitive purpose: the U.S. ambition to reclaim leadership in outer space from the Soviet Union. NASA harnessed scientific ingenuity from around the world toward this end, but ultimately only one flag would be planted on the Moon. Canadian contributions to the Apollo 11 mission include landing gear built by Héroux Aerospace, a heat shield developed by engineer Bryan Erb, and planning and design for the Eagle landing module by engineer Own Maynard.[127] Switzerland contributed to the scientific aspect of the mission, developing a sail to capture particles in solar wind.[128] Engineers from Britain,[129] Spain,[130] Australia,[131] and Germany[132] supported the Apollo program in different ways. (In hindsight, collaboration is not always positive: NASA's indiscriminatory recruitment enabled Nazi rocket engineer Wernher von Braun to join its ranks and make significant

[126] "The Cuban Missile Crisis, October 1962," Office of the Historian, Department of State.
[127] "A quick history of Canada on the Moon," Government of Canada, last modified April 18, 2023.
[128] Atmani, Mehdi, "Switzerland's role in the first moon landing," House of Switzerland, September 9, 2019.
[129] "The Brits who bolstered the Moon landings," *BBC*.
[130] Domínguez, Nuño, "The Spaniards who helped with the Moon landing," *El País*, July 19, 2019.
[131] "Australia and the first Moon landing," Australian Space Agency, July 18, 2019.
[132] Vartabedian, Ralph, "Who got America to the moon? An unlikely collaboration of Jewish and former Nazi scientists and engineers," *Los Angeles Times*, March 1, 2020.

contributions toward the Saturn V rocket that would bring men to the Moon.[133] For many, this controversial decision is a stain on the agency's Apollo story.)

On June 8, 1962, the U.S. and Soviet Union agreed to cooperate in outer space in four fields: sharing biomedical data, communications satellites experiments, sharing weather satellite images, and geomagnetic mapping.[134] "Early on, representatives of the two nations agreed to limit work to that which may be characterized primarily as data exchange or even coordinated observation–rather than designing or building instruments together, they agreed simply to share limited amounts of information," John Krige writes in *NASA in the World.*[135] It was not always a harmonious coordination of efforts: NASA administrator Hugh Dryden criticized Soviet withholding of data, one directional satellite communication, and general lack of responsiveness from Soviet counterparts. On March 18, 1965, the Soviet Union accomplished another first in outer space: Alexei Leonov conducted the first extravehicular activity (EVA) with a 12 minute, 9 second spacewalk. Later that spring, NASA's Gemini Program would demonstrate the U.S. capability to do an EVA as well.

The Apollo Program ran from 1962 to 1972 and included 11 crewed missions, six of which targeted the Moon.[136] In total, 12 American men walked on the Moon.[137] According to NASA, the Apollo Program's goals included:

- "Establishing the technology to meet other national interests in space.
- Achieving preeminence in space for the United States.

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[133] de la Garza, Alejandro, "How Historians Are Reckoning With the Former Nazi Who Launched America's Space Program," *Time*, July 18, 2019.
[134] Krige, John, Angelina Long Callahan, and Ashok Maharaj, *NASA in the World* (New York: Palgrave Macmillan, 2013).
[135] Krige, Callahan, and Maharaj, *NASA in the World,* 129.
[136] "The Apollo Program," NASA.
[137] Hollinghan, Richard, "Apollo in 50 numbers: The workers," *BBC*, June 19, 2019.

- Carrying out a program of scientific exploration of the Moon.
- Developing human capability to work in the lunar environment."

Two U.S.-centric goals and two goals for the benefit of humanity propelled the $25 billion endeavor. Before Apollo 11, achievements of the program included Apollo 7's first live TV broadcast of Americans in outer space, Apollo 8's Earthrise photo, Apollo 9's test of a crewed lunar module, and Apollo 10's orbit of the Moon. Apollo 11 launched on July 16, 1969, with three astronauts on board and a mission to finally put a man on the Moon. On July 20, Neil Armstrong and Buzz Aldrin undocked the lunar module, Eagle, and began descending to the Moon. The Eagle landed in the Sea of Tranquility, or Mare Tranquillitatis in Latin, a site chosen for its lack of large craters and radar access.[138] Armstrong, then Aldrin, stepped onto the Moon. About 650 million people watched the TV broadcast of this moment, when Armstrong stated, "One small step for a man, one giant leap for mankind."[139] In the next 24 hours, these words would appear on front pages and TV broadcasts around the world. On July 21, 1969, the *Guardian* led with, "Armstrong and Aldrin steer Eagle to a perfect touchdown."[140] "Men Walk on Moon," wrote *The New York Times.* For the *St. Petersburg Times*, it was, "Moon, We're Onto You." Papers in Australia, France, Italy, New Zealand, the Soviet Union, Vietnam, and beyond printed their own take on the news. For most, this meant big word, all caps, splashed across the top of the front page. For the Soviet newspaper *Izvestia*, this involved putting the Moon landing below the fold on page one.[141]

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[138] Moore, Patrick, "A guide to the Moon's Mare Tranquillitatis," *BBC: Sky at Night Magazine*, August 4, 2021.
[139] "The Apollo Program," NASA.
[140] Trott, Jan, "Man walks on the moon: 21 July 1969," *The Guardian*, July 19, 2019.
[141] McFall-Johnsen, Morgan, "Newspaper front pages from 50 years ago reveal how the world reacted to the Apollo 11 moon landing," *Business Insider*, July 20, 2019.

From the Moon, Armstrong and Aldrin spoke with President Nixon. They planted an American flag and posed beside it for a TV broadcast. Along with the stars and stripes, Armstrong and Aldrin left behind a silicon disk containing a variety of messages from 73 countries. (This disk "provides a perfect snapshot of the internal contradictions of Apollo 11 and the missions that followed," Ken Liu wrote in an Essay for *The New York Times*.[142] This "snapshot" showed which U.S. allies prioritized congratulating NASA; which countries wanted to tout their own accomplishments; and which countries wanted to present an image of freedom and peace, while often restricting those rights at home.) The two men spent 21 hours, 36 minutes total on the Moon, with more than two and a half hours of it spent outside the Eagle.[143] Crucially, they safely left the Moon, reconnected with the Columbia command and service module operated by Michael Collins, and returned to Earth. On July 24, 1969, Apollo 11 splashed into the Pacific Ocean. After three weeks in quarantine, the astronauts reunited with their families and began a tour around the world.

On November 24, 1969, Apollo 12 brought a second set of Americans to the Moon. Charles Conrad and Alan Bean conducted two extravehicular activities (EVA) during which they collected lunar samples, took photographs, walked around and inside craters, and retrieved pieces of the Surveyor III spacecraft.[144] 1970 passed without any Moon landings. (This was not for lack of trying; launched on April 11, 1970, the Apollo 13 mission quickly pivoted from an attempted lunar landing to a rescue mission after an oxygen tank exploded on board.) NASA orchestrated four additional lunar landings:

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[142] Liu, Ken, "Messages on the Moon From a World Turned Upside Down," *The New York Times*, July 1, 2019.
[143] Loff, Sarah A., "Apollo 11 Mission Overview," NASA, April 17, 2015.
[144] "Apollo 12: The Pinpoint Mission," NASA, July 8, 2009.

Apollo 14 in February 1971, Apollo 15 in August 1971, Apollo 16 April 1972, and Apollo 17 in December 1972. This last lunar landing saw the first scientist-astronaut on the Moon's surface, as well as the last humans present on a celestial body.

Space supremacy established, what would come next for the U.S.? Outwardly, it demonstrated an eagerness to keep the momentum, with the rest of the world by its side. "Of all of man's great enterprises, none lends itself more logically or more compellingly to international cooperation than the venture into space," President Richard Nixon told the UN General Assembly on September 18, 1969.[145] Nixon said the journey to the Moon was "not an end, but the beginning" of discoveries in outer space, and that "it is only right that we should share both the adventures and the benefits of space." Propelled by this message, NASA Administrator Thomas Paine met with counterparts in Germany, France, the UK, Japan, Canada, and Australia. He invited each to contribute researchers and money to America's space program, in exchange for access to data, technology, and space facilities. Potential partners faced costs as well, including investing in NASA projects that would not benefit them, less power to influence research decisions, and unequal exchange of technology and personnel. Ultimately, the U.S. held the power. States had a choice between "independence along with technological obsolescence, or cooperation at the risk of domination," observe John Krige, Angelina Long Callahan, and Ashoke Maharaj.[146]

Recognizing their insufficient independent resources and expertise, European countries chose collaboration with the U.S. during this decade over trying to forge

[145] "1755th Plenary Meeting of General Assembly: 24th Session - Part 2," UN Audiovisual Library, September 18, 1969. Time: 23:50.
[146] Krige, Callahan, and Maharaj, *NASA in the World,* 71.

forward alone.[147] In November 1965, France became the third country to successfully launch a satellite on its own rocket. (In February 1970, Japan became fourth, and two months later, China was fifth.) In 1971, the European Space Research Organization (ESRO), a group committed to science, became the European Space Agency (ESA), a group committed to satellites. The ESA headquarters is located in Paris. Its 17 member states include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. The ESA has fostered a robust, if asymmetric, partnership with the U.S. over the decades.[148] Meanwhile, collaboration between U.S. and Soviet researchers deepened during this period. In 1971, NASA's George Low and Arnold Frutkin met with then-U.S. National Security Advisor Henry Kissinger about collaborating with the Soviet Union on a test mission. "As long as you stick to space," Kissinger is quoted as saying, "do anything you want."[149] Negotiation commenced. On January 21, 1971, the two countries signed the U.S.-USSR Science and Applications Agreement. 1972's U. S.-Soviet Agreements on Cooperation in Space Exploration and in Science and Technology sought to fulfill the goals from the 1971 agreement and position both countries for joint ventures in space and research sharing on Earth. "The competition of the early Cold War gave way to détente, and a cautiously cooperative climate shaped the character of NASA-Soviet programs in the 1970s and early 1980s," Krige writes.[150]

With several Moon landings behind it, what should become of NASA and its fleet of space shuttles, equipment, and scientists? This question vexed administrations.

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[147] Johnson-Freese, *Space as a Strategic Asset,* 171.
[148] Johnson-Freese, *Space as a Strategic Asset,* 174.
[149] Krige, Callahan, and Maharaj, *NASA in the World,* 132.
[150] Krige, Callahan, and Maharaj, *NASA in the World,* 133.

Quickly, the U.S. commitment to space, and its supremacy in this realm, became more symbolic than real.[151] Funding shifted away from civilian use of outer space and toward military space projects. "[W]hen the policy of beating the Russians changed, and the reason for the programs vanished, so too did NASA's reasons for being," Johnson-Freese writes.[152] The Post Apollo Program (PAP) focused on building a space shuttle to carry materials to a not-yet-existent space station. This International Space Station (ISS) required partners to get going and keep going. When approached to join the ISS, the ESA negotiated to get more voting power and more access to the commercial benefits of space. In 1988, Europe joined the U.S., Japan, and Canada in signing an intergovernmental agreement that cemented their partnership in the space station. After the Soviet Union collapsed, NASA in 1993 named Russia as a partner in the endeavor as well. Since then, Russia has sent more astronauts to the ISS than any country beside the U.S. Cosmonauts from this country manage the Russian Orbital Segment (ROS) of the ISS, which is responsible for the station's guidance, navigation, and control.

In 2004, President George W. Bush re-committed America to its lunar ambitions. Goals included finishing assembling the ISS; developing, testing, and conducting the first manned mission on the Crew Exploration Vehicle by 2014; and bringing humans back to the Moon by 2020. Returning to the Moon would set the stage for human missions to Mars and beyond, Bush claimed. He invited other states to join the U.S. in what he called "this new era of discovery." "The vision I outline today is a journey, not a race, and I call on other nations to join us on this journey, in a spirit of cooperation and friendship," he said. Exploration is a hard sell, Johnson-Freese notes, and funds to support Bush's

[151] Johnson-Freese, *Space as a Strategic Asset,* 51.
[152] Johnson-Freese, *Space as a Strategic Asset,* 58.

mission emerged slowly.[153] The Bush administration found other priorities. Writing in 2007, Johnson-Freese notes potential drawbacks to this shift. "Letting go of its leadership in manned space might be tolerable under some circumstances, but not now," she writes. "Currently, the United States is considering forfeiting an area that has long yielded soft power when soft power is most needed. At the same time, the United States is building its military space capabilities in ways perceived threating to friends and foes alike."[154]

As the U.S. withdrew, private industry and other countries found new steam in outer space. Such activities, which support intelligence and international security, financial activities, and communications, are seen as critical for states to maintain their sovereignty. In the U.S., SpaceX, Virgin Galactic, and Blue Origin pioneered private spaceflight starting in the early 2000s. Among those, SpaceX would prove integral to NASA. Outside the U.S., commercial aerospace endeavors took longer to emerge. In the early 2000s, Germany and France were working to improve their satellite technology. Japan developed an Information Gathering Satellite (IGS) system.[155] In 2014, German company Airbus and French company Safran approached ESA with a proposal to together develop the Ariane 6 heavy-lift launcher. This joint venture led to the creation of ArianeGroup, Europe's most productive private spaceflight company. Italian company Avio has also enjoyed successful launches.

In 2003, China committed to developing an unmanned lunar exploration program, then proposed a manned one the following year. China's original timeline would put a man on the Moon in 2017, before the projected return goal of the U.S. (This was not to

[153] Johnson-Freese, *Space as a Strategic Asset*, 79.
[154] Johnson-Freese, *Space as a Strategic Asset*, 81.
[155] Johnson-Freese, *Space as a Strategic Asset*, 185.

be, for either country.) In 2006, U.S. National Security Council Acting Senior Director Dennis Wilder discussed the potential for cooperation in those shared goals. NASA Administrator Mike Griffin would visit China, he said, to talk about lunar exploration and space policies that would make operating in that realm safer for all parties.[156] Two Chinese state-owned corporations fueled this progress: China Aerospace Science & Industry Corporation Limited (CASIC) and China Aerospace Science and Technology Corporation (CASC). China's commercial space program gain significant momentum after President Xi Jinping took office and, in 2014, issued Document 60. In July 2019, i-Space became the country's first private company to enter orbit. China is now home to more than 300 private aerospace companies. These companies focus on the less glamorous, smaller parts of spaceflight. They are financially supported by the state. "To a large extent, China is following the same blueprint drawn up by the US: using government contracts and subsidies to give these companies a foot up," Neel V. Patel writes for the *MIT Technology Review*.[157] Both countries are using their own interpretations of international law to support such activities. The next section explores the most prominent laws in this domain.

Outer Space Legislation

In 1963, the UN General Assembly unanimously approved the first major treaty pertaining to out space. Resolution 1962 (XVII) "Declaration of Legal Principles

[156] "Press Briefing by Deputy National Security Advisor Faryar Shirzad and National Security Council Acting Senior Director Dennis Wilder on the President's Meetings with President Hu of the People's Republic of China," President George W. Bush, Office of the Press Secretary, April 20, 2006.
[157] Patel, Neel V., "China's surging private space industry is out to challenge the US," *MIT Technology Review*, January 21, 2021.

Governing the Activities of States in the Exploration and Use of Outer Space" established nine principles for the use of outer space, including that such use must be conducted for the "benefit and interests of all mankind," that all states have equal right to explore space and celestial bodies, that states may not make claims of sovereignty on space and celestial bodies, and that activities in space follow international law.[158] Of particular interest is Principle 6, which says: "In the exploration and use of outer space, States shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space with due regard for the corresponding interest of other States." General guidance is provided for circumstances when a state thinks its actions or ones taken, or planned, by another state could interfere with the peaceful exploration of space. In his *Notes and Comments* on this resolution, James Simsarian highlights the disagreement between the U.S. and Soviet Union over whether states should be the only bodies to conduct activities in space.[159] This was addressed in Principle 5, which made states responsible for activities in space that are carried out by their governments or non-governmental groups. A similar share of responsibility is passed to international organizations, and the states that participate in them, when they conduct activities in outer space. Simsarian also notes the Soviet Union's efforts to prohibit using artificial satellites to gather intelligence about foreign states – a proposal that the U.S. opposed.

Two other UN resolutions helped lay the groundwork for what would later become the Outer Space Treaty. In December 1963, UN Resolution 1963 (XVIII) "International co-operation in the peaceful use of space" re-enforced the importance of

[158] "Declaration of Legal Principles Governing the Activities of State sin the Exploration and Use of Outer Space," United Nations, 1962.
[159] Simsarian, James, "Outer Space Co-Operation in the United Nations in 1963," *American Journal of International Law* 57, no. 4 (1964).

studying and forming legal principles around liability for damage caused by space activities and mutual assistance regarding astronauts and space vehicles. In October 1963, UN Resolution 1884 (XVIII) "Question of general and complete disarmament" sought to "prevent the spread of the arms race to outer space"[160] by calling on states to not put objects carrying nuclear weapons or other kinds of weapons of mass destruction into Earth's orbit, on celestial bodies, or stationed in outer space in any other way.

Outer Space Treaty

Echoes of these earlier agreements appear in UN Resolution 2222 (XXI) "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies."[161] Also known as the Outer Space Treaty (OTS), this agreement establishes that outer space is the "province of all mankind" and that activities and exploration in it should be done for the benefit of all countries; that outer space cannot be subject to claims of sovereignty; that states may not put nuclear weapons or other weapons of mass destruction in orbit; that the Moon and other celestial bodies most be used for peaceful purposes only; that states are liable for damage their space objects cause; and that states must attempt to avoid contaminating outer space. Article I notes the importance of freedom of scientific investigation on the Moon and that states should encourage international cooperation in that realm.

Relating to the use of the Moon for peaceful purposes, Article IV prohibits states from building military bases, testing weapons, or conducting military maneuvers on

[160] "Question of general and complete disarmament," United Nations, 1961.
[161] "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," United Nations, 1966.

celestial bodies. It allows military personnel to conduct the scientific investigations on the Moon. Liability for activities performed by international organizations falls to the organization and states participating in it. States are required to undertake international consultation if they believe their activities on the Moon, or activities being performed by other states, could cause harm. "All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other State Parties to the Treaty on a basis of reciprocity," the treaty says. Such accommodations require advance notice, to ensure safety and avoid interfering with ongoing activities.

In December 1966, the UN General Assembly endorsed the treaty. States began adding their names in January 1967 and it entered into force that October. More than 100 countries are parties to this treaty, including Panama and Croatia newly coming on board in 2023. Over the decades, the Outer Space Treaty has been deemed "the backbone for space law,"[162] "remarkably successful,"[163] and "a failure."[164] In the *Journal of Air Law and Commerce*, Paul G. Dembling and Daniel M Arons called it a "remarkable endeavor of great significance to internal law and politics."[165] No matter one's assessment of the treaty's track record, it must be noted that the OTS does not stand alone.

[162] Grush, Loren, "How an international treaty signed 50 years ago became the backbone for space law," *The Verge*, January 27, 2017.
[163] Stuart, Jill, "The Outer Space Treaty has been remarkably successful – but is it fit for the modern age?" *The Conversation*, January 27, 2017.
[164] Roberds, E.H.J., "Failure of the Outer Space Treaty," Canadian Forces College, 2016.
[165] Dembling, Paul G., and Daniel M. Arons, "The Evolution of the. Outer Space Treaty," *Journal of Air Law and Commerce* 33 (1967).

Rescue, Liability, and Registration

Three other treaties from this period were critical to shaping the outer space legal regime.[166] The "Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched in Outer Space," also known as the Rescue Agreement, requires states to do whatever they can to rescue astronauts in distress and bring them back to their home state.[167] This has special relevance for the forthcoming lunar efforts, which also pledge to help astronauts in distress. The Rescue Agreement also requires that states recover and return space objects that land on Earth outside the launching state's territory. This treaty entered into force in December 1968.

The "Convention on International Liability for Damage Caused by Space Objects," or Liability Convention, holds states responsible for their space objects by making them pay for any damage those objects cause while on Earth or in outer space. It outlines settlement procedures should such damage occur. This treaty entered into force in December 1972. The "Convention on Registration of Objects Launched into Outer Space," or Registration Convention, builds on the Outer Space Treaty, Rescue Agreement, and Liability Convention by giving states a way to identify which state is responsible for which space objects. Any such object would need to be registered with the UN Secretary-General. This treaty entered into force in September 1976.

Together, these four treaties "reduced both uncertainty and risk," according to Susan Buck.[168] "Issues of sovereignty and acquisition of resources were largely answered, and concerns about damages caused by launched material both in space and on

[166] Buck, Susan J. *The Global Commons: An Introduction*. Island Press: Washington DC, 1998.
[167] "Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space," United Nations Office for Outer Space Affairs, 1967.
[168] Buck, *The Global Commons: An Introduction*, 147.

Earth were quieted," she writes. One further treaty would emerge to clarify how such resource and territory questions could apply to Earth's greatest satellite.

The Moon Agreement

In 1959, the American Bar Association declared, "celestial bodies should not be subject to exclusive appropriation,"[169] and the UN Ad Hoc Committee on the Peaceful Use of Outer Space cautioned, "serious problems could arise if States claimed, on one ground or another, exclusive rights over all or part of a celestial body." In 1979, the Moon Agreement codified these notions by stating that the Moon was the common heritage of mankind and that resources extracted from it should be shared equitably.

The "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies," or the Moon Agreement, builds on the ideas established in the Outer Space Treaty. It took seven years (1970 – 1979) for this treaty to take shape and get adopted in the UN, and another five years for it to enter into force. Work on this treaty could hardly have been timelier. The eighth session of the UN's Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS), focused on establishing rules for activities on the Moon and other celestial bodies, convened on June 9, 1969. This was just six weeks before the U.S. would become the first country to land on the Moon. Argentina, Poland, and France called the group together and, in 1970, Argentina shared a draft agreement. This was not taken up at the time, and matters relating to human activity on the Moon and celestial bodies remained in subcommittee until 1971,

[169] Lipson, Leon, and Nichols Deb. Katzenbach, "Report to the National Aeronautics and Space Administration on the Law of Outer Space," American Bar Foundation, 1961.

when the Soviet Union shared a draft Moon treaty with the UN General Assembly. (By that time, three U.S. crews had stepped foot on the Moon.)

In November 1971, the General Assembly adopted a resolution tasking COPUOS with preparing a treaty for activities on the Moon. Progress was slow, with issues arising around resource exploitation, information-sharing regarding activities on the moon, and the scope of the treaty.[170] The Austrian delegation took charge on breaking this impasse with a draft proposal that could bring all parties closer to a consensus. The draft was considered in committee, amendments and clarifications added. In 1979, the General Assembly adopted resolution 24/68 without a vote and opened it for signature and ratification. International response was underwhelming. The U.S. abstained, as did the Soviet Union. By 1984, enough states had signed on for the treaty to take effect.

To date, 18 states have joined as parties and four more as signatories.[171] None are major spacefaring nations. (The number of Moon Agreement supporters will soon drop to 17: Saudi Arabia is in the process of withdrawing from the treaty, after deciding instead to support commercial endeavors on the Moon.) Buck notes how the Moon Agreement "struck a precarious balance, prohibiting appropriation of 'natural resources in place' … while retaining the possibility of appropriation of resources that had been moved, such as, mined ore."[172] This balance appears increasingly unstable as more states make way for all-out exploitation of Moon resources. One major move in that direction came from the U.S. during the Obama Administration.

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[170] "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies," United Nations Audiovisual Library of International Law, 2021.
[171] Marboe, Irmgard, "What, if any, relevance does the Moon Agreement have to activities in space today?" Perry World House, 2021.
[172] Buck, *The Global Commons: An Introduction,* 152.

U.S. Commercial Space Launch Competitiveness Act (CSLCA)

U.S. activity in space has changed drastically in recent decades. In November 2015, Congress facilitated part of this shift by passing the CSLCA, also known as the "Spurring Private Aerospace Competitiveness and Entrepreneurship Act of 2015" or SPACE Act. This legislation sought to expand exploration and resource extraction from space, while removing hurdles for industry. Title IV – Space Resource Utilization and Extraction details which space resources (water and minerals) could be extracted by American citizens and companies.[173] It also prohibits claims of territorial sovereignty on celestial bodies. Therefore, any extracted resources, but not the territory on which they were found, would become property of their extractor. A company can find, mine, and take minerals home from the Moon. It cannot claim any Moon territory as its own.

Reactions were mixed. "The CSLCA was met with exuberance by the commercial space sector, but many scholars declared that the legislation was a violation of international space law," P.J. Blount and Christian J. Robison wrote about it.[174] For businesses, the CSLCA created an exciting and potentially massive new resource stream. The number of space launches increased, as did revenue generated by commercial space launchers.[175] As of 2021, the most recent year such data is available, FAA license requests showed a continued upward trajectory. But was it legal? Or was the U.S. again acting only in the interest of the U.S.? Scholars grappled over contrasting interpretations of the Outer Space Treaty's Article II, which says that outer space "is not subject to

[173]"U.S. Commercial Space Launch Competitiveness Act," 114th Congress, November 25, 2015.
[174]Blount, P.J., and Christian J. Robison, "One Small Step: The Impact of the U.S. Commercial Space Launch Competitiveness Act of 2015 on the Exploitation of Resources in Outer Space," *North Carolina Journal of Law and Technology* 18 (2016).
[175] Krause, Heather, "Testimony Before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives," United States Government Accountability Office, June 16, 2021.

national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." Blount and Robison argue that critics who claim the CSLCA violates the Outer Space Treaty are applying a rigid lens to a loose text. What matters most is the way states choose to interpret and act in response to the CSLCA, according to Blount and Robison. "Unless States reject the interpretation, the howls of 'illegality' coming from numerous academics will be like trees falling in empty woods," they write.[176]

Many such howls went unheard or unheeded: the subsequent U.S. administration doubled down on principles proposed in the CSLCA, while other states such as Luxembourg[177] and the United Arab Emirates[178] followed America's example by proposing their own national frameworks to commercialize outer space. Not everyone was on board. An April 2016 meeting of UN COPUOS heard some concerns on this subject: "The view was expressed that regulations associated with the commercialization of outer space should not be promoted, as outer space was the heritage of humankind and belonged to all States on an equal footing."[179] Promoted or not, such laws have proliferated in the eight years since the CSLCA passing. The next chapter will explore how humanity's venture into its most distant "common heritage" could bring states together or divide them further.

[176] Blount and Robison, "One Small Step," 181.
[177] "Luxembourg sets out to conquer space," *Financial Times* Partner Content, Luxinnovation.
[178] Barnard, Lucy, "UAE to finalise space laws soon," *The National*, March 6, 2016.
[179] "Report of the Legal Subcommittee on its fifty-fifth session, held in Vienna from 4 to 15 April 2016," United Nations Office for Outer Space Affairs, 2016.

Chapter V.

Back to the Moon!

It was July 20, 2019. Fifty years after Apollo 11 made Armstrong and Aldrin the first-ever men on the Moon, the world's media and museums reflected on that momentous day. In Cambridge, Massachusetts, the Broad Institute hosted a special Moon exhibit, which featured a timeline of the Apollo Program, a giant Moon hanging from the ceiling, and a lunar lander simulation. Participations could try their best at bring the Eagle to a safe rest in the Sea of Tranquility. (Despite her most enthusiastic efforts, this author failed – twice.) In Dorchester, thousands braved the scorching July heat to visit the JFK Library and Museum, which had been decked out inside and out in special Moon décor. Astronauts, artists, and historians shared their reflections on the mission that would make Americans the first ever humans to touch a celestial body.

President Donald J. Trump marked this anniversary by committing the country to a new mission: America would return to the Moon and then go on to Mars. This built on remarks he made at the December 2017 signing ceremony for Space Policy Directive – 1. ("This directive will ensure America's space program once again leads and inspires all of humanity," Trump said at that time, dispelling any uncertainty about whether this was a space supremacy issue.[180]) When it comes to the rockets, launch site, personnel, and other resources needed for America's mission to the Moon and beyond, "we'll be doing it ourselves," the president said.[181] He and NASA Administrator Jim Bridenstine discussed

[180] "Remarks By President Trump and Vice President Pence at Signing Ceremony for Space Policy Directive – 1," Trump White House Archives, December 11, 2017.
[181] "Remarks by President Trump Commemorating the 50th Anniversary of the Apollo 11 Moon Landing," Trump White House Archives, July 19, 2019.

the logistics of getting to Mars and why the Moon is a useful proving ground for longer term travel in space. The millions of tons of water ice on the Moon would provide life support and rocket fuel for the space shuttle, according to Bridenstine, while a Moon base would provide a bridge to a Gateway space station that could bring people to Mars.

At several points during his July 2019 speech, the president emphasized how space supremacy strengthens defense. "We're going to be doing the Space Force," Trump shared about the military branch that now oversees U.S. and ally interests in outer space. For Bridenstine's part, he noted the symbiotic relationship NASA and the Department of Defense share: "So there's a lot of back and forth between what NASA does for science and technology and what the Department of Defense does for the national security interests of the country." By developing and launching a Space Force, according to Bridenstine, the U.S. would enjoy more opportunities to safely explore outer space.

Safety on Earth became a hurdle for all of humanity in the months after this program was launched. As the COVID-19 pandemic spread across the globe, shuttering industries and killing millions, space programs already deep into the planning stages pivoted slightly to accommodate the new viral threat. In some ways, NASA was uniquely prepared: Since 1971, it had been standard practice for astronauts endure a two-week quarantine before beginning a journey to space.[182] Ground teams, families, media, and other interested parties shifted their participation – as seen when a launch scheduled for April 9, 2020, took off as planned, with fewer people present for launch day and shifts set up to minimize contact between crews. That July, NASA sent the Perseverance Rover to Mars. Closing out the year, Bridenstine shared, "By putting the health and safety of the

[182] Strickland, Ashley, "NASA astronaut launches stop for nothing – not even a pandemic. Here's how they did it," *CNN*, March 4, 2021.

NASA team first, we've been able to safely navigate the challenges of COVID-19 and keep our missions moving forward as much as possible."[183] Other space agencies kept things moving in 2020 as well: CSNA sent Chang'e 5 to the Moon to collect lunar samples, the first mission of this type since the 1970s; JAXA brought asteroid samples back to Earth; and the United Arab Emirates kicked off its uncrewed mission to Mars. Policy developments that year established the conditions studied in this thesis.

The upcoming section will explore two major initiatives to build a permanent presence on the Moon. The section on the U.S. and its allies will begin by introducing the Artemis Accords of 2020 and following their path toward today and beyond. It will look at domestic conditions that could accelerate progress, change that path's direction, or stop it altogether. The section on China and Russia will begin with a look at their plan. The same treatment will be applied toward geopolitical conditions. This section will conclude by comparing and contrasting the two plans, with a look toward how they could impact the future of the Moon.

America and its allies

On April 6, 2020, the Trump Administration signed the "Encouraging International Support for the Recovery and Use of Space Resources" executive order, paving the way for the commercial use of space.[184] It states America's position on extracting resources from celestial bodies, its commitment to the Outer Space Treaty, and its openness to collaborating with other countries. It reinforces the U.S. rejection of the

[183] "NASA Perseveres Through Pandemic, Looks Ahead in 2021," NASA.
[184] "President Donald J. Trump is Encouraging International Support for the Recovery and Use of Space Resources," Trump White House Archives, April 2020.

Moon Agreement, and states, “Outer space is a legally and physically unique domain of human activity, and the United States does not view space as a global common.”

Artemis Accords

By that point, the Artemis Accords were in the works and in the news. The twin sister of Apollo, Artemis is Greek mythology’s goddess of wild animals and the hunt. In space policy, she represents a collaboration of state and commercial powers; the addition of women and people of color to the list of humans who’ve walked on the Moon; and the early planning to bring a manned mission to Mars. Also known as “Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes,” the Artemis Accords are a non-binding set of guidelines for space exploration led by NASA and the U.S. Department of State. They were finalized on October 13, 2020. “Artemis will be the broadest and most diverse international human space exploration program in history, and the Artemis Accords are the vehicle that will establish this singular global coalition,” Bridenstine said in a news release.[185] Australia, Canada, Italy, Japan, Luxembourg, United Arab Emirates, and United Kingdom joined the U.S. as founding members. As of January 2024, it has 34 signatories, including: the original eight countries, Angola, Argentina, Bahrain, Belgium, Brazil, Bulgaria, Colombia, Czech Republic, Ecuador, France, Germany, Iceland, India, Israel, Mexico, Netherlands, New Zealand, Nigeria, Poland, Romania, Rwanda, Saudi Arabia, Singapore, South Korea, Spain, and Ukraine. Artemis Accords signatories convened for their first in-person meeting on September 19, 2022. In Paris, representatives from the then-21

[185] “NASA, International Partners Advance Cooperation with First Signings of Artemis Accords,” NASA, October 13, 2020.

signatory countries met each other, shared their interests and next steps, and worked to translate the Accords' lofty, sometimes vague principles into clear rules.[186]

The accords have 10 core principles:

1. Peaceful purposes
2. Transparency
3. Interoperability
4. Emergency assistance
5. Registration of space objects
6. Release of scientific data
7. Protecting heritage
8. Space resources
9. Deconfliction of activities
10. Orbital debris and spacecraft disposal

In short, the Artemis Accords outline how states will work together and individually on sustainable, transparent, and peaceful use of outer space. They apply to each state's civil space agency. "The principles in the Artemis Accords were really inspired by the missions that NASA and their international partners want to do on the Moon and then onwards to Mars," said Gabriel Swiney, State Department Attorney Adviser.[187] "On the policy side, we ask ourselves: What are the new things that are going to be happening? What is humanity doing in space that we haven't done before? And what are the legal and policy questions we need to answer before those things actually

[186] Foust, Jeff, "Artemis Accords signatories hold first meeting," *SpaceNews*, September 21, 2022.
[187] "Artemis Accords," U.S. Department of State.

happen?" The accords ground themselves within existing outer space governance, such as the Outer Space Treaty, the Rescue and Return Agreement, the Liability Convention, and the Registration Convention. The embraces UN COPOUS as a forum for cooperation and governance of outer space.

The accords call for building the Artemis Base Camp on the Moon's south pole and the Gateway space station in the Moon's orbit. The base camp will give astronauts a home and an office on the Moon. It will take several missions to set this up. The result: a fixed habitat where up to four astronauts at a time can live for up to a month.[188] Before manned missions go to the Moon, an uncrewed Volatiles Investigating Polar Exploration Rover (VIPER) will scope out the region's available ice. The Gateway space stations will be a 40-ton ship consisting of modules for communications, service, and connecting, and airlock, an operations area, and living quarters. "Like a mountain refuge, it will provide shelter and a place to stock up on supplies for astronauts en route to more distant destinations," ESA writes.[189] It will also give astronauts a place to test technologies that might be trickier to experiment with closer to Earth, where gravity could interfere.

The above efforts will occur over the course of several missions:

- Artemis I: From Nov. 16, 2022, through Dec. 11, 2022, NASA's Space Launch System (SLS) super-heavy-lift rocket propelled the uncrewed Orion spacecraft around the Moon and back to Earth. It conducted two lunar flybys. It came within 80 miles of the Moon's surface.[190]

[188] "Lunar Living: NASA's Artemis Base Camp Concept," NASA, October 28, 2020.
[189] "Gateway," European Space Agency.
[190] Ridgeway, Beth, "Splashdown! NASA's Orion Returns to Earth After Historic Moon Mission," NASA, December 11, 2022.

- Artemis II: This mission will welcome a crew of four above the Orion spacecraft and SLS rocket on another mission around the Moon. They will get as far as 4,600 miles beyond the Moon before beginning a four-day return trip to Earth. Artemis II is scheduled to launch no earlier than November 2024.
- Artemis III: In the words of the ESA: "The third mission is what it is all about: landing astronauts on the Moon."[191] Again, four astronauts will exit Earth's orbit aboard an Orion spacecraft propelled by an SLS rocket. Two astronauts will travel to the lunar surface, while two remain within Orion. They will spend six days on the Moon before returning to the Orion, and eventually back to Earth. This mission is scheduled for December 2025.
- Artemis IV: In addition to delivering two more astronauts to the Moon's surface, this mission will involve transporting the International Habitat Module (I-Hab) to the lunar Gateway. This is a key step in setting up living quarters on the space station, which is scheduled to launch in November 2025. Two astronauts will spend six days exploring the Moon. The other two astronauts will spend this time working on the I-Hab. This mission is scheduled for September 2028.
- Artemis V: Two more astronauts to the Moon, one more piece of Gateway.[192] This mission is scheduled for September 2029.
- Artemis VI – X: Details are not yet available regarding these proposed Artemis missions.

[191] "Artemis III," European Space Agency.
[192] "Artemis V," European Space Agency.

These missions represent collaborations between NASA and its international partners. Not since the Apollo Program has NASA built a rocket like the SLS to bring astronauts and cargo to the Moon. Consisting of a core stage, engines, rocket boosters, launch vehicle stage adapter, Orion stage adapter, and Interim Cryogenic Propulsion Stage, the SLS represents a major engineering feat. "With the largest payload mass and volume of any existing rocket, SLS represents greater safety, less risk, and increased probability of mission success in the dynamic, unforgiving environments of spaceflight," reads NASA's Space Launch System Reference Guide. "More mass and volume translate into fewer launches of fewer pieces requiring less assembly time in orbit."[193] NASA is working with contractors Boeing, Aerojet Rocketdyne, Northrop Grumman, Teledyne Brown Engineering, and United Launch Alliance to develop the SLS components.

The ESA is designing and developing Orion's service module. This crucial component of the spacecraft provides air, electricity, and propulsion. It represents the first collaboration between the ESA and NASA on a transportation vehicle for astronauts.[194] The German offices of multinational aerospace firm Airbus are the prime contractor for this service module, with subcontractor support from firms in Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Switzerland, and Sweden. ESA contributions to the Gateway spaceship are known as ESPRIT, short for European System Providing Refueling Infrastructure and Telecommunication.[195] This includes a communications module and connecting module. The HALO-Lunar Communication System (HLCS) uses computers, radio equipment, and antennas to

[193] "NASA's Space Launch System Reference Guide," NASA, 2022.
[194] "Orion European Service Module kit," European Space Agency.
[195] "Gateway: ESPRIT," The European Space Agency.

support video and voice transmissions from the Moon. The ESPRIT Refueling Module (ERM) transports cargo to Gateway, provides storage space once there, provides fuel to the Gateway's propulsion system, and gives astronauts a view of space and the Moon. With support from its Italian and British teams, French Thales Alenia Space is leading development of both ESPRIT components. German firm OHB is designing the unpressurized bits of the ERM. Japan's contributions to Gateway will include batteries for several parts of the spaceship and the Environmental Control and Life Support System (ECLSS), cameras, and the thermal control system for the I-HAB module.[196]

A Western Moon regime

While the Artemis Accords repeatedly and explicitly embrace the Outer Space Treaty, several of their underlying principles reject the Moon Agreement. This creates a tension for Artemis signatories that are also parties to the Moon Agreement. This list is short, and includes Australia, France, India, Mexico, and the Netherlands.

Writing in the *Australia Journal of International Affairs*, Fabio Tronchetti and Hao Liu observes two areas where the treaties diverge, and how they could create challenges for Australia and other Moon Agreement members. First, the Moon Agreement represents a multilateral, cooperative effort to govern Moon activities, while the Artemis Accords result from "a regulatory initiative undertaken at domestic US level that reflects American interests and the foreign policy approach of the Trump Administration," Tronchetti and Liu write.[197] This is despite, the authors write, America's

[196] "NASA, Japan Announce Gateway Contributions, Space Station Extension," NASA, November 17, 2022.
[197] Tronchetti, Fabio, and Hao Liu, "Australia's signing of the Artemis Accords: a positive development or a controversial choice?" *Australian Journal of International Affairs* 75, no. 3 (June 1, 2021).

openness to accept signatories and supporters from around the world. Second, the treaties diverge regarding the use of Moon resources. The Moon Agreement emphasizes scientific purposes, and dictates that commercial endeavors require approval of the international community. The Artemis Accords are significantly more open to the commercialization of the Moon. Naturally, environmental protections provided by each treaty are inconsistent. While the Moon agreement supports minimal impact on the lunar surface, the Artemis Accords are more concerned with space debris and the deconfliction of research stations on the Moon. Tronchetti and Liu note the difficulty Australia and other states may face determining which treaty applies at which moment. "Australia might have to eventually assess whether permanence in the Moon Agreement is in its best interest or whether withdrawal should be evaluated," they write.[198]

A related challenge, explored more in the coming chapter, is the difference between the Moon regime established by the Artemis Accords and the one presented by China and Russia. "The biggest risk is you have two opposite set of rules," Malcolm Davis of the Australian Strategic Policy Institute told *Bloomberg*. "You could have a Chinese company on the moon in the 2030s claiming territory with a resource on it, in the same way the Chinese have claimed the entire South China Sea."[199]

China and its allies

Several states did not see their aims represented in the Artemis Accords. Some compared the endeavors to colonialism,[200] while others saw them as a way to bend

[198] Tronchetti and Hao, "Australia's signing," 249.
[199] Einhorn, Bruce, "China, US Are Racing to Make Billions From Mining the Moon's Minerals," *Bloomberg*, May 17, 2022.
[200] "Russia Compares Trump's Space Mining Order to Colonialism," *The Moscow Times*, April 7, 2020.

international law in a way that favors American interests. China, for its part, could not join the Artemis Accords even if it wanted to. Since 2011, the U.S. Congress's Wolf Amendment has prohibited NASA from using federal funding on efforts engaging with the Chinese government.[201] Exceptions require approval by Congress and the Federal Bureau of Investigations (FBI). For those who see potential benefits for U.S.-China cooperation in space, this regulation "undermines an international culture of multilateralism"[202] and has "created a wide opening for a challenger to rival NASA's historic leadership role in space exploration."[203] The U.S. cannot benefit from Chinese progress in space, and China cannot sign onto U.S.-led agreements. Shortly after Artemis Accords marked its first birthday, China revealed it had its own plans.

The ILRS

On March 9, 2021, China and Russian signed a memorandum of understanding committing to work together on the International Lunar Research Station (ILRS).[204] The two states would use their experience to build a roadmap for the Moon base, to collaborate on designing, developing, and implementing the project, and promoting the project to other spacefaring nations. The two countries would follow up in April 2021 with a joint statement[205] and an invitation to the international community to work with

[201] Whitford, George, "Trouble in the Stars: The Importance of US-China Bilateral Cooperation in Space," *Harvard International Review*, October 27, 2019.
[202] Whitford, "Trouble in the Stars."
[203] "10 Years of the Wolf Amendment: Assessing Effects and Outcomes," Secure World Foundation, December 9, 2021.
[204] "China and Russia sign a Memorandum of Understanding Regarding Cooperation for the Construction of the International Lunar Research Station," China National Space Administration, March 9, 2021.
[205] "Joint Statement Between CNSA And ROSCOSMOS Regarding Cooperation for the Construction of the International Lunar Research Station," China National Space Administration, April 29, 2021.

them on the ILRS.[206] In the joint statement, the project was described as "complex experimental research facilities" built with international partners on or in orbit of the Moon, for the purposes of scientific research, "including exploration and use of the Moon, moon-based observation, fundamental research experiments and technology verification, with the capability of long-term unmanned operation with the prospect of subsequent human presence." CNSA and Roscosmos welcomed any interested countries, companies, and other organizations to help out. "The CNSA and Roscosmos will promote extensive cooperation in the station for the development of human space science and technology and socio-economic progress," said CNSA deputy director Wu Yanhua.

In June 2021, China and Russia released their Guide for Partnership for an International Lunar Research Station.[207] This guide welcomes international partnership in the plan, implementation, operation, and research conducted at the Moon base. Alongside sections dedicated to conceptual designs and mission development, several sections outline cooperation opportunities and structure.

The above efforts will occur over the course of several phases:

1. Phase I (Reconnaissance): This involves learning about the Moon and selecting a site for the ILRS. Tests on landing technology will be conducted. Missions include CNSA's Chang'e 4, Chang'e 6, and Chang'e 7, and Roscosmos's Luna 25, Luna 26, and Luna 27. Phase I is scheduled for 2021 – 2025.
2. Phase II (Construction): This phase will be broken up into two stages, with the first dedicated to testing command center technology, retrieving lunar samples,

[206] "China, Russia welcome int'l partners in moon station cooperation," China National Space Administration, April 25, 2021.
[207] "International Lunar Research Station (ILRS) Guide for Partnership," China National Space Administration, June 6, 2021.

delivering cargo, and beginning joint operations. Missions include Chang'e8, Luna 28, and potential partner missions. The second stage will include building the ILRS facilities on the lunar surface and in orbit in order to conduct research-related goals. Missions include ILRS-1 through ILRS-5. Stage 1 is scheduled for 2026 – 2030. Stage 2 is scheduled for 2031 – 2035.

3. Phase III (Utilization): With an up and running ILRS, lunar research and exploration can commence. This is scheduled for after 2036.

The ILRS plan welcomes international partners to cooperate at different levels, identified by categories A, B, C, D, and E.[208] Category A: Space Mission Cooperation calls for the deepest involvement, including developing plans for and helping with the building of the ILRS. Category B: Space System Cooperation involves developing at least one ILRS system and participating in a Phase I mission. Category C: Subsystem Cooperation calls for working on a subsystem, like those use for navigation, communication, or handling scientific payloads. Countries that help with Category D: Equipment Cooperation will help meet mission or subsystem equipment needs, while those participating at Category E: Ground and Application Cooperation level will assist with data analysis and sharing. As of January 2024, eight countries support ILRS. They are China, Russia, Azerbaijan, Belarus, Pakistan, South Africa, United Arab Emirates, and Venezuela. One state signed on in September 2023, followed by three in October and another in December. "The number of recent announcements appears to reflect a plan to attract founding members," Andrew Jones wrote for *SpaceNews*.[209] In addition to states,

[208] "International Lunar Research Station (ILRS) Guide for Partnership," China National Space Administration, August 2021.
[209] Jones, Andrew, "China adds Belarus as partner for ILRS moon base," *SpaceNews*, October 23, 2023.

several companies and organizations support the ILRS, including the Asia-Pacific Space Cooperation Organization (APSCO), the International Lunar Observatory Association, nanoSPACE AG, and the National Astronomical Research Institute of Thailand.

It is worth noting that all information on this partnership and the accompanying project comes from the Chinese side. As of January 2024, Roscosmo's website is unavailable. Viewing it with the Wayback Machine reveals that the last updates were made in April 2021 to celebrate the anniversary of Yuri Gagarian's historic flight.

A Chinese Moon regime

China's space ambitions are not subject to the same political or financial restraints that NASA, the ESA, and Roscosmos face, according to Xiaodan Wu, a former member of the Chinese delegation to UN COPUOS. Such goals are "considered as the pride of the nation and a symbol of national strength,"[210] but that does not mean China can quickly launch all its lunar hopes and dreams. Achieving this will require soft and hard power improvements from China, according to Wu, including focusing on compliance with the international space regime, expanded cooperation, and improving its space legislation.

China is not prioritized within the existing space governance regime, according to Wu. "There are hundreds of cooperative agreements, protocols and memorandums between China and dozens of other countries," he writes, "but only a few of them are steady partners, and there is rarely special treatment or priority status on the Chinese side."[211] This dynamic creates a China that cannot enjoy the new space technology and political partnerships that come with being in the "international space club," despite its

[210] Wu, *China's Ambition in Space,* 31.
[211] Wu, *China's Ambition in Space,* 71.

participation in major regional and international conventions. (Chinese opacity around space policy does not help in this regard, according to Wu.) For example, China is a party to the Outer Space Treaty and a member of UN COPUOS. It participates in the Convention of the Asia-Pacific Space Cooperation Organization (ASPCO), the Forum on China-Africa Cooperation (FOCAC), and the Lancang-Mekong Spatial Information Exchange and Cooperation Center Project. China has partnered extensively with several spacefaring states, including Argentina, Brazil, France, Italy, and Russia. With the U.S., such cooperation is "torturous and minimal," according to Wu,[212] creating significant hurdles to being taken seriously and supported on the global stage.

China's Moon regime is one that looks inward for technology, human power, and innovation, and outward for political supporters. China touts the international bodies that it is party to, while claiming that its ILRS missions are more consistent with precedent than the Artemis ones being proposed by the U.S. and its partners. Like the U.S., China is not a party to the Moon Agreement. A newer actor in space and on the Moon, Chinese space law has some maturing to do, especially when it comes to regulating commercial actors. Wu writes: "The participation of unconventional space actors in China in response to the welcome policy signals and rapid development of space legislation in other states has magnified the inadequacy of China's regulatory framework and further built up the pressure and necessity of improving legislation."[213] Industry is a part of the ILRS plan. Chinese regulations will need to evolve to be successful and sustainable, even as the country criticizes rival commercialization policies as steps toward colonizing the Moon.

[212] Wu, *China's Ambition in Space,* 67.
[213] Wu, *China's Ambition in Space,* 116.

The Moon: A shared domain

If China and the U.S. are to be believed, their proposed Moon plans are diametrically opposed. Before exploring these perceived differences, a review of their similarities reveals: a common geographic destination (the Moon's south pole); shared openness to international partners; consistent, positive views on exploiting the Moon for mineral resources; shared plans to use the Moon as a bridge for deeper manned space exploration; similar timelines; and, most importantly, a common commitment to using this global commons domain for peaceful purposes. The Artemis Program is clearly led by one country, the U.S., while the ILRS is ostensibly led by two. (China is clearly the dominant partner.) Artemis is more explicit about the role of industry in its "peaceful" use of the Moon. The ILRS is much less transparent toward international audiences. Its partners are far fewer in number, at this stage, and do not include the same degree of technological and economic power that Artemis has recruited.

One key difference not articulated in the plans: the very different legacy of the relevant space programs. The U.S. brings to the Artemis Program decades of experience in space exploration and space law. When it comes to the Moon, the U.S. stands alone. This position gives Artemis soft and hard power that will be difficult for many countries to compete with. Those that don't compete may cooperate. Roscosmos likewise has decades of experience in space but does not enjoy the power of a NASA. China is newer to the superpower stage in general and the space race in particular. Speedy economic and technological growth cannot close certain gaps between the ILRS and Artemis plans.

The competing plans sparked competing commentary from their respective proponents. The top fear in the U.S.: China is concealing its true plans of occupying the

Moon and extracting its resources solely for Chinese benefit.[214] "Beijing will not be disposed to share the bounty that space has to offer," Mark R. Whittington wrote in *The Hill*. "It will use control of space resources to dominate the Earth." NASA Administrator Bill Nelson echoed these concerns, saying, "[W]e better watch out that they don't get to a place on the moon under the guise of scientific research."[215] For China's part, the idea of a U.S.-China competition in space is "meaningless."[216] It views Artemis as an attempt to maintain supremacy in the space arena. "Space observers also pointed out that as NASA is trying hard to relive its Apollo glories, China is working on innovative plans to carry out its own crewed moon landing missions," Deng Xiaoci wrote in the *Global Times*.[217] Harsh words aside, the two projects are continuing down similar paths and will meet on the Moon's south pole if they are executed fully. International relations theory helps us determine whether they will meet as competitors or allies.

[214] Whittington, Mark R., "Why China is fuming over NASA's Artemis program," *The Hill*, September 4, 2022.
[215] Bender, Bryan, "'We better watch out': NASA boss sounds alarm on Chinese moon ambitions," *Politico*, January 1, 2023.
[216] Jones, Andrew, "'We're in a space race.' NASA chief says US 'better watch out' for China's moon goals," *SpaceNews*, January 5, 2023.
[217] Xiaoci, Deng, "China's top space contractor CASC reveals new launch vehicle able to send Chinese to Moon by around 2030," *Global Times*, August 21, 2022.

Chapter VI.

Prediction and prescription for the Moon

Something unusual happened when Americans arrived on the Moon, according to Susan Buck. "In July 1969, humans first set foot on the Moon, and the event was hailed as a milestone in scientific exploration. However, especially interesting was what did not occur: the United States did not claim territorial sovereignty," she writes.[218] Buck asks why, when humans arrived at this an uninhabited land, this "truly virgin territory," did they resist the urge to call it their own?[219] She claims this transpired thanks to diligently applied principles of national sovereignty and airspace. There was precedence: Even when the Soviet Union became the first country to put a satellite in outer space, no country accused Sputnik of laying claim to Earth's LEO. Perhaps this same generosity of spirit could be applied to future international relations on the Moon.

Cooperation is practically the middle name of both the Artemis Accords and the ILRS plans. Both call for abundant cooperation on Earth, cooperation on the Moon, cooperation in the space in between and beyond. But what about cooperation between treaties? Is a bridge possible for rival states proposing rival research stations, when many of their goals are shared? The previous chapters looked for such cooperative activities in geopolitics, military, and economics, as well as the signing of international treaties for Antarctica, the high seas, and outer space. Of those three domains, Antarctica was home

[218] Buck, *The Global Commons: An Introduction,* 141.
[219] Buck, *The Global Commons: An Introduction,* 141.

to the most cooperative regime. The high seas saw the most competition. Outer space landed in between.

This chapter analyzes how events are most likely to unfold on the Moon based on what we know now. Like earlier chapters, it weighs the relationships between the loudest, most powerful countries, plus their state and private supporters; the resources at stake, and how able or likely states are to share them; the military dimension; and existing legislation around the domain. After solidifying the prediction, this chapter offers a prescription for the Moon. What would the most ideal path look like? Based in this thesis's case studies, this prescription leverages empirical evidence suggesting what conditions help the most states achieve their goals in a domain.

A prediction for the Moon

Under current conditions, two cohorts (each led by one of Earth's most powerful countries) are unofficially competing for Moon supremacy. Not only this, but they are also competing for international partners to support their competing missions. As outlined above, this competition is most of the picture, but not the entire picture. Cooperation within the cohorts is abundant and beneficial in myriad ways. NASA can accelerate its missions and expand its resource and talent pools by outsourcing technical design, development, and implementation to allies most skilled in those areas. CNSA can enjoy the political support and technical resources its partners provide.

The U.S. and China are operating within the international regime created in the 1950s. Yet, the plans propelling their current competition forward are relatively young: The Artemis Accords are about three years old, and the ILRS plans about 30 months. This reflects decades of slow-growing competition bubbling up between the two states, as

China's power and economy grew, culminating in the rapid boil of hostility in recent years. The Moon is far from the only domain in which the U.S. and China are openly competing – and bringing their partners along. As discussed earlier, the two states compete in Antarctic science and in high seas boundaries. China separately competes with many American allies, and America competes with states allied with China.

To review: Realism posits that states are the main actors in an anarchic international system. Their actions are rational, either taken because they directly benefit them or because they are consistent with international norms that would be advantageous to follow. Defensive structural realism provides room for cooperation as well: According to Charles Glaser, "cooperative policies are more effective at increasing a state's security than competitive ones."[220] This is consistent with Walt's proposal that states form alliances in order to strengthen their positions against potential threats.[221] Current efforts toward the Moon, and previous actions in the high seas, reflect these perspectives.

In terms of geopolitics, the U.S. and China are the main actors on the Moon. They are acting in opposition, trying to make gains that lead to losses for the other side. Perhaps reflecting the leadership styles of those who initiated the Artemis Program and ILRS, the states are proceeding without significant consideration for international organization or existing treaties. Bridging the gap between the Moon programs would require reconciling differences between Beijing and Washington, and between NASA and the CNSA. The high seas case study suggests the two superpowers would rather exchange hard words or warning fires than an olive branch. NASA Administrator Nelson quite directly compared China's Moon efforts to circumstances in the South China Sea.

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[220] Elman, Colin, and Michael Jensen, eds., *The Realism Reader* (United Kingdom: Routledge, 2014), 135.
[221] Elman and Jensen, *The Realism Reader,* 134.

"If you doubt that, look at what they did with the Spratly Islands," he told *Politico* on concerns that China would make territorial claims on the Moon.[222] As long as both states are locked in competition, their lunar efforts will occur in self-interest. This is likewise the case when it comes to collecting partners.

Per the Outer Space Treaty, any activities targeting space or celestial bodies must be conducted for peaceful purposes. Nuclear testing was prohibited, as was storing such weapons in orbit. Written amid Cold War anxieties, this formulation upholds current considerations about international security as well as realist perspective on nuclear deterrence. "Because countries heavily armed with strategic nuclear weapons can carry war to its ultimate intensity, the control of force, in wartime as in peacetime, becomes the primary objection," writes Waltz.[223] So far, this control has been successful. However, it's worth noting that, like in Antarctica and the high seas, the Outer Space Treaty does not preclude states from leveraging military personnel and other conventional defense components in their lunar ambitions. On the Artemis side, defense contractors are propelling the development of rockets, satellites, and research technology that will make reaching the Moon possible. This is made possible by a combination of private and government funding. Similar structures are at work on the ILRS side. As seen during the original space race, rocket and communications technology has clear applications for weaponry and information components of national security. Geopolitical conditions would make a realist nervous about the strength of the "peaceful purposes" principle on the Moon: "When distrust and fear are great, the competitive building of arms

[222] Bender, Bryan, "'We better watch out': NASA boss sounds alarm on Chinese moon ambitions," *Politico*, January 1, 2023.
[223] Waltz, *Realism and International Politics,* 273.

intensifies," writes Waltz. "As the arms race intensifies, distrust and fear grow greater."[224] Our case study on the high seas reveals how militarization can occur in a place designated for peaceful purposes. Current conditions suggest a similar risk exists for the Moon.

Here we must acknowledge the vast wealth and riches potentially below the lunar surface. "A state's military power is clearly dependent on its base of economic power, while economic power is built on the foundation of potential power," writes D.C. Copeland, noting that potential power is the yet-leveraged accumulation of physical and human capital and resources.[225] Like the high seas, a Moon full of water and minerals able to boost a state's economic and thus military power has an obvious draw to the realist. Also like the high seas, international law prohibits wanton appropriation of such resources. Often a realist, America opted out of the laws protecting Moon and high seas resources for the common heritage of mankind. Most other states did the same in relation to the Moon, leaving them relatively free to enjoy the economic power derived from Moon mining. Contracts with private industry enable states to make the most, technologically, economically, and militarily of this freedom. "For the Artemis Accords to retain legitimacy, the onus will be on NASA to have these contracts reflect, where relevant, the Artemis principles," David O. Fidler writes for the Council on Foreign Relations.[226] The state and its agents remain the primary actor, and beneficiary, of such an arrangement. Similarly, the ILRS program plans to leverage private industry to boost

[224] Waltz, *Realism and International Politics,* 254.
[225] Copeland, David, "Neorealism and the myth of bipolar stability: Toward a new dynamic realist theory of major war," in *The Realism* Reader, ed. by Colin Elman and Michael Jensen, (United Kingdom: Routledge, 2014), 237.
[226] Fidler, David P., "The Artemis Accords and the Next Generation of Outer Space Governance," Council on Foreign Relations, June 2, 2020.

its space activities and Moon resource extraction. Its participants hope to achieve a soft power gain by claiming their activities more closely align to the Outer Space Treaty.

Right now, the Moon represents another stage for states to compete. Power struggles on Earth are amplified by the anarchic environment of a global commons, where a mishmash of competing international treaties and interpretations thereof allow states to act in ways that best suit their interests while lobbing accusations at their rivals. The option to opt out until a suitable treaty washes ashore may leave the Moon looking a lot like the high seas, when it would be better off imitating Antarctica.

A prescription for the Moon

To unlock themselves from this power struggle, states will need to change their approach to the Moon. This requires acting in ways that are less clearly self-interested: authority must be ceded to international and nongovernmental organizations; treaties limiting behavior must be agreed upon; and a structure for co-existence if not direct cooperation must be formed. From there, norms can take shape. The above recommendation prescribes liberalism as the most immediate need for a stable Moon.

Liberalism goes beyond cooperation, which can occur even when states put their interests first. To review: Liberalism posits a global system in which international organizations are the main actors and the laws, reason, and morality they construct guide state interactions. Different flavors of liberalism assign different characteristics to states and to the institutions operating between them. “In contrast to realists, who believe that national identity is achieved by separation and autonomy, liberals stress community and

belonging," writes Richard Ned Lebow.[227] This community is created where democracy is embraced and stabilized by a hegemonic state (see: America). It is worth noting here that by prescribing liberalism for the Moon, this thesis does not endorse American exceptionalism as the way forward here. In fact, no matter how powerful the U.S. is when Moon stations are established, it and all other participants must abide shared rules and restrictions – just as they did in another global commons space, Antarctica.

For states to achieve their stated goals on the Moon, they will need to work together. Norms need to be established. A constructivist approach will be helpful. Right now, the norms that exist around state actions on the Moon are embraced by few and followed by even fewer. (Rather than saying the Moon Agreement provides norms, perhaps the norm is to reject the Moon Agreement.) Norms needed include how commercial endeavors should operate, whether states can claim territory or property, disposal of state property, practices for aid and assist of humans representing other states, and militarization, among many others. As discussed in earlier chapters, global commons spaces like the Moon, Antarctica, and high seas are resistant to the typical formation of norms because they do not house permanent multigenerational human populations. No society exists from which normative behaviors could emerge. So, how would they form on the Moon? They will rely on the norms created by international organization.

The tenets of liberalism should frame the coming decades in this domain. UN COPUOS has a leading role here. Before competitor states begin erecting research stations on the same land, and under different international agreements, the Moon requires:

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[227] Lebow, Richard Ned, "IR Theory as Identity Discourses." In *International Relations Theory Today,* ed. by Ken Booth and Toni Erskine (Malden, MA: Polity Press, 2016), 58.

- A new Moon Agreement, signed by the U.S., China, and other spacefaring nations, that outlines what types of actors can extract what types of materials for what types of usage; how equipment and materials will be discarded after they complete their usage; how the lunar surface can be divided to accommodate state activities; and what steps must be taken in times of emergency of disagreement;
- An oversight agency that can hold states responsible for their actions;
- Clear guidance on which activities, such as weapon testing, territorial claims, and possibly types of mining, are prohibited.

The above bullets mirror the successful parts of the ATS and the requests already being made by many state and non-state actors. They reflect what history tells us: cooperation within guardrails is possible, even between fierce rivals and amidst competition like the original space race. As we saw in Antarctica, countries with competing territorial claims found shared ground in the ATS. Following the first Moon landing, the U.S. and Soviet Union agreed to limited cooperation. Likewise, the U.S. and Russia continue cooperation on the ISS even as relations between the countries deteriorate. Strong international regimes and existing norms around scientific research have enabled states to prioritize cooperation over more obvious national interests.

This thesis has taken diligent care to avoid predicting future. However, the following paragraphs will assume that conditions in the coming decade will not mirror those that inspire the IGY or the treaties that followed. This lack of urgency (no immediate threat of nuclear annihilation) should not prevent states from convening to get talks underway. Within liberalism, diplomacy is viewed as a "tool to affect the nature of the interaction between states and the international system, rather than a core matter of

international relations which determines the character and interests of the constituent actors in the system," write Dan Hart and Asaf Siniver.[228] This tool can be used for the Moon as it was with Antarctica. Consistent with liberal ideas, the IGY created conditions in which states could work together over shared scientific and international security goals. It gave U.S. leadership a clear lens regarding what Antarctica needed and which states could best shape it at that time. Perhaps because this earlier diplomacy happened without the inconvenience of transparency, and the power displays that go with it, states that are typically reticent to cede power found ways to do so. (Perhaps the brief human history and limited access to Antarctica helped, as well.) The Moon requires the same. A non-zero-sum negotiation is needed to develop a new Moon Agreement that most states can agree to. What that agreement looks like, through a liberal lens, is addressed below.

One key part will be the creation of a new body dedicated to Moon governance. Such structures play a key part within liberalism, which "looks to international organizations to help states cope with interdependence," writes Michael N. Barnett.[229] On the Moon, as other global commons domains, this interdependence occurs in a uniquely anarchic environment. UN COPUOS has long existed to address this power vacuum in the domain directly outside Earth's atmosphere. What's needed now is a group dedicated to addressing Moon issues. Non-profits, like the California-based Moon Global Foundation, and non-governmental organizations, like the Vienna, Austria-based Moon Village Association, have carved out space in this domain, but neither wield the authority of a UN agency. Industry representatives, space agency leaders, and researchers have

[228] Hart, Dan, and Asaf Siniver, "The Meaning of Diplomacy," *International Negotiation* 26 (2021).
[229] Barnett, Michael N., "Bringing in the New World Order Liberalism, Legitimacy, and the United Nations," *World Politics* 49, no. 4 (July 1997).

called for an organization like the UN's International Civil Aviation Association (ICAO) to shape norms around space and specifically lunar activity.[230] "ICAO is a proven model that has enabled enable consensus and convergence upon, and dissemination of, best practices that enhance safety and reduce the possibility of harmful interference for aviation," writes Peter Garretson, a senior fellow at the American Foreign Policy Council.[231] He proposes an International Civil Lunar Organization (ICLO) to promote the orderly, cooperative growth of a Moon economy. This would include setting standards for interoperability, communications, navigation, and delivery of lunar materials back to Earth. He recommends the U.S. take the lead in developing such a group, as it did for the ICAO and as NASA pledged to do as part of the Artemis Accords.

Liberalism promotes economic growth within a system of interdependent states. They are bound by the norms (including growth) promoted by the international organizations in which they participate, as well as by free markets and their own goals of stability, property, and other societal preferences.[232] Some liberals, such as Marcel Wissenburg, suggest that societal preferences are only legitimate when they are not ecologically or socially destructive. Contrasting that is the liberal utilitarianism believe that "general social welfare ought to be maximized."[233] Like realism, liberalism is a broad international relations theory with several different interpretations and angles. Which branch of liberalism is most appropriate for the Moon long-term may fluctuate depending on terrestrial conditions. This thesis prescribes a liberalism that fosters

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[230] "The role of space in driving sustainability, security, and development on Earth," McKinsey & Company, 2022.
[231] Garretson, Peter, "An ICAO for the Moon: It's time for an International Civil Lunar Organization," *The Space Review*, July 11, 2022.
[232] Ferguson, Peter, "Liberalism and Economic Growth," *Environmental Values* 25, no. 5 (October 2016): 599.
[233] Ferguson, "Liberalism," 606.

economic growth within environmental constraints. Whether American leadership believes it or not, the Moon meets criteria for a global commons and its reserves should be leveraged carefully. For now, this could mean an approach like Antarctica's that prohibits mining entirely in the coming decades. That time could instead be spent fulfilling the resource prospecting campaign several lawyers and scientists are calling for[234] to understand what water and minerals await beneath the lunar surface. Such an effort would give states a chance to set precedents for lunar activities, while testing the limits and drawbacks of the existing legal framework. It could serve as a blueprint for human activities on Mars. "Results from this campaign will inform multiple stakeholders," the authors write, "and herald the beginning of a new era of international cooperation in space exploration."

A liberal approach would position the Moon, and the states that endeavor to study it, for slow and steady success, the kind that can be sustained for decades to come. Looking toward the ATS, states can find the ingredients for this cooperative approach, which works best when begun earlier than later. The next several years will determine whether the 21st-century space race is one dominated by power politics or one in which collaborative efforts protect and promote the shared future of humankind.

[234] Neal, Clive R., Antonino Salmeri, Angel Abbud-Madrid, James D. Carpenter, Anthony Colaprete, Karl A. Hibbitts, Julie Kleinhenz, Mathias Link, and Gerald Sanders. "The Moon needs an international lunar resource prospecting campaign." *Acta Astronautica* 214 (2024).

Chapter VII.

Conclusion

Humanity is returning to the Moon in the next decade. That much is for sure – as long as scientists, governments, and national budgets hold their course. What is less clear is what governance regime will exist to guide those next giant leaps for humankind. Will the current competitive course continue? Will the years between now and 2028 witness a reprioritized perspective, where cooperation and the shared human heritage of Earth's satellite inspire states to put their differences aside? Signs now point toward competition.

By beginning our analysis during the Cold War period, this thesis highlighted the urgent conditions that brought states together to establish peace and scientific progress in the global commons domains. From there, we saw the places where paths diverged: Antarctica tended toward a more cooperative, rules-based regime; the high seas were too potentially profitable and hard to slice for states to arrive at compromise; and outer space brought states together to agree on general norms, while pushing them apart when it came to issues like mining. A 21st-century Moon race will test what we've learned.

No matter how questions about competition versus cooperation are answered, there are several certainties. For one, no country will embark on its Moon efforts alone. Right now, U.S. and Chinese ambitions are supported by ever-growing alliances of states, nongovernmental institutions, and industry partners. Each ally contributes its own ingredient (political influence, tech skills, money) to tip the scale toward Artemis or ILRS. Lunar stations established on the Moon will have impacts on Earth and potentially

deeper into outer space. Initially, terrestrial effects may be similar to the previous Moon landing's: soft power gained from taking a new giant leap for humankind. Long term, the states participating in lunar research may benefit financially, militarily, and strategically when it comes time to extend manned space exploration to Mars and beyond.

Future researchers should endeavor to fill gaps in our current understanding around the drafting of the Antarctica Treaty; what Roscosmos is working on in general; and what specific ILRS partners are contributing to the plan. Greater understanding in these domains will illuminate how an enduring treaty system like the ATS was created and what exactly China gains from working with Russia and other states. Additional language fluency could also help fill gaps. In particular, the ability to read technical writing in Chinese could open doors to finding, analyzing, and contextualizing proposals from the CNSA. Expertise in Chinese public relations practices (speechmaking, censorship, and online documentation) would further enrich this research. Russian language fluency could improve understanding of Roscosmos activities. Those findings, together with the ideas proposed in this thesis, will provide some of the pieces needed to solve international relations on the Moon. They might be the right pieces. There might be one, two, or several ideas still needed to complete the puzzle.

So, how will researchers cope? As time passes, more clues will appear. The next decade will reveal how the Artemis Accords and ILRS projects unfold, whether new treaties and IOs emerge, and whether states decide to divvy up the Moon's resources or leave them below the lunar surface. These factors will shape how states work together, for the good of humankind, or separately, for themselves, on Earth's largest satellite.

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