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U.S.-RUSSIAN SPACE COOPERATION: EXPLAINING OUTER SPACE PARTNERSHIP IN THE MIDST OF EARTHLY RIVALRY

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U.S.-RUSSIAN SPACE COOPERATION: EXPLAINING OUTER SPACE PARTNERSHIP IN THE MIDST OF EARTHLY RIVALRY

A THESIS APPROVED FOR THE
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BY

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Dr. Mark Raymond, Chair

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Dr. John Fishel

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Dr. Eric Heinze

For my dad, who sparked my curiosity about space

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Abstract

Literature that covers the topic of U.S.-Russian space cooperation tends to isolate it from the overall context of U.S.-Russian relations, while literature that does take the rivalrous relationship into account tends to focus primarily on non-cooperative outer space ventures. This thesis seeks to explain why cooperation between the U.S. and Russia emerged and why it has continued in spite of often negative relations on Earth. To examine this case study, I first explore the history of American and Russian/Soviet space activities, highlighting critical points of cooperation emergence, continuation, and discontinuation. After assessing the usefulness of major theories of international relations in assisting with this research question, I then examine the critical historical junctures primarily through the lenses of neoliberal institutionalism and constructivism (especially epistemic community literature) in order to determine the causes of cooperation's emergence and maintenance. I find that the scientific community's support for the norm of scientific cooperation in outer space, formal institutions codifying this norm, and entrenchment of this norm in the government system due to socialization, habit-formation, geopolitical interests, and perceptions of status were the main contributors to the emergence and maintenance of space cooperation between Russia and the U.S. This finding has great importance for the future of U.S.-Russian space cooperation, as they suggest its strength and likelihood of continuation. It also has great implications for the possibility of space cooperation with other emerging space powers and the private sector. This finding suggests these cases may have more difficulties in reaching a relationship that mirrors that of the U.S. and Russia in the realm of space cooperation.

Chapter 1: Introduction

The United States and Russia have been closely cooperating in the realm of outer space for decades. Even amidst conflicts on earth, which have at times reached a level some have deemed "proxy war," outer space cooperation has continued.[1] In fact, large-scale cooperation through the International Space Station (ISS) and RD-180 rockets has so entrenched itself in the U.S. and Russian space systems that to end cooperation would cause a huge monetary loss, a decrease in scientific output, and require the redesigning of spacecraft.[2] Even at points in recent history during which tensions were higher than before, as during the early 1980s, cooperation in outer space still continued between Russia (at that point, the Soviet Union) and the United States.[3] This interesting observation suggests an important research question: what are the causes of the emergence and maintenance of U.S.-Russian space cooperation, which appear to be strong enough to overcome tense political relations over earthly matters?

Existing literature on the topic does not provide a clear answer to this question. Some literature discussing U.S.-Russian space cooperation does so in a vacuum devoid of the context of U.S.-Russian relations overall, arguing it can serve as a positive model

[1] The New York Times, Russia Today, and CNN labelled the Syrian conflict a proxy war between the U.S. and Russia. Mark Mazzetti, Anne Barnard, and Eric Schmitt, "Military Success in Syria Gives Putin Upper Hand in U.S. Proxy War," *The New York Times*, August 6, 2016, https://www.nytimes.com/2016/08/07/world/middleeast/military-syria-putin-us-proxy-war.html?_r=0.; "Russia & US will engage in 'global war', unless 'proxy' Syria conflict resolved – Turkey's deputy PM," *Russia Today*, October 12, 2016, https://www.rt.com/news/362572-us-russia-syria-proxy-war/.; "Syria's 'proxy war' rages in towns near Aleppo, Syria," *CNN*, October 14, 2015, http://www.cnn.com/videos/world/2015/10/14/anderson-syria-proxy-war-aleppo-syria.cnn.

[2] U.S. Congress, House of Representatives, Committee on Armed Services, Subcommittee on Strategic Forces, *Hearing on Assuring National Security Space: Investing in American Industry to End Reliance on Russian Rocket Engines*, 114th Cong., 1st sess, 2015, 36-37.

[3] Roald Sagdeev, "United States-Soviet Space Cooperation during the Cold War," *NASA*, May 28, 2008, https://www.nasa.gov/50th/50th_magazine/coldWarCoOp.html.

for multi-national cooperative ventures in general.[4] Others who recognize the negative tensions between the U.S. and Russia focus primarily on outer space activities that have mirrored this relationship, particularly focusing in the era of the space race.[5] This thesis seeks to bridge the gap and reconcile the reality of a friendly, scientific outer space relationship with the reality of often negative U.S.-Russian relations in general by determining the reasons for space cooperation's emergence and maintenance.

Chapter two provides the historic background of U.S. and Russian space activities. It is organized loosely by decade and goes through the evolution of space activities chronologically, noting periods of cooperation and competition throughout. This history chapter provides details about important events in cooperation, such as the creation of the UN Committee on the Peaceful Uses of Outer Space, the Apollo-Soyuz Mission, low-level cooperation throughout the 1980s, the fall of the Soviet Union, and the creation of the International Space Station. It also details competitive moments in space history and events leading up to cooperation points, in order to provide complete historic context. This historical background provides the building blocks from which the later analysis uncovers the answer to the research question.

Chapter three provides an overview of relevant theories of international relations and their stances on cooperation – the likelihood of its emergence, the likelihood of its maintenance, the tools that actors consciously use to affect cooperation, and the

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[4] See: Lara L. Manzione, "Multinational Investment in the Space Station: An Outer Space Model for International Cooperation?" *American University International Law Review* 18, 2 (2002).; David Tan, "Towards a New Regime for the Protection of Outer Space as the 'Province of All Mankind," *Yale Journal of International Law* 25 (2000).

[5] See: Alice Gorman and Beth O'Leary, "An ideological vacuum: The Cold War in outer space," in *Fearsome Heritage: diverse legacies of the Cold War*, ed. John Schofield and Wayne Cocroft (New York: Left Coast Press, 2007), 73.; Richard A. Morgan, "Military Use of Commercial Communication Satellites: A New Look at the Outer Space Treaty and 'Peaceful Purposes,'" *Journal of Air Law and Commerce* 60 (1994).

mechanisms that operate on a more subconscious level in supporting cooperation. It points out persuasive and unconvincing elements of the frameworks and weighs the effectiveness of each framework of thought in helping to examine transitions of cooperation and methods of cooperation in outer space. This chapter provides the theoretical tools with which to unpack the evidence outlined in chapter two.

Chapter four analyzes the research question using seven critical turning points in history to organize discussion and the primary theoretical frameworks of neoliberal institutionalism and constructivism. It highlights the importance of perceptions of status and geopolitical threats, formal institutions, and norms of scientific cooperation and respect for international institutions in bringing about and upholding cooperation. This chapter answers the research question, finding that the scientific community and the norms of scientific cooperation that it supported for use in outer space activities and the creation of formal institutions that support the peaceful, scientific uses of outer space were the primary creators of space cooperation. It also finds that the increased entrenchment of these norms of space cooperation within the upper-level government due to continued support from the scientific community and the process of socialization, habit-formation, geopolitical interests, and perceptions of status, in addition to the previously stated two factors, contributed to the maintenance of space cooperation.

Chapter five concludes the thesis by identifying the implications these findings have for the future of space cooperation between the U.S. and Russia, the possibility of space cooperation between the U.S. or Russia and emerging space partners (in particular China), and the private sector in outer space. It highlights the extraordinary nature of space cooperation between the U.S. and Russia and explains some of the difficulties

other rivalrous states and non-state actors may encounter when trying to replicate this relationship in the contemporary age.

Chapter 2: Historic Overview of U.S.-Russian Relations and Outer Space Projects

This chapter provides the historic background of Russian and American activities in space, which will facilitate analysis in later chapters of U.S.-Russian space cooperation. The chapter has been broken into five parts – the 1950s & 1960s, the 1970s, the 1980s, the 1990s, and the 2000s to present – loosely following decade demarcations as well as general shifts in space relations from competition to cooperation and vice versa and follows chronological order whenever possible for clarity. This chapter does not in itself seek to answer the greater research question of why the sides cooperated, and instead lays the groundwork for when and how they cooperated (or did not) in order to track overall trends in cooperation for later analysis. Overall, the relationship with regard to outer space has shifted back-and-forth between more competitive and more cooperative at various points through history, but has evolved into a state of relatively robust cooperation.

The Space Race of the 1950s & 1960s: An Era of Competition

The space race traced its roots to the Soviet-American race to acquire German rocket technology and scientists during World War II. The Nazi V2 rocket that Wernher von Braun and his team developed paved the way for Cold War missiles. The International Geophysical Year (IGY) from 1957 through 1958, which supported collaborative scientific projects between 67 countries, set a goal of putting a satellite

into orbit.[6] The IGY grew as a brainchild of a group of American scientists who modelled the IGY on the International Polar Years of 1882 and 1932 that had encouraged scientists from many different countries to study the Polar Regions. In September 1954, Lloyd Berkner, head of Brookhaven National Laboratory, Vice President of the *Comité special de l'année géophysique international* (CSAGI), and President of the International Scientific Union, arranged two committees to study the utility of scientific space programs, and included members of the Soviet Academy of Sciences. Although the Soviet scientists remained silent at the meetings, the committees ultimately approved the American scientists' proposal of orbiting a satellite for scientific purposes.[7] This set the stage for space operations to be of a scientific, rather than military/defense-related nature. But the end of the 1950s instead saw a shift toward competition, rather than the IGY's hoped-for scientific collaboration, and paved the way for a militaristic space in which reconnaissance satellites, rather than scientific projects, took precedence.

In March 1954, RAND Corporation, in the "Feedback" study cosponsored by the CIA, had suggested that the Air Force undertake "at the earliest possible date completion and use of an efficient satellite reconnaissance vehicle as a matter of vital strategic interest to the United States."[8] By March 1955, the Air Force issued General Operational Requirement Number 80, asking for private sector proposals for developing a photographic reconnaissance satellite.[9] Lockheed won the proposal in October 1956 to

[6] Gorman and O'Leary, "An ideological vacuum," 73.
[7] Edward Clinton Ezell and Linda Neuman Ezell, *The Partnership: A History of the Apollo-Soyuz Test Project* (Washington, D.C.: NASA, 1978), kindle loc. 500, 507.
[8] William E. Burrows, *Deep Black: Space Espionage and National Security* (New York: Random House, 1986), 83.
[9] *Ibid.*, 84.

develop Weapons System 117L, code named Pied Piper.[10] The overall five-year-long project that included two reconnaissance systems and a surveillance system constituted the US's first space program.[11]

In February 1955, the USSR chose a region at the Tyuratam junction on the Moscow-Tashkent railway, 200 km from the town of Baikonur, in the Kazakh Soviet Socialist Republic for the R-7 intercontinental ballistic missile (ICBM) testing facility.[12] The top-secret area went nameless for fear of American intelligence, but is today most commonly known as Baikonur.[13] Given that this is the modern-day location of the Baikonur Cosmodrome, I will use that name in discussing this area, except when referencing material that explicitly uses the name Tyuratam.

On October 4, 1957, the USSR launched an R-7 ICBM carrying Sputnik 1, the first artificial satellite, into space.[14] On November 3, 1957, the USSR launched Sputnik 2, carrying Laika, a dog who became the first animal to orbit the Earth.[15] The U.S. had been focused on the scientific IGY mission of the Vanguard satellite, but switched support to the military satellite Explorer out of a fear of the military threat that the USSR posed based on its launch of Sputnik I.[16] The propaganda potential for the Soviet Union was enormous and Nelson Rockefeller, President Eisenhower's special assistant stated, "I am impressed by the costly consequences of allowing the Russian initiative to

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[10] *Ibid*.
[11] *Ibid*.
[12] Ben Evans, *Escaping the Bonds of Earth: The Fifties and Sixties* (New York: Springer Praxis Books, 2009), 4-5.
[13] Baikonur refers more generally to a wider area near the town of the same name. Alternate names for this strategically important area included "Gagarin's Start," after the most historic event that occurred there, and Tyuratam, after the railway junction that is actually closest to the site. Evans, *Escaping the Bonds of Earth,* 4.
[14] *Ibid.,* 5.
[15] *Ibid.*
[16] Gorman and O'Leary, "An ideological vacuum," 73.

outrun ours through an achievement that will symbolize scientific and technological advancement to people everywhere. The stake of prestige that is involved makes this a race we cannot afford to lose."[17] Sputnik was an embarrassment to the Eisenhower administration, which was accused of being overly frugal and naïve about Soviet intentions.[18]

This event signaled the completely competitive nature of the US-USSR space relationship amidst a cloud of fear over military abilities in space.[19] According to the US National Advisory Committee for Aeronautics (NACA) Working Group on A National Integrated Missile and Space Vehicle Development Program in 1958, the primary goal was "to catch up with and ultimately surpass the Soviets in the race for leadership on this planet and for scientific and military supremacy in space."[20] The conflicting desires of the U.S. government to establish dominance in technology against the USSR and of American scientists to work cooperatively in studying the cosmos clashed in the discussions in which the U.S. National Aeronautics and Space Administration was born out of the NACA; its civilian leadership showed Eisenhower's desire to avoid an militarization of outer space and his support for space exploration "for peaceful purposes only."[21] Meanwhile Lockheed's Pied Piper was publicly cancelled after an article about it leaked in *Aviation Week*, which set the US up for

[17] Ezell and Ezell, *The Partnership,* kindle loc. 543.
[18] Illustrating the public's level of disapproval, Michigan Governor G. Mennen Williams penned this poem: "Oh Little Sputnik, flying high/With Made in Moscow beep,/You tell the world it's a Commie sky/And Uncle Sam's asleep/You say on fairway and on rough/The Kremlin knows it all,/We hope our golfer knows enough/To get us on the ball." Burrows, *Deep Black,* 93-94.
[19] Ezell and Ezell, *The Partnership,* kindle loc. 568.
[20] *Ibid*., 580.
[21] *Ibid.,* 591.

Khrushchev's criticism of the U.S.'s blatantly militaristic, rather than scientific, uses of space.[22]

By 1959 NASA had gained a mandate to cooperate in international programs, but without any clear guidance regarding with whom and to what extent they should cooperate.[23] Meanwhile, through letters between the American and Soviet leadership and in debates at the United Nations (UN), American leaders towed the Eisenhower line and spoke/wrote of the need to ban militarization of outer space, while the USSR thought these calls were a trap that sought to strip Russia of its security against America's nuclear strike capabilities so that America, with the support from its allies in the UN, could become the dominant power in space and on Earth.[24] Khrushchev claimed to seek détente with the West, but also exploited every American misstep to bolster Soviet propaganda.[25] The USSR's failures were kept in greater secrecy, to take away that propaganda weapon from the U.S.[26]

Eisenhower supported cooperating with the USSR in all areas of space except for the US reconnaissance program.[27] Although not explicitly relating to outer space use, Eisenhower's "Open Skies" proposal that the U.S. and U.S.S.R. exchange locations of military installations allowing for aerial surveillance to provide verification for arms accords (which the Soviets rejected) in some ways seems to suggest his openness in the realm of reconnaissance. But it is important to note that Eisenhower himself said later that he knew the Soviets would reject it and he hoped to gain a propaganda victory

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[22] Burrows, *Deep Black*, 107.
[23] Ezell and Ezell, *The Partnership*, kindle loc. 641-648.
[24] *Ibid.*, 677-684.
[25] *Ibid*., 703.
[26] Charles S. Sheldon (II), *Review of the Soviet Space Program: With Comparative United States Data* (New York: McGraw-Hill Book Company, 1968), 12.
[27] Burrows, *Deep Black*, 141.

through the proposal by making the Soviets appear to be disinterested in arms control overall.[28] In late 1958 U.S. Secretary of State John Foster Dulles suggested the creation of a UN space committee and in 1959 the ad hoc United Nations Committee on the Peaceful Uses of Outer Space was born, which Eisenhower hoped would protect U.S. freedom in its space activities, to allow its reconnaissance projects to succeed.[29]

On January 21, 1959, the CIA and Air Force's Discoverer 1, intended to be a camera-less test-run of a sophisticated reconnaissance satellite, was aborted on the launch-pad. It made it into orbit almost a month later, but lost control due to a fault in the stabilizing system. Discoverers 2-12 similarly experienced various failures.[30] The USSR launched its first lunar probes in 1959; in January, Luna I was the first to penetrate interplanetary space, Luna II was the first to hit the moon, and Luna III photographed the back side of the moon in October.[31] 1959 was an unfortunate year of launch failures for the U.S., but a rather successful one for the USSR.[32]

In May 1960, Khrushchev, who was dreading an upcoming summit given a widening ideological split with China and the hardening opposition to the USSR by the U.S., U.K. and France regarding the two Germanys, took an upper hand and gracefully avoided the summit while placing blame on the U.S. after American pilot Francis Gary Powers was shot down in his Lockheed U-2 high altitude reconnaissance aircraft in the Soviet Union, which would be named the infamous "U-2 incident."[33] This harmed

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[28] Andrew Glass, "Ike offers 'Open Skies' plan at Geneva Summit, July 21, 1955," *Politico,* August 21, 2010, http://www.politico.com/story/2010/07/ike-offers-open-skies-plan-at-geneva-summit-july-21-1955-039988.
[29] Burrows, *Deep Black,* 141.
[30] *Ibid.*, 109-110.
[31] Ezell and Ezell, *The Partnership,* kindle loc. 716.
[32] *Ibid*.
[33] *Ibid.*, 722-728.

NASA's hopes for cooperation further, as it had served as Powers's cover for his clandestine intelligence flight, which clouded perception of its own motives.[34] This event, along with the anti-Soviet defense-heavy focus of the Kennedy versus Nixon Presidential campaign, quieted calls for international space cooperation among American scientists.[35] While Eisenhower had downplayed the idea of a military competition in space, Nixon, in response to Kennedy's call for America to not "run second in this vital race," highlighted the U.S.'s successes in the space race, saying, "If the Eisenhower Administration had not long ago recognized that we were in a strategic race with Russia, our space record would not be as creditable as it is today."[36]

Eisenhower and his NASA tried to keep the conversation on cooperation going with the Soviets; Arnold Frutkin, Deputy Director of NASA international programs talked with Anatoliy Arkadyevich Blagonravov of the Soviet Academy of Sciences about the possibility of using the Echo I communications satellite, which had launched August 12, 1960, for experimenting with communication between the US and USSR.[37] Meanwhile on August 10, 1960, the CIA finally got the reconnaissance satellite Discoverer 13 to make a successful trip, followed by Discoverers 14-18, which had taken good-quality photographs.[38] *The New York Times* and *Aviation Week* reported on the Discoverer program; this reporting was met by a Soviet *International Affairs* journal article that emphasized the illegality of spy satellites flying over Soviet territory and

[34] *Ibid*.
[35] *Ibid.*, 735.
[36] *Ibid*., 747-753.
[37] *Ibid*., 758.
[38] Burrows, *Deep Black*, 110.

warned that the Soviets could bring down any satellite just as they had with Powers and his U-2.[39]

Between May 1960 and March 1961, the USSR tested the manned spacecraft, called the Korabl-Sputnik at that point (which means "Spaceship-Satellite") by sending small mammals, plants, fungi, and a human-sized mannequin called "Ivan Ivanovich" into orbit in it.[40] Some of these were successful, as with the dogs Belka and Strelka who survived and are today displayed in taxidermy-form in the Memorial Museum of Cosmonautics in Moscow. Others were not successful, sending the craft further into space when trying to return to Earth or simply exploding immediately following lift-off.[41] On October 23, 1960, an R-16 missile exploded on the launch pad, killing 130 technicians, military officers, and engineers.[42] Its destruction of the launch facility delayed the planned, manned space launch that would use an R-7.[43]

On August 25, 1960, the U.S. government created the National Reconnaissance Organization (NRO) to centralize some of the operations fought over by the CIA and Air Force.[44] On September 22, Eisenhower addressed the UN and suggested a four-point treaty for the peaceful exploration of outer space based on the 1959 Antarctic Treaty, which banned military activity and allowed scientific research on the

[39] *Ibid*., 111.
[40] Evans, *Escaping the Bonds of Earth*, 6.
[41] *Ibid*.
[42] *Ibid*., 5.
[43] *Ibid*., 6.
[44] The Air Force and the CIA both saw themselves as the rightful leader in space reconnaissance, and their competition went beyond greed for funding and into the realm of a power-status dispute; the CIA's Corona and Air Force's SAMOS programs competed directly for funding and for the honor of being America's foremost space reconnaissance system. The Air Force was particularly sour about the thought of losing more ground to a civilian agency after NASA's formation in 1958. Burrows, *Deep Black*, 202-203.

continent.[45] Kennedy's inaugural address seemed to support the themes of cooperation for which Eisenhower laid the groundwork, as Kennedy invited all nations (including the USSR)

> to join with us in developing a weather prediction program, in a new communications satellite program and in preparation for probing the distant planets of Mars and Venus, probes which may someday unlock the deepest secrets of the universe… Both nations would help themselves by removing these endeavors from the bitter and wasteful competition of the Cold War.[46]

Kennedy appointed Jerome Wiesner of MIT as his assistant for science and technology, an appointment which was quickly followed by the Wiesner Report, prepared by Kennedy's science advisers, which criticized Eisenhower's space program, but foresaw possibilities for cooperation in space exploration.[47] Public addresses from Kennedy continued to keep the themes of cooperation, while privately Kennedy struggled to balance cooperation and competition, worrying that the perception of being second rate in space would reflect poorly on America's military strength.[48]

By April 7, 1961, despite some of the unsuccessful attempts with the Korabl-Sputnik, the Soviets decided to go ahead with the Vostok mission, worried that the U.S. would beat them to the manned flight by the end of April.[49] On April 9 the Soviets announced that Yuri Gagarin would be the first man in space, which was possibly due in part to Korolev's favoring of Gagarin over German Titov as a person or to General Nikolai Kamanin's assessment of Titov's "stronger character" that would be more useful on the Vostok 2, as it would spend an entire day in space.[50] On April 12, 1961,

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[45] Ezell and Ezell, *The Partnership,* kindle loc. 764.
[46] *Ibid*., 783.
[47] *Ibid*., 771-777.
[48] *Ibid*., 796.
[49] Evans, *Escaping the Bonds of Earth,* 10.
[50] *Ibid*., 10-11.

Yuri Gagarin became the first man in space as he orbited once in the Vostok, which was propelled into space by the R-7, and returned safely to Earth.[51]

On April 14, 1961, Kennedy called a meeting with his aides to discuss the possibility of landing a man on the moon in order to show American technological skill and beat Russia.[52] Soviet propaganda using Gagarin's flight stressed that it showed the virtues of "victorious socialism," the technical superiority of the Soviet Union over all other nations, and the ultimate Soviet goal of world peace and disarmament, in spite of its ability to turn its technological superiority into production of superior military weapons.[53]

Meanwhile on April 17, 1961, the Bay of Pigs operation took place, in which 1,500 Cuban exiles landed in a pro-Castro area of Cuba, and were met by Castro's troops who, after four days of fighting, killed or captured all of them.[54] Kennedy's embarrassment over the fiasco led him to turn toward outer space as the frontier in which to beat the Soviets; a memo he wrote to Vice President Lyndon Johnson read, "Is there any space program that promises dramatic results in which we could win? Do we have a chance of beating the Soviets by putting a laboratory in space or a trip around the Moon or by a rocket to land on the Moon or by a rocket to go to the Moon and back with a man?"[55] Johnson turned to Wernher von Braun, a rocket scientist who had designed the Nazi V-2 missile before defecting to the U.S. in 1945, who suggested a lunar landing as he felt the current Soviet rocket technology could not get them to the

[51] *Ibid*., 11.
[52] *Ibid*., 26.
[53] Ezell and Ezell, *The Partnership,* kindle loc. 808.
[54] Evans, *Escaping the Bonds of Earth,* 28.
[55] *Ibid*.

moon. Von Braun had joined NASA in 1958 only on the condition that he could work on the Saturn rocket, which was in the early planning stages by his discussion with Johnson. Von Braun told Johnson they could reach the moon by 1967 or 1968.[56]

Three weeks after the Bay of Pigs failure, on May 25, 1961, Kennedy gave his famous speech declaring the U.S.'s commitment to "landing a man on the moon and returning him safely to earth" before the end of the decade.[57] He tied the competition in space to the "battle that is going on around the world between freedom and tyranny."[58] Kennedy's speech reaffirmed the relationship between the USSR and US as one of a competitive rather than cooperative nature and NASA mirrored this position, telling Congress that although they still were open to cooperation, the lack of openness with which the Soviets carried themselves in international meetings meant there was little chance of successful cooperation.[59]

On May 5, 1961, Alan Shepard became the first American in space aboard the Mercury-Redstone 3 or *Freedom 7*.[60] The Soviets had not completely abandoned the possibility of cooperation, but they maintained pride for their technological superiority.[61] In a press conference, Leonid Sedov, Soviet Chairman of the Commission for the Promotion of Interplanetary Flights of the USSR Academy of Sciences, congratulated Shepard, while pointing out that Gagarin's flight was more important and promoted the Soviet position that a solution to the disarmament problem was necessary before any meaningful international space cooperation could occur.[62]

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[56] *Ibid*., 28-29;
[57] Ezell and Ezell, *The Partnership,* kindle loc. 844.
[58] *Ibid*., 832.
[59] *Ibid*., 844.
[60] Sheldon, *Review of the Soviet Space Program,* 15.
[61] Ezell and Ezell, *The Partnership,* kindle loc. 855.
[62] *Ibid*., 861.

Back in the USSR, Khrushchev urged Korolev to move quickly on the Vostok 2 and suggested that it fly before August 10, 1961 – a date which some later speculated was meant to produce a propaganda hype that would cover up the Berlin Wall's initial building.[63] On August 6, 1961 German Titov, in Vostok 2, became the second person to orbit Earth and the first to orbit multiple times and get space sickness.[64] While in orbit Titov relayed greetings to the U.S. and was promoted by Khrushchev in a congratulatory call.[65] On August 13, 1961, a week after Titov's successful mission, East German troops sealed the border in Berlin and began building the Berlin Wall.[66] Korolev continued work, applying the technology from the Vostok to the production of the Zenit spy satellite.[67] Facing American opposition over the wall, Khrushchev threatened to sign a peace treaty with East Germany, which would give it recognition as a separate communist state – something the US did not want.[68] Kennedy threatened to go to war to defend Berlin's freedom, which Khrushchev took to be an ultimatum.[69] Khrushchev responded by breaking the moratorium on atmospheric nuclear weapons tests and starting September 1, the USSR ran tests for two months, the biggest of which was the 58-megaton explosion of the most powerful hydrogen bomb at that time.[70]

Discussion of rules in outer space had continued to take place in the United Nations since the establishment of the Committee on the Peaceful Uses of Outer Space. In December 20, 1961, the UNGA adopted Resolution 1721, declaring international law

[63] Evans, *Escaping the Bonds of Earth,* 30.
[64] *Ibid*., 31-34.
[65] *Ibid*., 35.
[66] *Ibid*., 36.
[67] *Ibid*., 38.
[68] Ezell and Ezell, *The Partnership,* kindle loc. 873.
[69] *Ibid*., 880.
[70] *Ibid*.

applicable to humans and human activities in outer space.[71] This established that the sphere of influence of the UN would not end at the edge of the atmosphere, but instead pertained to human activities, setting a precedent that would later establish the UN's ability to decide law pertaining to human activities far beyond Earth's orbit.

On February 20, 1962 American astronaut John Glenn orbited the Earth three times and set a record for longest "confirmed-successful" flight aboard the Mercury-Atlas 6 as the third American in space and the first American to orbit.[72] On May 24, Scott Carpenter orbited in the Mercury-Atlas 7, aka *Aurora 7*.[73] In the USSR, the triple-Vostok mission turned into a dual-Vostok mission due to constraints of the Soviet tracking and rescue networks and Kamanin limited Korolev's three day goal for each to a two day mission, to reduce his cosmonauts' chances of sickness.[74] Soviet leadership demanded the launch be in early March, after seeing the Americans' successful orbit, but a month turnover was far too quick for Kamanin and technical issues and multiple Zenit launch failures delayed the mission until July.

In December 1961, the Soviet delegation ended its boycott of the UN Committee on the Peaceful Uses of Outer Space, hinting at a future possibility of cooperation.[75] Frutkin and Hugh Dryden, Deputy Administrator of NASA, visited with Blagonravov on March 27, 1962 for an informal discussion about the possibility of cooperation between the space programs.[76] On May 10, 1962 Vice President Johnson

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[71] Henri A. Wassenbergh, *Principles of Outer Space Law in Hindsight* (Dordrecht, the Netherlands: Martinus Nijhoff Publishers, 1991), 16.
[72] Evans, *Escaping the Bonds of Earth,* 38; Robert B. Hotz, "Foreword," in *Review of the Soviet Space Program* by Charles S. Sheldon II (New York: McGraw-Hill Book Company, 1968), v.
[73] Sheldon, Charles S. (II), *Review of the Soviet Space Program: With Comparative United States Data,* (New York: McGraw-Hill Book Company, 1968): 15.
[74] Evans, *Escaping the Bonds of Earth,* 39.
[75] Ezell and Ezell, *The Partnership,* kindle loc. 909.
[76] *Ibid.,* 1010.

gave a speech to dedicate the NASA Space Exhibit at the Seattle World's Fair in which he said that joint scientific efforts would be beneficial for the political realm, but that it would take both sides to shoulder the burden and so he approached the possibility "with a spirit of cautious optimism."[77]

On July 9, 1962, the U.S. detonated a thermonuclear warhead in its Starfish Prime test in the Pacific Ocean, which inadvertently disabled satellites and caused radiation concerns for manned orbit.[78] After asking that the U.S. refrain from nuclear tests while the USSR launched more men into orbit, the Soviets sent Andrian Nikolayev aboard Vostok 3, powered by an R-7, into space on August 11, 1962.[79] Pavel Popovich followed suit on August 12 in Vostok 4.[80] On October 3, 1962, American Walter Schirra orbited in the *Sigma 7* on the Mercury-Atlas 8 mission.[81]

On October 14, 1962 U.S. U-2 aircraft reconnaissance photos showed ballistic missile base construction in Cuba.[82] Following the Bay of Pigs failure, Cuba declared itself a socialist republic and allied openly with the USSR, which then began to install coastal defense missiles and Soviet-controlled nuclear weapons in Cuba.[83] The Joint Chiefs of Staff supported a full military invasion of Cuba, while Secretary of Defense Robert McNamara supported a naval blockade focused only on weapons, which might still technically count as an act of war under international law, but which Kennedy thought would not provoke a Soviet counter-strike.[84] Kennedy's decision to create a

[77] *Ibid.*, 1051.
[78] Evans, *Escaping the Bonds of Earth*, 39.
[79] *Ibid.*, 40.
[80] *Ibid.*, 43.
[81] Sheldon, *Review of the Soviet Space Program*, 15.
[82] Evans, *Escaping the Bonds of Earth*, 46.
[83] *Ibid.*, 46-47.
[84] *Ibid.*, 47-48.

blockade around Cuba led Khrushchev to counter that this was an act of aggression and marked possible transition from Cold to Hot War.[85] This escalation in temperament led to U.S. forces going to DEFCON 2, signaling imminent warfare and on the morning of October 26, in the midst of a stalemate, Kennedy decided, privately with his advisors, that it would take a U.S. attack to get the missiles out of Cuba, though he hoped diplomacy might still work.[86] Khrushchev sent Kennedy a message noting the horrors a nuclear war would have in store for the world and proposed that, "If there is no intention to doom the world to the catastrophe of thermonuclear war, then let us not only relax the forces pulling on the ends of the rope, let us take measures to untie that knot. We are ready for this."[87] In response, Kennedy sent Khrushchev a message indicating he would promise not to invade Cuba in exchange for Soviet missile removal under UN supervision.[88] After some clandestine negotiation of a quid-pro-quo removal of U.S. based missiles from Turkey, on October 28, Khrushchev publicly stated the Soviet missiles would be removed and by November 20, 1962 the U.S. quarantine was over.[89]

By the mid-1960s, both the USSR and the US were using photographic space technology; part of the power of deterrence relied on letting the enemy know that the weapons exist – thus both sides were somewhat open to allowing reconnaissance

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[85] Mark J. White, *The Cuban Missile Crisis* (London: MacMillan Press, 1996), ix.
[86] "The Cuban Missile Crisis, October 1962," *Office of the Historian, U.S. Department of State*, https://history.state.gov/milestones/1961-1968/cuban-missile-crisis.; Kennedy estimated the probability of disaster was 1/3; it might have killed 100 million Americans, more than 100 million Russians, and at least a few million Europeans. Graham T. Allison, "Conceptual Models and the Cuban Missile Crisis," *The American Political Science Review* 63, 3 (September 1969): 689.
[87] "The Cuban Missile Crisis, October 1962."
[88] *Ibid.*
[89] *Ibid.;* U.S. Attorney General Robert Kennedy secretly promised Soviet Ambassador to the U.S. Anatoly Dobrynin that the U.S. planned to remove Jupiter missiles that Khrushchev had demanded be removed from Turkey, but not as part of the public resolution to the crisis. *Ibid.*

missions from the enemy, in private of course.[90] Regardless, Kennedy decided early on that space reconnaissance should be veiled in secrecy, in contrast to Eisenhower's comparative openness about the subject.[91] This secrecy helped to maintain the integrity of the intelligence-gathering process; avoided opening the Soviets to ridicule that might provoke an angry response; hid the massive reconnaissance budget from the public, ensuring its continual funding; protected arms control negotiations, as it was easier to verify, privately, that the satellites did their job rather than putting it up to public scrutiny; kept less developed countries from feeling paranoid that Kennedy was spying on them; and allowed the President to keep all his options open after gaining information from reconnaissance missions, rather than having to pay attention to the popular opinion on the matter.[92]

The Cuban missile crisis solidified the importance of U.S. space reconnaissance for the U.S. government; American satellites eventually exposed the Soviet long-range ballistic missile program as a fraud, and pictures from the crisis itself helped Kennedy to keep Khrushchev at bay.[93] It also showed that satellite reconnaissance helped to stabilize the Cold War, because it reduced the element of surprise.[94] As William Burrows writes,

> The gravest concern in the realm of space policy in four successive administrations, beginning with Eisenhower's and ending with Richard M. Nixon's was not getting astronauts safely to the moon and back, however important those voyages were taken to be, but protecting U.S. 'spy' satellites from attack, both politically and militarily. And their safety remains of such

[90] Burrows, *Deep Black*, 132.
[91] *Ibid.*
[92] *Ibid.*, 133-134.
[93] *Ibid.*, 137.
[94] *Ibid.*, 149.

> paramount importance that… an attack on a U.S. reconnaissance satellite would be taken as an act of war.[95]

The U.S. satellites were not always successful, however; the KH-5 Argon – an Air Force reconnaissance satellite program that left out the NRO – attempted its first mission in February 1963 and failed.[96] Between 1963 and March 30, 1967, forty-six KH-5s orbited, and four failed outright (those that did reach orbit suffered failure soon after).[97]

On May 15, 1963, Gordon Cooper took off from Cape Canaveral in *Faith 7* on the Mercury-Atlas 9 – the last Mercury program manned mission and the last time an American orbited solo.[98] The U.S. space program was gradually moving toward the moon. Khrushchev's goal for the Soviet space program was more focused on short-term spectacular stunts that his regime could use for propaganda; the next great Soviet mission was sending the first woman into space.[99] This decision coincided with the U.S. decision to bar interested female pilots from participation in the Mercury space program.[100] Allowing women into the Soviet program was a way for the USSR to show that women were equal to men, which was part of the socialist state's ideology.[101] Kamanin narrowed 200 female aviation sports candidates to five who he then trained, and finally chose Valentina Tereshkova, of whom he said, "She is a Gagarin in a skirt."[102] On June 14, 1963, Valeri Bykovsky flew Vostok 5 and was joined in orbit on June 16 by Tereshkova on the Vostok 6 for a dual flight mission. The launch coincided

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[95] *Ibid.*, 138.
[96] *Ibid.*, 214.
[97] *Ibid.*
[98] Sheldon, *Review of the Soviet Space Program*, 15.
[99] Evans, *Escaping the Bonds of Earth*, 49.
[100] *Ibid.*
[101] *Ibid.*
[102] *Ibid.*, 50.

with British Labour party leader Harold Wilson's visit to Moscow, during which he asked how many cosmonauts the USSR had in space this time and Khrushchev replied, "Only one… so far!"[103] Tereshkova totaled 48 orbits of Earth and 70 hours in flight, beating the six Mercury missions to that date combined.[104] That was the end of the Vostok space program.

In June and July 1963, Sir Bernard Lovell, Director of the Jodrell Bank radio telescope facility, which was supposed to play a role in the Soviet-American communications satellite experiments championed by Blagonravov and Dryden and Frutkin, visited the Soviet Academy of Sciences.[105] The Soviets gave him a tour of optical and radio observatories, something that had not yet been seen by any Westerner – or by many Soviet scientists, for that matter.[106] Mstislav Keldysh, Presideent of the USSR Academy of Sciences, told Lovell that Soviet scientists were shifting focus toward unmanned moon exploration, given economic and safety difficulties in sending a manned mission, which some in the scientific community of the U.S. took to mean that the Soviets dropped out of the manned moon-race.[107] Others, including Dryden, thought it was simply a ploy to get the U.S. to reveal their moon-mission plans to an international scientific body, and so it was determined the U.S. would go on as it had planned, to beat the Soviets to the moon with a manned mission, at least for the time being.[108] Blagonravov and Dryden met in New York and discussed a cooperative lunar exploration in early September, 1963.[109]

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[103] *Ibid.*, 54.
[104] *Ibid.*, 57.
[105] Ezell and Ezell, *The Partnership*, kindle loc. 1132.
[106] *Ibid.*, 1137.
[107] *Ibid.*, 1137-1155.
[108] *Ibid.*, 1155-1161.
[109] *Ibid.*, 1179.

Kennedy met with NASA Administrator James Webb on September 18, 1963 to enlist his help in bringing the rest of NASA on board with the idea of a cooperative moon flight.[110] On September 20, Kennedy addressed the UN General Assembly and said that "space offers no problems of sovereignty… why, therefore should man's first flight to the moon be a matter of national competition? Why should the United States and the Soviet Union, in preparing for such expeditions, become involved in immense duplications of research, construction, and expenditure," suggesting that a joint expedition might be possible.[111] This flip-flop between a competition for the moon between two ideological enemies, the perspective supported by the U.S. military and some in NASA, and the practicalities and possibilities of cooperation, championed by many in the scientific community both domestically and internationally, was a common theme within the Kennedy administration that would continue throughout the administrations of Kennedy's successors.

Unfortunately for Kennedy, although the speech was meant to improve political relations, the USSR ignored the proposal and did not even report it in the press.[112] Even later Soviet accounts of the period omit this particular speech, while including Kennedy's speeches at universities in prior months that lacked actual proposals to cooperate and simply expressed his support for a cooperative stance with the USSR.[113] In the U.S. public opinion was equally split between strong support and strong opposition for cooperation.[114] NASA's scientists had mixed reactions, as many saw

[110] *Ibid.*, 1187.
[111] *Ibid.*, 1173.
[112] *Ibid.*, 1201.
[113] Anatolii Andreievich Gromyko, *Through Russian Eyes: President Kennedy's 1036 Days*, ed./trans. Philip A. Garon (Washington, D.C.: International Library Inc., 1973), 215-218.
[114] Ezell and Ezell, *The Partnership*, kindle loc. 1201.

great possibility for cooperative ventures – in the view of Deputy Associate Administrator for Manned Space Flight George E. Mueller, space could be like Antarctica, where scientists worked together but, "they got there in different ships," – while others, like Robert Gilruth, Director of the Manned Spacecraft Center, voiced concerns about the technical difficulties of integrating the two programs.[115] Optimism for a joint mission stagnated as the U.S. public still wanted the U.S. to be the first to the moon, regardless of support for cooperation, and the attitude became concrete when Congress's December appropriations bill said, "No part of any appropriation made available to the National Aeronautics and Space Administration by this Act shall be used for expenses of participating in a manned lunar landing to be carried out jointly by the United States and any other country without consent of Congress."[116]

The U.S. felt a shockwave when President Kennedy was assassinated on November 22, 1963. His vice president Lyndon B. Johnson took over and served until 1969, taking a similar stance on the space program as Kennedy. By 1964, the KH-6 program launched, sending its crafts into low orbit for excellent quality pictures, but had short craft lifespans due to the heat at the low altitudes.[117]

On October 12, 1964, the Voskhod (or "sunrise") program launched the Voskhod 1 with three astronauts, Vladimir Komarov, Konstantin Yegorov, and Boris Feoktistov.[118] Leonid Brezhnev took over as leader of the Soviet Union in October of 1964, two days after the Voskhod 1 launch. On March 18, 1965, the Voskhod 2 took Pavel Belyayev and Alexey Leonov to space, which included the first spacewalk,

[115] *Ibid.*, 1201-1208.
[116] *Ibid.*, 1222.
[117] Burrows, *Deep Black*, 214.
[118] Sheldon, *Review of the Soviet Space Program*, 15.

completed by Leonov.[119] The U.S., meanwhile, continued its own separate missions, completing its own spacewalk in its June 1965 Gemini 4 mission with James McDivitt and Edward White.[120] The competition for being the first to complete various activities in space continued between the Voskhod and Gemini programs.

In the UN Committee on the Peaceful Uses of Outer Space, meanwhile, cooperation was occurring in the creation of international space law. The 28 member nations of the Legal Subcommittee incorporated principles supported in prior General Assembly resolutions about similar international issues, and created the treaty during their Fifth Session from July 12 to August 4, 1966 and in New York from September 12 to 16, 1966. They included in their discussions a recommendation by a 1959 American Bar Association resolution that stated, "in the common interest of mankind… celestial bodies should not be subject to exclusive appropriation;" a similar report by the UN Ad Hoc Committee on the Peaceful Uses of Outer Space in 1959 that said "serious problems could arise if States claimed, on one ground or another, exclusive rights over all or part of a celestial body… some form of international administration over celestial bodies might be adopted;" the 1959 Antarctic Treaty; President Eisenhower's September 1960 speech to the UNGA asserting American agreement that "celestial bodies are not subject to national appropriation by any claims of sovereignty… nations of the world shall not engage in warlike activities on these bodies… no nation will put into orbit or station in outer space weapons of mass destruction," with verification power given to the UN; the 1961 UN Resolution 1721; and the 1963 Treaty Banning

[119] *Ibid.*; Alexei Leonov, "Learning to Spacewalk," *Air & Space Magazine*, January 2005, http://www.airspacemag.com/space/the-nightmare-of-voskhod-2-8655378/.
[120] Sheldon, *Review of the Soviet Space Program*, 15; "First American Spacewalk," *NASA*, June 3, 2008, https://www.nasa.gov/multimedia/imagegallery/image_feature_1098.html.

Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water, which banned nuclear weapons testing "in the atmosphere, beyond its limits, including outer space."[121]

As the space race continued and a moon landing seemed increasingly possible, a sense of urgency arose surrounding the need to establish clear restraints on moon activities. Soviet spokesmen had been calling even more vocally than their American counterparts for peaceful uses of outer space and cooperation, as evidenced by the spokesman for the Soviet space program (who also had a close, friendly relationship with NASA's Hugh Dryden) Leonid Sedov's 1959 praising of peaceful uses of outer space as a means to ease military tensions, a sentiment which he continued to hold even into his 1971 statement that space research and international cooperation helps to create world peace.[122] President Johnson's May 7, 1966 speech urging the international community to create a treaty "to insure that explorations of the moon and other celestial bodies will be for peaceful purposes only… to be sure that our astronauts and those of other nations can freely conduct scientific investigations of the moon" reflected this sense of urgency.[123] On December 8, 1966, these members announced they had finalized the text of a treaty to establish principles governing activities in outer space.[124]

On January 27, 1967, tragedy struck the U.S. space program when the Apollo 1 mission on the Apollo Saturn-204, which sought a lunar landing, had a cabin fire during the ground test, killing all three of its crew through carbon monoxide asphyxiation: Gus

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[121] Paul G. Dembling and Daniel M. Arons, "The Evolution of the Outer Space Treaty," *Journal of Air Law and Commerce* 33 (1967): 419-425.
[122] William H. Schauer, *The Politics of Space: A Comparison of the Soviet and American Space Programs* (New York: Holmes & Meier Publishers, Inc., 1976), 109.
[123] Dembling and Arons, "The Evolution of the Outer Space Treaty," 426.
[124] *Ibid,* 420.

Grissom (third scheduled flight), Edward White (second scheduled flight), and Roger Chaffee.[125] On April 23, 1967, the USSR had its own tragedy when its Soyuz 1 vehicle crashed due to parachute failure, killing Vladimir Komarov (second space flight) in the first in-flight fatality in spaceflight history.[126] There were signs that the Soyuz 1 was imperfect, so much so that its creator, Vasili Mishin, refused to sign the paperwork permitting it to fly.[127] But Mishin did not have the political clout Sergei Korolev or Wernher von Braun did and so Soviet leadership ordered the flight to take place as scheduled, coinciding with an important victory day celebration.[128] Clearly, the politically-motivated competition sometimes had a dangerous consequence on both sides for the astronauts taking part.

On the evening of the Apollo 1 accident in 1967, President Johnson was with five veteran astronauts in Washington D.C., who watched him sign "The Outer Space Treaty," officially known as "The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies."[129] The USSR agreed to the Treaty as well. In 1968 Brezhnev reiterated the Soviet position that space research be devoted to peaceful uses with the goal of international cooperation.[130]

Seeking to redeem itself after the Soyuz 1 disaster, the USSR first performed a successful docking of unmanned craft with the Cosmos 213 and Cosmos 212 in April, 1968.[131] Mishin suggested a mixed docking, with one manned and one unmanned craft

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[125] Sheldon, *Review of the Soviet Space Program,* 15; Evans, *Escaping the Bonds of Earth,* 404.
[126] Sheldon, *Review of the Soviet Space Program,* 15.
[127] Evans, *Escaping the Bonds of Earth,* 423.
[128] *Ibid.*, 423-424.
[129] *Ibid.*, 418.
[130] Schauer, *The Politics of Space,* 109.
[131] Evans, *Escaping the Bonds of Earth,* 455.

and on October 25, 1968, the unmanned Soyuz 2 lifted off to rendezvous and then dock with Georgy Beregovoi piloting the Soyuz 3.[132] Although the docking was unsuccessful, possibly due to pilot error, it proved that the Soyuz could be a safe manned vehicle.[133]

By early 1968, Johnson was under pressure over the war in Vietnam, which seemed to be failing due to the military's strategy of attrition, and yet the generals there requested an extra 206,000 troops.[134] While the Tet Offensive proved to be a military failure for the Vietcong, it proved a political success as U.S. public support for the war dropped dramatically, striking a blow to the Johnson administration; the My Lai Massacre shattered much remaining support.[135] Meanwhile, NASA was facing hardship trying to get its Saturn V up and running.[136] Luckily, by the end of 1967, they had gotten a successful first flight of the Saturn V and on October 6, 1968, NASA launched the Apollo 7 with a Saturn 1B rocket, carrying Walter Schirra (third spaceflight), Donn Eisele, and R. Walter Cunningham.[137]

On October 14, 1968, Academician Leonid Sedov told the Congress of the International Astronautical Foundation that sending astronauts to the moon was not a priority for the USSR at that time.[138] Korolev had been planning for a Soviet moon mission ever since Kennedy's speech, but rocket fuel problems ultimately slowed development of a moon mission.[139] On November 10, 1968, the USSR's Zond 6 carried

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[132] *Ibid.*, 457.
[133] *Ibid.*
[134] *Ibid.*, 438.
[135] *Ibid.*
[136] *Ibid.*, 439.
[137] *Ibid.*, 442-464.
[138] *Ibid.*, 458.
[139] *Ibid.*, 479-460

a biological payload to the moon and back, which killed the specimens it carried, but also pushed the U.S. to work faster on the Apollo 8.[140]

On December 21, 1968, the Apollo 8, using the Saturn V rocket, took Frank Borman, James Lovell, and William Anders to orbit the moon.[141] This was ultimately the sign that the U.S. won the race to the moon. It paved the way (along with the Apollo 9, in which Rusty Schweickart tested the spacesuit by climbing out of the lunar module hatch, and the Apollo 10, which served as a dress rehearsal for the Apollo 11 with Thomas Stafford, John Young, and Eugene Cernan) for Neil Armstrong, Mike Collins, and Buzz Aldrin to take the Apollo 11 to the Moon on July 20, 1969.[142]

On January 14, 1969, the USSR's Soyuz 4 with Vladimir Shatalov and Soyuz 5 carrying Boris Volynov, Aleksei Yeliseyev, and Yevgeny Khrunov rendezvoused and docked in space, where Yeliseyev and Khrunov walked to the Soyuz 4 and then parted, with Volynov piloting the Soyuz 5 alone back to earth and Shatalov, Yeliseyev, and Khrunov coming back in the Soyuz 4.[143] This successful flight followed the tragedy of the Soyuz 1 and its cancelled docking attempted with the Soyuz 2.[144] But the USSR would continue investment in its space program even after the Apollo 11 won the space race, at least in terms of propaganda.

Concluding Thoughts on the Era That Started It All

In March 1967, Lyndon Johnson said to a group of government officials, "we've spent thirty-five or forty billion dollars on the space program. And if nothing else had

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[140] *Ibid.*, 460-461.
[141] *Ibid.*, 470.
[142] *Ibid.*, 481-482.
[143] Ben Evans, *Foothold in the Heavens: The Seventies* (New York: Springer Praxis Books, 2010), 2.
[144] *Ibid.*

come out of it except the knowledge we've gained from space photography, it would be worth ten times what the whole program has cost. Because tonight we know how many missiles the enemy has."[145] This statement illustrates the nature of the space race throughout the 1950s and 60s. It was a time of competition and obsession with security against the enemy, be it the USSR or US. Just as the USSR used its space program to promulgate its socialist ideology, boosted by Tereshkova's orbit, the US, too, used its space programs to show the superiority of its own technology and ideology of capitalism.[146]

After the IGY kicked off the true race with Sputnik 1, the activities of the US and USSR in space throughout the rest of the 1950s and 60s were clearly militaristic and propaganda-fueling. Both governments kept more hushed, but equally as important reconnaissance satellite programs that sought to boost the respective militaries of each. The technology boost of the 1960s produced an extraordinary reconnaissance capability, which naturally went hand-in-hand with military, rather than scientific operations.[147] Often, the information the reconnaissance missions gathered, using photographic satellite capabilities, assisted in considerations of arms control treaties and restraints.[148] Military commanders have attempted to gain intelligence about the enemy by getting a look from as high in the sky as possible for centuries; Chinese and Japanese folklore includes "spotters" who spied on the enemy from baskets hanging from kites high in the air and 1794 France used spies in balloons to watch the enemy, organized

[145] Burrows, *Deep Black,* vii.
[146] Gorman and O'Leary, "An ideological vacuum," 74.
[147] Burrows, *Deep Black,* 12.
[148] *Ibid.,* 15.

into a company of aérostiers.[149] World War I established the usefulness of aerial reconnaissance with planes, so the extension into space was a natural desire for militaries.[150]

By 1968 Robert B. Hotz, editor-in-chief of *Aviation Week & Space Technology*, had written, "The massive competition between the space programs of the United States and the Soviet Union is one of the most significant events of modern times."[151] The 1968 *Review of the Soviet Space Program* for which Hotz wrote this statement as part of a foreword lists a sort of tallying chart by which it keeps score for the countries involved in space from 1957-October 4, 1967. It lists successes of U.S. launch vehicles (388 overall), Soviet launch vehicles (221), French launch vehicles (4), and Italian launch vehicles (1), along with successful payloads to Earth orbit, which have a similar breakdown by country, and successful "escape payloads to moon, beyond" which lists the U.S. with 26 and the USSR with 21.[152] Failures are scarcer, likely due to less available data, and lack much breakdown by year, but overall list failed U.S. launch vehicles (84), Soviet launch vehicles (497), and Japanese launch vehicles (3), with a similar listing for payloads to Earth orbit, and failed "escape payloads to moon, beyond" as U.S. (10) and USSR ("14+?").[153] This score-keeping shows the limited number of actors in the space race of the 50s and 60s. Although France, Italy, and Japan make an appearance, the real competition was limited to the US and the USSR, which used the frontier of space as an extension of their competitive rivalry on the Earth.

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[149] *Ibid.*, 28.
[150] *Ibid.*, 36.
[151] Hotz, "Foreword," v.
[152] Sheldon, *Review of the Soviet Space Program,* 12.
[153] *Ibid.*

The 1970s: Cooperation of the Apollo and Soyuz

After the United States won the race to the moon, the USSR continued to land automated rovers called Lunokhods on the moon, but these were not effective propaganda tools, as the world was still most impressed by the U.S. moon landing.[154] In the post-moonwalk world, the USSR turned its attention toward its Soyuz craft, which would become the most-used manned spacecraft of all time.[155] Its current version with an updated R-7 continues to shuttle astronauts from many different nations into space in the present day.[156] Soyuz, which means "union," was Korolev's brainchild and arguably greatest achievement, although he gave that title to his Voskhod 2 mission of 1965.[157] While Neil Armstrong in Gemini 8 had docked with an unmanned vehicle in 1966 and the Soviet Cosmos 186 and 188 had docked unmanned, it made sense that the spacecraft called "union" would run the USSR's first manned docking and exchange of crew members between vehicles.[158] Korolev's Soyuz 19 would go on to be used in the Apollo-Soyuz Test Project of 1975 with the U.S.'s Apollo vehicle. The 1970s largely continued the military satellite production of the 1960s, but was ultimately defined by the first major joint project between the USSR and the US – the Apollo-Soyuz Test Project.

On April 11, 1970, the Apollo 13 launched with Jim Lovell (fourth space flight), Jack Swigert, and Fred Haise, nearly facing disaster due to various technical issues, but their remarkable recovery was largely eclipsed in the U.S. public's eye by the

[154] Evans, *Foothold in the Heavens,* 1.
[155] *Ibid.,* 2.
[156] *Ibid.*
[157] *Ibid.,* 6.
[158] *Ibid.,* 1-3.

increasingly unpopular Vietnam War.[159] Meanwhile Keldysh and NASA Administrator Thomas Paine had been corresponding about the development of compatible equipment and procedures for a cooperative spaceflight.[160] Soviet officials were far more receptive to cooperation in this post-moon landing era. On July 10, 1970, President Nixon publicly stated support for space cooperation and suggested that negotiations between the USSR and US on a technical level should begin.[161]

In August, the Advanced Manned Missions Planning Group in NASA's Office of Manned Space Flight was assigned to develop a compatible docking system. This staff worked out the Apollo-Soyuz docking capabilities and requirements and suggested that, although the USSR could not participate in Skylab A due to time and hardware restraints, but it could absolutely match the systems for later Skylab and Space Station flights if the Soviets were interested. Paine pursued the suggestions and wrote to Keldysh to suggest the Soyuz rendezvous with Skylab. On September 23, Academician Keldysh responded and suggested they begin talks in Moscow in October or November, which Paine accepted.[162] NASA officials and Soviet officials, along with technical specialists and astronauts from both countries met in Moscow to draft a cooperative space venture agreement, which they signed on October 28, 1970.[163] In 1971, Arnold Frutkin and George Low met with Keldysh and Feoktistov to discuss the possibility of a compatible docking system with the Apollo and Soyuz.[164]

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[159] *Ibid.*, 406.
[160] Ezell and Ezell, *The Partnership*, kindle loc. 1915.
[161] *Ibid.*, 1915, 1920.
[162] *Ibid.*, 1926-2104.
[163] *Ibid.*, 2313.
[164] *Ibid.*, 2461.

On April 19, 1971, the USSR launched the first space station, the Salyut 1 and on April 23, the Soyuz 10 went into orbit and docked with Salyut 1.[165] Space stations' primary purpose at this point was to be an information gathering, processing, transmission, and dissemination tool to support satellite operations and to help with earthly functions like weather, ecological, and agricultural observation.[166] The possibility of military use, however, remained on the radar, as scholars pointed out that only explicitly attack-focused military capabilities and not self-defense-related military capabilities were prohibited in the Outer Space Treaty.[167]

Meanwhile, Soviet scientists continued to work on docking options with NASA, visiting Houston in June 1971. They decided to focus on a docking mission with Apollo and "a manned orbital scientific station of the Salyut type," with a later possible docking flight between Soyuz and Skylab.[168] Docking research to support the cooperative venture went less-than-smoothly with the Soviet Soyuz 11 depressurization, killing its crew, and the American Apollo 14 operation difficulty with service and lunar module docking, but efforts continued nonetheless.[169] James Chipman Fletcher became Administrator of NASA on April 27, 1971 and announced his support for closer cooperation with the USSR.[170]

Brezhnev and Nixon (who had taken office in 1969) met multiple times in Helsinki and Vienna for the Strategic Arms Limitation Talks (SALT), which sought to

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[165] *Ibid.*, 2608.
[166] Delbert D. Smith, *Space Stations: International Law and Policy* (Boulder, Colorado: Westview Press, 1979), 4.
[167] *Ibid.*, 140.
[168] Ezell and Ezell, *The Partnership*, kindle loc. 2657-2725.
[169] *Ibid.*, 2800-2874.
[170] *Ibid.*, 2887-2893.

reduce both countries' ballistic missile stocks.[171] This was part of a general détente, a cooling of hostilities between the USSR and the US. Scientists had been sharing information between the two countries for many years, exchanging lunar soil specimens and biomedical data. Détente facilitated expansion of the existing cooperation and by 1973 this improvement in relations created the Prevention of Nuclear War Agreement.[172]

The political climate began to match this scientific relationship in the making of the Anti-Ballistic Missile Treaty, at which point the US and USSR agreed upon the Apollo-Soyuz Test Project, in which an Apollo spacecraft with three men would dock with a Soyuz spacecraft with two men mid-orbit. On May 24, 1972 Nixon and the USSR's Premier Alexei Kosygin signed the Apollo-Soyuz Test Project agreement, with some trepidation that the other side might not follow through.[173] The Soviets were very opaque in their dealings, for a while refusing to let Stafford, one of the Apollo crewmembers, visit the Tyuratam Cosmodrome and see the Soyuz. A major difference between the Soviet and American space programs was that the Soviet manned program was entirely under the arm of the military, while the American manned programs were run by the civilian organization, NASA (although the CIA and Air Force ran much of the non-manned space agenda of the U.S.).[174] This helps in part to explain their less-transparent nature in dealing with their cooperative partner.

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[171] Evans, *At Home in Space*, 2.
[172] *Ibid.*
[173] *Ibid*.
[174] *Ibid.*, 2-3.

Skylab launched in 1973 as the US's first space station. In November 1974, President Ford signed a SALT accord with Premier Brezhnev.[175] Although it did not lead to a treaty, this accord did show the agreement between Brezhnev and Ford about limiting arms on both sides.[176] At the same time, the U.S. was introducing new ICBMs – the Minuteman III in 1969 and Minuteman IV in 1974 – while the USSR was building five new classes of ICBMs and upgrading those classes at least seven times.[177] While the political spirit of disarmament and cooperation was there, military fears still loomed heavily behind the diplomacy moves.

To prepare for cooperation, on December 2, 1974 Anatoli Filipchenko and Nikolai Rukavishnikov went into orbit on the Soyuz 16, which the U.S. was tracking and monitoring, and practiced the systems and procedures for the Apollo-Soyuz Test Project.[178] Due to the differing natures of the US and USSR's manned space programs, some issues arose even in this early stage of cooperation: the USSR let NASA know about Soyuz 16 and offered to give advance notice of the launch as long as NASA promised not to reveal anything to the press. But this broke with NASA's tradition of transparency and so the head of the American side of the Apollo-Soyuz Test Project, Glynn Lunney, told his Soviet counterpart that NASA would rather know nothing about Soyuz 16 because they would tell the American press.[179] To combat the press issue with the Apollo-Soyuz project, Low had included a line in his agreement with Vladimir Kotelnikov of the Russian Academy of Science in April 1972 that stated that the two

[175] David Pahl, *Space Warfare and Strategic Defense* (New York: Bison Books, 1987), 16.
[176] *Ibid.*
[177] *Ibid.*
[178] Evans, *At Home in Space,* 6.
[179] *Ibid.*, 7.

countries would develop a public information plan together that "takes into account the obligations and practices of both sides."[180] After much correspondence and multiple long meetings face-to-face, a compromise arose: Soviet correspondents would be limited in number, in order to facilitate the limitation of information in the USSR, and American correspondents would be promised full freedom and access, although this all turned out easier said than done.[181]

NASA and Soviet scientists worked hard for years in preparation for the Apollo-Soyuz Mission, astronauts trained in Russian and English and practiced the procedures, and on July 15, 1975, the mission finally launched.[182] The Soyuz launched first and the Apollo launched to meet it later that day. After some troubleshooting on July 16, the two crafts rendezvoused and docked on July 17.[183] Stafford entered the Soyuz, greeted by Leonov, and then Stafford, Slayton, Leonov, and Kubasov symbolically exchanged gifts before sitting down for the first joint space banquet.[184] On July 18, Kubasov and Brand broadcasted from "your Soviet/American TV center in space," giving a tour of the Soyuz, and Stafford gave Leonov and the Soviet viewers a Russian language tour of the Apollo.[185] Kubasov said in English, in a travelogue, "Dear American TV people, it would be wrong to ask which country's more beautiful. It would be right to say there is nothing more beautiful than our blue planet."[186] After a few days of exercises together and separately, the two parties bid farewell on July 21, ran more experiments on the 22-

[180] Ezell and Ezell, *The Partnership,* kindle loc. 4423.
[181] *Ibid.,* 4599.
[182] *Ibid.,* 5922.
[183] *Ibid.,* 6161.
[184] *Ibid.,* 6161-6192.
[185] *Ibid.,* 6223.
[186] *Ibid.,* 6230.

23, and came back to Earth on July 24.[187] This event can be considered the closing of the space race chapter for the Soviet Union and U.S. It marked the first real cooperation between the two in outer space and foreshadowed cooperation to come.

While this cooperative venture was taking place, the US was cooperating with other non-Soviet allied countries, in particular Norway and Australia, with its reconnaissance and surveillance activities against the USSR.[188] By the time Carter took over as the US President in 1977, satellites had advanced to where they could produce what was called "real-time imaging."[189] The Soviet Union caught up to the US in terms of weaponry stock and capabilities.[190] The USSR had a large stock of ICBMs totaling 1600 missiles by 1975, which they cut back slightly in favor of more accurate missiles by the later 1970s.[191]

In 1979 the US's Skylab fell back to Earth. In the same year, President Carter signed the SALT II accord with Premier Brezhnev.[192] Many in the U.S., however, argued that the USSR "ignored the spirit of the treaties," as David Pahl writes in his book about the Strategic Defense Initiative of the 1980s, which coincided with a fear that the USSR might develop effective anti-ballistic missile defense, thus ending the promise of effective retaliation in the event of a nuclear attack and ruining deterrence.[193] Both the US and USSR had an impressive arsenal of ICBMs and were continuing development of the weapons that would give each the better strategic

[187] *Ibid.,* 6468.
[188] Burrows, *Deep Black,* 181-188.
[189] *Ibid.,* 226.
[190] Pahl, *Space Warfare and Strategic Defense,* 12.
[191] *Ibid.*
[192] *Ibid.,* 16.
[193] *Ibid.*

foothold.[194] The U.S. tended to have better weapons technology, spurring the USSR to create a more sizable weaponry stock to make up the difference. Likewise, though, the US feared the USSR's great number of weapons; Pahl writes that

> the Soviet arsenal of equipment – both conventional and nuclear – has grown to the point where it exceeds the combined inventories of all of NATO (including the United States) and the People's Republic of China… the quantity of Russian goods more than makes up for any disparity in quality. With this in mind and ignoring the Soviet nuclear missile threat, the size and quality of the Russian conventional force is such that their military leaders would likely be capable of advancing through the NATO defenses almost with impunity.[195]

Pahl's assessment reflects the reality of the military build-up as well as the fear of the Soviet capabilities that the U.S. was harboring by the end of the 1970s. This helped to corrode the spirit of trust and cooperation the Apollo-Soyuz mission cultivated and brought in the new decade on a nervous, warlike note.

The 1980s: Another Space Race

The Apollo-Soyuz was one flicker of cooperation that quickly dimmed as the 1980s rolled around and relations between the US and USSR soured.[196] In November 1982 Yuri Andropov took over after Brezhnev's death as leader of the Soviet Union.[197] Reagan campaigned for the US presidency on the promise of bringing the US military into the first place spot, lamenting that the US was neither the world's strongest nor largest military power as it was second to the USSR.[198] Reagan blamed this in part on the quest for disarmament, which was disproportionately cutting down the US's military capabilities compared to the USSR's.[199] U.S. public opinion and politics had once again

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[194] *Ibid.*, 19.
[195] *Ibid.*, 23.
[196] Evans, *At Home in Space*, 6.
[197] John Hughes-Wilson (Col.), *A Brief History of The Cold War: The hidden truth about how close we came to nuclear conflict* (New York: Carroll & Graf Publishers, 2006), 294.
[198] Pahl, *Space Warfare and Strategic Defense*, 41.
[199] *Ibid.*, 41-44.

swung back toward a fear of Soviet aggression and mistrust.[200] Reagan won the presidency in November 1980 and Congress backed (at times reluctantly) the move toward suspending arms control negotiations and boosting U.S. arms until the U.S. was on par or exceeded the USSR before it renegotiated disarmament.[201] Naturally, this shift made it difficult to convince the USSR to reduce arms as the US increased its own. It became even more difficult when NATO, the UK, and France each began programs to modernize their own nuclear retaliatory forces.[202] In arms limitation discussions in the early 1980s, the U.S. demanded drastic reductions in the most effective and modern Soviet weapons, while refusing to reduce its own stocks at a comparable rate.[203]

The relationship between the USSR and the US soured and both accused the other of seeking the first strike advantage.[204] From the Soviet perspective, both sides had been operating in the spirit of détente, until suddenly the U.S. decided to rebuild their arms and create an environment of confrontation.[205] To try and force the other side to concede to renegotiation of disarmament, both countries ran a series of non-secret weapons tests to show their own might.[206] Premier Andropov refused to speak with President Reagan following the US test of Cruise missiles, instead stating in 1983 that this deployment "destroyed the very bases on which it was possible to seek an agreement."[207] In March of 1983 President Reagan announced a research and

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[200] *Ibid.*, 6.
[201] *Ibid.*, 44.
[202] *Ibid.*; Note: although NATO did not have "alliance" nuclear weapons, as early as 1957 the North Atlantic Council argued that NATO needed "a fully effective nuclear retaliatory force" to "be kept in constant readiness at all times" with less emphasis on conventional forces in the future. Brian J. Collins, *NATO: A Guide to the Issues* (Santa Barbara, California: Praeger, 2011), 67-68.
[203] Pahl, *Space Warfare and Strategic Defense*, 44.
[204] *Ibid.*
[205] *Ibid.*
[206] *Ibid.*
[207] Hughes-Wilson, *A Brief History of The Cold War*, 300.

development project called the Strategic Defense Initiative (SDI), which would rival the Kennedy era in its demands on the scientific community in the U.S.[208] This highly aggressive announcement came from the USs discovery of the Krasnoyarsk radar facility and the Soviet's testing of the a series of SS-20 missiles on a trajectory toward the US, which the USSR destroyed and labelled "tests" before they could do damage, but left the US leadership with what they perceived to be a warning.[209] SDI sought to lessen the perceived gap in capabilities between the US and the USSR and provide some level of defense as offensive capabilities were already quite advanced.[210]

The U.S. ran various Spacelab missions to conduct experiments in space starting in 1983. In President Reagan's 1984 State of the Union speech, he announced his plan for NASA to create a permanently manned space station, which would come to be known as the Space Station Freedom.[211] That same year the Strategic Defense Initiative Organization was established in the Department of Defense to manage SDI efforts.[212] SDI, which sought to end the Mutually Assured Destruction (MAD) nuclear deterrence strategy by giving the U.S. a proper defense system, set the early 1990s as the goal for development of defense technologies.[213] SDI was meant to produce a deterrent against any Soviet rapid expansion of anti-ballistic missile systems beyond those which the 1972 Anti-Ballistic Missile Treaty established.[214] Andropov decried the SDI announcement, saying that space-based defense "would open the floodgates of a

[208] Pahl, *Space Warfare and Strategic Defense*, 6.
[209] *Ibid.*, 44.
[210] *Ibid.*, 46.
[211] Ronald Reagan, "Address Before a Joint Session of the Congress on the State of the Union," *The American Presidency Project*, January 25, 1984, http://www.presidency.ucsb.edu/ws/?pid=40205.
[212] Pahl, *Space Warfare and Strategic Defense*, 58.
[213] *Ibid.*, 59.
[214] *Ibid.*

runaway race of all types of strategic arms, both offensive and defensive… Washington's actions are putting the entire world in jeopardy."[215] Reagan later offered SDI not only to the U.S.'s allies, but to the USSR as well, in order to boost the U.S.'s image of being a contributor of global peace and security.[216] It was also a strategic move on Reagan's part, as he knew the USSR would have to attempt to keep up with the U.S. in the arms race and that any defense program would cost the Soviets more than they could afford, with an already shriveling economy.[217]

Also in the 1984 State of the Union address, Reagan gave support to the space station program, which sought a permanently manned station by 1991.[218] Reagan called for American allies to take part in the program and in March 1984 NASA Administrator James Beggs met with European and Japanese officials to discuss cooperation on a space station project.[219] In April, NASA's Space Station Program Office was established and it called for design proposals from the aerospace industry in September.[220] The European Space Agency agreed to contribute in 1985 and Japan and Canada joined in the project in 1986.[221] The U.S. had tragedy strike when its Space Shuttle *Challenger* exploded in January 1986, and this resulted in the push-back of the planned space station launch until 1995.[222] This delay would inadvertently end up allowing Russia to take part in the space station project after the collapse of the Soviet Union, which will be discussed in the next section.

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[215] Hughes-Wilson, *A Brief History of The Cold War*, 308.
[216] *Ibid.*, 309.
[217] *Ibid.*
[218] Reagan, "Address Before a Joint Session of the Congress on the State of the Union."
[219] *Ibid.*; Anatoly Zak, "Space Station Freedom Chronology (1984-1992): 1984: Go ahead," *Spacecraft: Manned: ISS: Freedom project*, http://www.russianspaceweb.com/iss_us_roots.html.
[220] *Ibid.*
[221] *Ibid.*
[222] *Ibid.*

Under Reagan's administration, the U.S. space program became more concerned with defensive capabilities and surveillance and reconnaissance satellites. The importance of reconnaissance satellites to the U.S. was clear in the allocation of money: The National Reconnaissance Office had the largest budget of any intelligence organization – five billion dollars – in 1985.[223] The USSR had a similar outlook on the proper uses of space and technology in the 1980s as it feared (and later faced) Western pressures and collapse.

By early 1984 the USSR was facing a major economic and military challenge in Afghanistan, where Russian forces and resources were funneled in at a fast pace to try and fight a powerful insurgency and the Soviet economy could not keep up with the demands of the renewed arms race, leaving its people to suffer with food shortages.[224] In February Andropov died and was succeeded by Konstantin Chernenko.[225] Chernenko's poor health meant he often handed over control in meetings to his Head of the Secretariat, Mikhail Gorbachev, who took over the premiership upon Chernenko's death in March 1985.[226] The quick turnover of Soviet leaders – three premiers dead within three years – meant that little positive, meaningful dialogue occurred between the US and USSR on a large scale from the early to mid-1980s and American scientists directed a majority of their cooperative discussions toward American allies for the space station project.[227] The lack of large-scale dialogue was perhaps justified for the Soviet leaders regardless, as Reagan's National Security Directives (particularly NSDD 32 in

[223] Burrows, *Deep Black*, 198.
[224] Hughes-Wilson, *A Brief History of The Cold War*, 300.
[225] *Ibid.*
[226] *Ibid.*, 302.
[227] Hughes-Wilson, *A Brief History of The Cold War*, 303.

1981) placed secret economic and diplomatic pressures on the USSR in an effort to, as some commentators put it, deliberately "attempt to murder the Soviet Union."[228] Still, not all scientific dialogue ended during the early to mid-1980s. Low-level cooperative programs, like a medical device sharing and experimentation program led by Soviet academician Oleg Gazenko and Anatoly Grigoriev and NASA scientist Arnauld Nicogossian, and the coordination of U.S.-Canadian-French SARSAT with Soviet COSPAS satellites for search and rescue efforts continued throughout the 1980s.[229]

Gorbachev's premiership brought in a new era in US-Soviet relations, as he was more receptive to discussions with American leadership; Vice President George H.W. Bush and Secretary of State George Shultz met with Gorbachev at Chernenko's funeral and reported back to Reagan that he was someone with whom they could "do business."[230] Unlike previous leaders, Gorbachev, apparently unafraid of revealing the USSR's weaknesses in public, visited with and asked the people about their needs, which focused on the terrible economy.[231] Gorbachev called for perestroika ("restructuring") to fix the economy and glasnost ("publicity") to allow the public greater say in the actions of the government.[232] The rest of the Communist leadership was less approving of these reforms and of Gorbachev's willingness to meet and work with Reagan.[233]

Reagan held his positions steadfast, forcing Gorbachev to make concessions, which further angered the rest of the Soviet regime.[234] As Reagan applied pressure to

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[228] *Ibid.,* 303.
[229] Sagdeev, "United States-Soviet Space Cooperation during the Cold War."
[230] Hughes-Wilson, *A Brief History of The Cold War,* 315.
[231] *Ibid.,* 318.
[232] *Ibid.*
[233] *Ibid.,* 321-323.
[234] *Ibid.,* 325.

"drive the Communists out of Afghanistan" by giving $300 million in military aid to the Mujahidin and began to cut off communication with the USSR, Gorbachev's hopes for a summit in June 1986 vanished.[235] Along with the failing counterinsurgency in Afghanistan, Soviet leadership found evidence of Islamic insurrection spreading into Tajikistan within the Soviet Union, and the Chernobyl nuclear disaster in Ukraine in 1986 turned out to have a much larger impact than it initially appeared, including revealing the USSR's bankruptcy.[236]

On a positive note, the USSR launched the base block for the Mir (meaning "peace") space station on February 19, 1986, which had multiple docking ports and could accept large, permanent scientific modules, using the Soyuz as the cargo carrier from earth, as it had with the Salyut.[237] Gorbachev sought to end the Cold War threat in order to shift attention toward the domestic economic and political corruption problems plaguing the USSR and so he offered a huge unilateral cut in nuclear missiles in 1988, although many within the Soviet leadership disagreed with this move.[238]

In the U.S., negotiations with its foreign partners for the space station project finished, with 12 countries signing a participation agreement in 1988 and on September 29 the U.S. Space Shuttle began flying again for the first time after *Challenger*.[239] In 1989 President Bush approved the Space Exploration Initiative (SEI) to return man to the moon and plan a manned mission to Mars, although it was never implemented.[240] The Mir station in the USSR on the other hand faced enormous setbacks due to the

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[235] *Ibid.*
[236] *Ibid.*, 325-326.
[237] Rex D. Hall and David J. Shayler, *Soyuz: A Universal Spacecraft* (New York: Springer-Praxis Books, 2003), 317.
[238] Hughes-Wilson, *A Brief History of The Cold War*, 338-339.
[239] Zak, "Space Station Freedom Chronology (1984-1992): 1984: Go ahead."
[240] *Ibid.*

tumultuous political environment on Earth.[241] Funds previously allocated did not turn up, leaving Soyuz launches to the Mir delayed or cancelled.[242] Mir, which was supposed to be permanently manned, had a few extended periods in which it was not manned at all due to political uncertainty and budget shortages.[243]

Change was happening too fast in the Soviet Union and was causing massive instability; Reagan and Gorbachev agreed to meet in December 1988 for a small summit to discuss the future.[244] By 1989, Gorbachev's reforms favoring "freedom of choice" in elections allowed uprisings in Eastern Europe and held support in other areas of the communist bloc.[245] Hungary and Czechoslovakia began a reform process and border fences between East and West came down with no one disallowing escapes to the West.[246] When the Berlin Wall came down, many in the West, including the administration of the new President George H.W. Bush, were in disbelief, and one by one communist governments were toppled.[247]

In December 1989 Bush and Gorbachev met for a summit in Malta, which marked the end of the Cold War and included American economic initiatives aimed at helping the Soviet Union.[248] At the meeting, Gorbachev told Bush that the Soviet Union wanted America as a partner, "not as an enemy… things have changed… The Soviet Union will never start a new war against the United States… we should cooperate."[249]

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[241] Hall and Shayler, *Soyuz*, 334.
[242] *Ibid.*
[243] *Ibid.*
[244] Hughes-Wilson, *A Brief History of The Cold War*, 351.
[245] *Ibid.*, 349.
[246] *Ibid.*, 353.
[247] *Ibid.*, 357-358.
[248] *Ibid.*, 359.
[249] *Ibid.*, 360.

This was the note on which the last decade of the Cold War ended and an entirely new decade of soon to be Russian-American relations entered.

The 1990s

The collapse of the Soviet Union in 1991 opened the door to the possibility of better U.S.-Russian relations and greater cooperation in space. President George H.W. Bush transferred the Strategic Defense Initiative into the Global Protection Against Limited Strikes (GPALS) to defend against "purposeful strikes by various Third World powers developing ballistic missiles, or accidental or unauthorized launches from the U.S.S.R."[250] When the Soviet Union collapsed, SDI was irrelevant in its original form and even GPALS lost one of its probable enemies.[251] SDI was, in a sense, mothballed as it had received $20.9 billion from 1985 to 1991 and the technology it produced was stored in case of later use.[252]

NASA had continued to run scientific missions in the late 1980s, even as it ran defense-related projects, raising important scientific and political issues like nuclear power, which many scientists saw as necessary to the future of space operations, but which loomed heavily in the political sphere after the Chernobyl disaster.[253] The use of American intelligence satellites also remained, even as the Soviet Union began to crumble.[254] In October 1990, Congress cut the space station budget by six billion dollars, causing NASA to redesign the project.[255] That same year the U.S. launched the

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[250] John Pike, "Strategic Defense Initiative," *GlobalSecurity.org*, July 21, 2011, http://www.globalsecurity.org/space/systems/sdi.htm.
[251] *Ibid.*
[252] *Ibid.*
[253] Ben Evans, *Tragedy and Triumph in Orbit: The Eighties and Early Nineties* (New York: Springer Praxis Books, 2012), 566.
[254] *Ibid.*, 585.
[255] Zak, "Space Station Freedom Chronology (1984-1992): 1984: Go ahead."

Hubble Space Telescope, which had been on the radar for development immediately following World War II, but which Congress deemed too costly and of lesser importance in the context of the space race with the Soviet Union.[256] The Soviet Union's demise allowed the U.S. space program to justify more scientific, less militaristic expenses and ultimately paved the way for a new era of cooperation in space.

A 1995 Office of Technology Assessment for the U.S. Congress titled "U.S.-Russian Cooperation in Space" concluded that the collapse of the Soviet Union allowed for increased dialogue between states of the Former Soviet Union (FSU), which led to cooperative space programs with Russia "that would have been unimaginable just a few years ago."[257] The main cooperative ventures to begin in this period were the Space Shuttle-Space Station Mir dockings and the International Space Station (ISS).[258] The primary reasons for cooperation, Office of Technology Assessment Director Roger C. Herdman explains, are not necessarily technological necessity, but that it helped to stabilize the Russian economy and it provided an incentive for technological elites to stay in Russia and work on peaceful space projects rather than finding employment outside of Russia and contributing to the proliferation of weapons of mass destruction (which their skills would allow them to do, with a good paycheck in return).[259] Naturally the expansion of U.S.-Russian space cooperation did provide a scientific and technological benefit as well on top of the political and economic.[260] The U.S. brought

[256] Evans, *Tragedy and Triumph in Orbit*, 586.
[257] U.S. Congress, Office of Technology Assessment, *U.S.-Russian Cooperation in Space* (Washington, DC: U.S. Government Printing Office, April 1995), iii.
[258] *Ibid.*
[259] *Ibid.*
[260] *Ibid.*, 1.

Russia into the group of nations that had already agreed to work on the International Space Station Project, which initially caused some tension between the U.S. and its original ISS partners.[261]

Russia's Mir space station, which in 1991 was only expected to survive to around 1996, continued to operate with teams of cosmonauts manning it until August 1999.[262] In 1991-1992 the Soviet Union/Russia signed agreements with the German national space agency, European Space Agency, and the French national space agency to allow them to do short missions to Mir and then a longer mission for the European Space Agency, allowing many Europeans to train at Star City (the cosmonaut training center's home) in Russia.[263] The Russian space program ran its first manned mission on March 17, 1992 with a German cosmonaut in its crew.[264] It is interesting to note that this mission brought cosmonaut Sergei Krikalev back to Earth as a Russian citizen after a May 1991 mission took him to Mir as a Soviet citizen, where he stayed for nearly a year.[265] The new Russian space program was notable for its foundation of international cooperation, beginning with European space programs.

On June 17, 1992 U.S. President George H.W. Bush and Russian President Boris Yeltsin signed an agreement to initiate cooperative manned space programs, which became the basis for future space program agreements between Russia and the U.S.[266] That year the U.S. launched its newest orbiter, the Space Shuttle Endeavour,

[261] *Ibid.*, 3.
[262] Hall and Shayler, *Soyuz*, 336.
[263] *Ibid.*, 344.
[264] *Ibid.*
[265] *Ibid.*, 344-345.
[266] *Ibid.*, 345.

flew.[267] In 1993 NASA Administrator Dan Goldin and Roscosmos (the Russian Space Agency) General Director Yuri Koptev agreed upon a series of Shuttle docking missions to Mir to eventually bring the Russians onboard an international space station effort.[268] They also agreed to examine whether the Freedom station, which was still in design and production, could have a Soyuz docking port.[269] President Clinton called for the redesign of the space station Freedom in 1993 to decrease costs and incorporate more international involvement.[270] NASA called the new project Alpha and Russia agreed to supply hardware that it had intended for its Mir 2 space station program.[271] And so following the talks between Koptev and Goldin, the Mir 2 and Freedom projects morphed into one joint project – the International Space Station.[272]

When President Clinton took over in 1993, he declared the U.S.'s support for Russia in the second reset with Russia, after Bush's dealings with them in the post-Soviet context.[273] He sought to improv democracy within Russia and facilitate its economic conversion to an American market-oriented model.[274] Clinton continued Bush's goal of decreasing the nuclear threat of FSU countries.[275] Clinton and President Yeltsin disagreed over Russian support for Iran's nuclear program, causing a rift between the two in cooperative negotiations.[276]

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[267] Ben Evans, *Partnership in Space: The Mid to Late Nineties* (New York: Springer Praxis Books, 2014), 231.
[268] *Ibid.*, 383.
[269] Zak, "Space Station Freedom Chronology (1984-1992): 1984: Go ahead."
[270] "A History of U.S. Space Stations," *National Aeronautics and Space Administration* (June 1997): 3.
[271] *Ibid.*, 3-4.
[272] *Ibid*.
[273] Angela E. Stent, *The Limits of Partnership: U.S.-Russian Relations in the Twenty-First Century* (Princeton, NJ: Princeton University Press, 2014), 13.
[274] *Ibid.*, 15.
[275] *Ibid.*, 30.
[276] *Ibid*.

On February 8, 1994, the U.S. Space Shuttle Discovery (including a Russian cosmonaut among the crew) linked up with the Russian Mir space station; *Good Morning America* broadcast the event live, as the event marked the first real cooperation in action since the Apollo-Soyuz mission in 1975.[277] Over the course of the three-year Shuttle-Mir program, the U.S. Shuttle docked with Russia's Mir nine times, serving as an introduction to long-duration missions for astronauts who would go on to work in the International Space Station.[278] In March 1996, the U.S. Shuttle Atlantis took astronaut Shannon Lucid to Mir to stay for six months – the first long-duration shuttle drop of a crew member to a space station.[279] In August 1996 Atlantis and Mir exchanged Lucid for John Blaha, delivering supplies, equipment, and water.[280]

On January 29, 1998, representatives from the U.S., Russia, Japan, Canada, and the participating European Space Agency countries (Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom) signed the Intergovernmental Agreement on Space Station Cooperation.[281] The U.S. also signed bilateral memoranda of understanding with Russia and Canada, then later with Japan on February 24.[282] These agreements superseded the 1988 agreements with the U.S., Europe, Japan, and Canada, reflecting the importance of Russian cooperation in the post-Soviet world.[283] Space station assembly began with the

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[277] Evans, *Partnership in Space*, 375.
[278] Stephanie Covey, "1990s: International Flair and Understanding the Solar System," *NASA: Kennedy Space Center*, ed. Jeanne Ryba, June 29, 2012, https://www.nasa.gov/centers/kennedy/about/history/timeline/90s-decade.html.
[279] "A History of U.S. Space Stations," 4.
[280] *Ibid.*
[281] "Partners Sign ISS Agreements," *NASA: International Space Station*, ed. Arniko Kauderer, October 23, 2010, https://www.nasa.gov/mission_pages/station/structure/elements/partners_agreement.html.
[282] *Ibid.*
[283] *Ibid.*

Zarya control module launch using a Russian rocket on November 20, 1998.[284] The Zarya mission provided the ISS with its battery power and fuel storage and was followed by the shuttle Endeavour on December 4, bringing the Unity node to attach to Zarya, which created the station.[285] On May 27, 1999 the shuttle Discovery launched to bring research supplies to the laboratory on board the ISS.[286]

The 2000s to Present

NASA, still not entirely trusting the Russian space industry, mostly due to the weaker Russian economy, allotted money to projects that could replace Russia's projects in their joint missions, should Russia fail. One such NASA project was the $210 million US Naval Laboratory Interim Control Module (ICM) for the International Space Station, which served as a back-up in case Russia's Zvezda service module failed to dock in July 2000.[287] Some of these projects, like the ICM, had been previously designed in the 1980s when the U.S. did not have joint space projects with the USSR, but were developed in the late 1990s and early 2000s, doubling the total work (and the overall cost) put into the ISS.[288]

In the 2000s, various U.S. defense contractors began to buy Russian rocket engines for use with American military rockets, gradually replacing American rocket engine technology in favor of the RD-180 engines on satellites – including secretive

[284] Covey, "1990s: International Flair and Understanding the Solar System."
[285] *Ibid.*
[286] *Ibid.*
[287] "Interim Control Module will be ready to fly in December, says NASA," *Flight Global News,* April 18, 2000, https://www.flightglobal.com/news/articles/interim-control-module-will-be-ready-to-fly-in-december-says-64678/.
[288] "NRL Revamping Control Module for NASA Space Station," *U.S. Naval Research Laboratory,* June 1, 1997, https://www.nrl.navy.mil/media/news-releases/1997/nrl-revamping-control-module-for-nasa-space-station.

surveillance and reconnaissance satellites.[289] Use of the RD-180 has become so extensive that in the present the U.S. is completely reliant on the technology.[290] As Russian-American tensions over issues like Ukraine and Syria have heightened, some in Congress are unhappy with the reliance – particularly those to whom SpaceX financially contributes, including Senator John McCain – and argue that American companies should develop a rocket engine replacement.[291] On the other hand, companies like Boeing and Lockheed are reliant on Russian RD-180 engines and do not want to wait for SpaceX to develop a potentially costly alternative; their lobbying capabilities match (if not exceed) that of SpaceX and other members of Congress to whom they contribute, including Senator Richard Shelby and Senator Richard Durbin, have blocked attempts to ban the use of the RD-180.[292]

In 2000, President Clinton addressed Russian parliament and met with President Putin at the G8 summit about their continued disagreements surrounding the Iranian nuclear program and Chechnya, among other issues.[293] That year also saw the first crew on the manned ISS on November 2.[294] The 9/11 attacks in 2001 set the stage for the third reset in Russian-U.S. relations, when President Putin was the first leader to call President George W. Bush to offer support for an anti-terrorism campaign.[295] Relations worsened a bit, however, when Russia felt rebuffed at Bush's lack of serious interest in

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[289] Ken Dilanian, "Why Does the U.S. Use Russian Rockets to Launch Its Satellites," *NBC News,* June 9, 2016, http://www.nbcnews.com/mach/space/why-does-u-s-use-russian-rockets-launch-its-satellites-n588526.
[290] *Ibid.*
[291] *Ibid.*
[292] *Ibid.*
[293] "Highlights in the History of U.S. Relations With Russia, 1780-June 2006," *US Department of State Bureau of Public Affairs Office of the Historian,* May 11, 2007, https://www.state.gov/p/eur/ci/rs/200years/c30273.htm#clinton.
[294] *Ibid.*
[295] Stent, *The Limits of Partnership,* x.

Russian cooperation in anti-terrorism.[296] A hopeful President Bush met with other members of NATO and with President Putin to create a NATO-Russia council in May 2002.[297] Relations for the remainder of Bush's term were mainly business related or somewhat toothless nuclear terrorism agreements.[298]

After the 2008 Russian war with Georgia, U.S.-Russian relations hit a low, and so U.S. President Barack Obama sent Secretary of State Hillary Clinton to symbolically reset relations in a meeting with Russian Foreign Minister Sergei Lavrov.[299] Nuclear arms control and missile defense; WMD nonproliferation, and in particular Iran's nuclear program and the North Korean nuclear program; the U.S. and Russian roles in the FSU; European security issues and NATO's expansion; and Russian domestic issues like the wars in Chechnya are the main issues that increasingly plague U.S.-Russian relations, which have worsened over time.[300]

In June 2010, President Obama met with Russian President Dmitry Medvedev at Ray's Hell Burgers in Virginia for a laid-back summit in which they discussed technological advancements and announced a U.S.-Russian partnership for innovation.[301] By June 2012 relations had soured a bit, and President Obama met Russian President Vladimir Putin for their first meeting during the G-20 summit, where they privately discussed missile defense and the crisis in Syria.[302] Then in 2013, Edward

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[296] *Ibid.*
[297] "Highlights in the History of U.S. Relations With Russia, 1780-June 2006."
[298] *Ibid.*
[299] Stent, *The Limits of Partnership*, x.
[300] *Ibid.*, xv.
[301] *Ibid.*, ix.
[302] *Ibid.*

Snowden leaked classified information and was given asylum in Russia.[303] President Obama cancelled his next planned summit with President Putin in September 2013 and President Putin stated publicly that he and Obama, "simply don't agree. I don't agree with his arguments and he doesn't agree with mine."[304] Following Russia's annexation of Crimea, members of the G8 ousted Russia from the group, turning it into the G7 on the basis of Russia's violation of international law protecting territorial integrity and creating further distance between Russia and the U.S.[305] It seems that each new U.S. president and every Russian president entering the post for the first time has held a high expectation for U.S.-Russian relations in their term, only to be met with the reality of recurring issues in relations.[306]

In March 2011, NASA retired Shuttle Discovery, in June Shuttle Endeavor, and in August Shuttle Atlantis.[307] NASA had lost Shuttle Columbia in February 2003 and Shuttle Challenger in January 1986.[308] On August 31, 2011 NASA's space shuttle program officially ended after more than 30 years.[309] The retirement was meant to allow greater resource allocation to sending astronauts to an asteroid, the moon, and Mars.[310] The lack of a shuttle meant that NASA could no longer send its astronauts to the ISS.[311] The U.S. turned to Russia for transporting its supplies and crew to and from the ISS

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[303] Ewan Macaskill and Gabriel Dance, "NSA Files: Decoded, What the revelations mean for you," *The Guardian*, November 1, 2013, https://www.theguardian.com/world/interactive/2013/nov/01/snowden-nsa-files-surveillance-revelations-decoded#section/1.
[304] Stent, *The Limits of Partnership*, ix-x.
[305] Jim Acosta, "U.S., other powers kick Russia out of G8," *CNN Politics*, March 24, 2014, http://www.cnn.com/2014/03/24/politics/obama-europe-trip/.
[306] Stent, *The Limits of Partnership*, x.
[307] Robert Z. Pearlman, "NASA's Space Shuttle Program Officially Ends After Final Celebration," *Space.com*, September 1, 2011, http://www.space.com/12804-nasa-space-shuttle-program-officially-ends.html.
[308] *Ibid.*
[309] *Ibid.*
[310] *Ibid.*
[311] *Ibid.*

using the Soyuz spacecraft.[312] The Soyuz spacecraft continues to be the sole means of transport to the ISS for the United States to the present.[313]

The contemporary level of cooperation, with the U.S. relying on Russia to get to an international space station they share with other nations, starkly contrasts with the animosity and secrecy of the space race of the 1960s. NASA, however, made sure to state that although the cancellation of the shuttle program would mean complete cooperation with Russia for the time being, "from day one, the Obama Administration made clear that the greatest nation on Earth should not be dependent on other nations to get into space," in NASA Administrator Charlie Bolden's words.[314]

In 2014, NASA awarded contracts to Boeing ($4.2 billion for the CST-100) and SpaceX ($2.6 billion for the Crew Dragon), which would allow NASA to end its reliance on the Soyuz with a goal of 2017.[315] Since this announcement, however, Boeing delayed its first crewed flight until 2018 due to technical issues.[316] After the SpaceX Falcon 9 rocket exploded on the launch pad during a refueling operation, its Crew Dragon spacecraft has also been delayed until 2018.[317] NASA Administrator Bolden blamed Congress for the reliance on Roscosmos, which costs $490 million, because Congress reduced funding to the agency and so it was unable to create a

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[312] Mindi Capp and Heather Deiss, "What is the Soyuz Spacecraft?" *NASA*, July 29, 2013, https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-the-soyuz-spacecraft-k-4.
[313] *Ibid.*
[314] Stephanie Schierholz and Stephanie Martin, "NASA Chooses American Companies to Transport U.S. Astronauts to International Space Station," *NASA*, ed. Allard Beutel, July 30, 2015, https://www.nasa.gov/press/2014/september/nasa-chooses-american-companies-to-transport-us-astronauts-to-international.
[315] *Ibid.*
[316] Jeff Foust, "Boeing delays first crewed CST-100 flight to 2018," *Space News*, May 12, 2016, http://spacenews.com/boeing-delays-first-crewed-cst-100-flight-to-2018/.
[317] Stephanie Martin, "NASA's Commercial Crew Program Target Flight Dates," *NASA*, December 12, 2016, https://blogs.nasa.gov/commercialcrew/2016/12/12/nasas-commercial-crew-program-target-flight-dates/.

replacement for the shuttle.[318] For now, even amidst allegations of hacking, sanctions, disagreement over territorial disputes/annexations, and involvement in conflicts in the Middle East, Russia and the U.S. are bound tightly in space cooperation.

Chapter 3: Theories of International Relations

This chapter will examine main strains of international relations theory – neorealism, neoliberal institutionalism, and constructivism – with regard to cooperation, in order to facilitate analysis in the following chapter to answer the question of why space cooperation between Russia and the U.S. emerged and continued. It will begin with neorealism; then move onto neoliberal institutionalism, which examines the connection between institutions and cooperation; and then discuss constructivism, which emphasizes the importance of norms in international cooperation and includes the epistemic community literature, which focuses on the role of experts in policy dealing with cooperation. This chapter on theories of international relations will set the stage for the analysis of international relations theories and the phenomenon of U.S.-Russian space cooperation to follow in the next chapter.

Each theory tries to understand why states cooperate and how this process occurs, and their distinct assumptions about the way the world works inform their understandings. Neorealists and neoliberal institutionalists see the world as anarchic and state-based, but the former argue that states rarely cooperate and only when it suits their interests and are likely to back out of agreements. The latter, on the other hand, argue that in reality cooperation is far more likely than realists assume and that institutions

[318] Charles Bolden, "NASA Notifies Congress about Space Station Contract Modification with Russia," *NASA* letter, August 5, 2015.

facilitate cooperation. Constructivists see the world as being governed by norms and rules. Even if the international system is anarchic, constructivists argue, actors within this anarchy still abide by various rules and norms. As Wendt writes, "Self-help and power politics are institutions, not essential features of anarchy. *Anarchy is what states make of it.*"[319] The content of an anarchic system depends on the rules and norms that predominantly operate in that system.

Like many institutionalists, constructivists consider non-state actors to be important as well. This seems to be a strength as our world has moved away from the bipolar Cold War, and NGOs and IGOs show their importance. Constructivists are also similar to neoliberal institutionalists in that both see institutions as consisting of rules and norms. Krasner's definition of international regime as "principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue-area" encapsulates this idea that institutions are themselves comprised of the principles, norms, rules, and accepted procedures believed in by the actors helping to create them.[320] Constructivists and institutionalists recognize that norms themselves and institutions upholding certain norms can influence states to cooperate, which can help to explain why states cooperate even in situations where that would not seem to be the rational choice. The similarities and differences between the main types of international relations theory will be examined in more depth in the following sections.

[319] Alexander Wendt, "Anarchy is what States Make of it: The Social Construction of Power Politics," *International Organization* 46, 2 (Spring 1992): 395.
[320] Stephen D. Krasner, "Structural causes and regime consequences: regimes as intervening variables," *International Organization* 36, 2 (Spring 1982): 185.

Neorealism

Neorealist literature relies on certain basic assumptions, which influence its examination of international cooperation. Neorealism assumes the world is anarchic and states are the actors in that world who operate in a rational, self-interested manner.[321] Jervis argues that cooperation is dangerous in the anarchic system, because states can quickly cease cooperation since there is no overarching institution that can enforce laws.[322] But Jervis explains that states are more likely to cooperate when there is some type of security buffer, like the ability to defend oneself, for both states, which protects them in case the cooperative deal sours.[323] Waltz argues that states all compete for power to increase security, since not competing reduces security if other states have hostile intentions; on the other hand, this competition can actually also reduce security, as other actors will likely respond.[324] This is a phenomenon he calls the "security dilemma."[325] Even as states cooperate, he says, they are still ultimately focused on their own security, which dovetails with Jervis's understanding of cooperation as requiring a security blanket.[326] Because a state is constantly competing for power to increase its security, states in the realist framework are concerned mostly with relative, rather than absolute gains.[327] Much of realist literature takes place in the context of the bipolar Cold War world and even as Waltz tries to make it relevant in the post-Cold War era, Wendt

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[321] Kenneth N. Waltz, "Structural Realism after the Cold War," *International Security* 25, 1 (Summer 2000): 5.
[322] Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics* 30, 2 (January 1978): 167.
[323] *Ibid.*, 172-173.
[324] Waltz, "Structural Realism after the Cold War," 8.
[325] *Ibid*.
[326] Kenneth N. Waltz, "The Emerging Structure of International Politics," *International Security* 18, 2 (Fall 1993): 59.
[327] Robert Powell, "Absolute and Relative Gains in International Relations Theory," *The American Political Science Review* 85, 4 (December 1991): 1303.

points out the flaws in the assumption that states operate for the clear, self-interested, security-buffering reasons that neorealists claim, which breaks down Waltz's argument in any time period.[328]

Ultimately, the neorealist views cooperation as the means to a rational, self-interested end, but a means that is fraught with uncertainty and fear of backstabbing, making it an option that does not hold up in the face of security issues between states. Realism, as Grieco says, holds a "pessimistic analysis of the prospects for international cooperation and of the capabilities of international institutions."[329] Realists think that institutions do not and cannot effectively constrain state actions in order to produce cooperation.[330] Instead, institutions merely reflect the current power distribution and have minimal influence on state behavior.[331] States, in choosing to cooperate, face the possibility that their cooperative partner may cheat or may gain more from the cooperation than the other will, realists argue, which makes states unlikely to cooperate.[332] The guiding question for whether or not to cooperate, in realist theory, is "what do I want" and if the state finds that the answer requires cooperative action, only then might it consider cooperation, but only if the partner state will not gain more from the cooperation.[333]

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[328] Wendt, "Anarchy is what States Make of it," 396.
[329] Joseph M. Grieco, "Anarchy and the limits of cooperation: a realist critique of the newest liberal institutionalism," *International Organization* 43, 3 (Summer 1988): 485.
[330] *Ibid*.
[331] John J. Mearsheimer, "The False Promise of International Institutions," *International Security* 19, 3 (Winter 1994): 7.
[332] Grieco, "Anarchy and the limits of cooperation," 487.
[333] M. J. Peterson, *International Regimes for the Final Frontier* (Albany, NY: State University of New York Press, 2005), 3.

Neoliberal Institutionalism

Neoliberal institutionalists similarly understand the world in terms of anarchy, with states as the primary actors, but argue that "realism overemphasizes conflict and underestimates the capacities of international institutions to promote cooperation."[334] In essence, they argue that international institutions can (possibly) increase the ability for states to cooperate in an anarchic world.[335] States can fear that other states will not uphold promises if they agree to cooperate, which can make cooperating unappealing, but sometimes states do cooperate, even though this might put them at a strategic disadvantage.[336] States are primarily concerned with absolute gains, rather than relative gains, as they are unconcerned about the gains of others as long as they themselves feel secure.[337] Snidal critiques realism by showing that even if states were concerned about relative gains more than absolute gains (although he argues, they are not), as realists claim, relative gains do not inhibit, nor in fact impact in any way, cooperation, particularly where more than two states are involved.[338] States "use international institutions to further their own goals" and "design treaties and other legal arrangements to solve specific substantive and political problems."[339]

Institutionalists argue that states rationally choose and form institutions to facilitate cooperation based on different factors, like different preferred outcomes and

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[334] Grieco, "Anarchy and the limits of cooperation," 486.
[335] *Ibid*.
[336] Kenneth A. Oye, "Explaining Cooperation Under Anarchy: Hypotheses and Strategies," *World Politics* 38, 1 (October 1985): 1.
[337] Powell, "Absolute and Relative Gains in International Relations Theory," 1303.
[338] Duncan Snidal, "International Cooperation Among Relative Gains Maximizers," *International Studies Quarterly* 35, 4 (December 1991): 387.
[339] Barbara Koremenos, Charles Lipson, and Duncan Snidal, "The Rational Design of International Institutions," *International Organization* 55, 4 (Autumn 2001): 762.

different problems they wish to solve.[340] Marks et al. envision international institutions as arising from the involved states' desire to cooperate, and then as parties discover shared understandings through involvement in contracts, this builds and reinforces commonalities and reduces fear of exploitation, which increases cooperation.[341] States that have trouble cooperating actually benefit from engaging with institutions, because these institutions enforce agreements.[342] Sometimes states may only cooperate when it is necessary in order to reach the mutual benefit, but the possibility of future cooperation being necessary and effective monitoring make states more willing to cooperate as well.[343] This is the main point of the institutionalist argument; international institutions, even when used by rational, self-interested states in an anarchic system, can facilitate cooperation by offering a means of effective monitoring and a likely possibility of future cooperation.

Some neoliberal institutionalist scholars look at larger groups' interactions, especially with issues that incorporate many states in the institutional solution. Stavins examines climate change cooperation and explains that using institutions to ensure international cooperation is the best way to combat climate change, because they hold states more accountable and spread the cost of climate change reform.[344] Kinne on the

[340] *Ibid.*, 767.; Kenneth W. Abbott and Duncan Snidal, "Why States Act through Formal International Organizations," *Journal of Conflict Resolution* 42, 1 (February 1998): 3.
[341] Gary Marks et al., "Discovering Cooperation: A Contractual Approach to Institutional Change in Regional International Organizations," *European University Institute* (June 2014): 2.
[342] Allison Carnegie, "States Held Hostage: Political Hold-Up Problems and the Effects of International Institutions," *American Political Science Review* 108, 1 (February 2014): 54.
[343] Oye, "Explaining Cooperation Under Anarchy," 6-9; *Ibid.*, 3; Robert Axelrod and Robert O. Keohane, "Achieving Cooperation under Anarchy: Strategies and Institutions," *World Politics* 38, 1 (October 1985): 235.
[344] Robert N. Stavins, "International Cooperation: Agreements and Instruments," (Working Group III Fifth Assessment Report Intergovernmental Panel on Climate Change at The Symposium on IPCC-AR5-WG III, Tokyo, Japan, July 5-6, 2011).

other hand looks more closely at bilateral cooperation, arguing that states choose bilateral agreements more than multilateral in order to maximize the benefits of cooperation, they examine various outside political, economic, and geographic factors, and they consider third party ties that the other states have.[345] This is particularly useful to the analysis of space cooperation because this is a case in which cooperation has been largely bilateral. Martin and Simmons also examine the ways in which institutions facilitate cooperation, arguing that institutions provide information to policy-makers, monitor behavior, resolve distributional conflict, substitute for domestic policy when it is ineffective, and encourage states' norms to match with the group.[346] Neoliberal institutionalists argue that states cooperate to fix shared problems and common goals, which suggests that there might be a bit of both conflict (as states seek to uphold their own interests) and cooperation (as states focus together on shared interests) in the formation of international institutions for the purpose of future cooperation on issues.

Constructivism

Constructivism moves even further away from the realist paradigm, questioning the assumption of state actors (positing that intergovernmental and nongovernmental organizations are actors as well) in global issues, questioning the anarchic world assumption, and recognizing the power of norms as a global force that influences actors, rather than seeing actors as primarily driven by self-interest. Even actors' interests, Wendt argues, are actually constructed from their identities.[347] Reus-Smit argues that

[345] Brandon J. Kinne, "Network Dynamics and the Evolution of International Cooperation," *American Political Science Review* 107, 4 (November 2013): 766.
[346] Lisa Martin and Beth Simmons, "Theories and Empirical Studies of International Institutions," *International Organization* 52, 4 (Autumn 1998): 740, 745, 752-3, 755.
[347] Wendt, "Anarchy is what States Make of it," 398.

even though states construct institutions, which can facilitate cooperation, they do so within the context of the norms, rules, and identities that shape their worldview, so that norms themselves are institutions which actually shape states and other actors, which then shape institutions over time.[348] Norms influence the way a state or other actor self-identifies and the desire to uphold one's self-identity is strong enough to make an actor choose an action that goes against other self-interests.[349] Constructivists understand cooperation to be subject to the power of international norms and rules as well.[350] States can create institutions to deal with cooperation issues, but international norms play a large role in the creation and operation of these cooperative institutions.[351] The greatest influence on cooperative practices comes from culturally and historically rooted beliefs, rather than from strategic imperatives, Reus-Smit argues.[352]

Johnston extends the constructivist understanding of the power of norms to directly argue that "attitudes toward social standing, status, and self-esteem" get connected to attitudes about cooperation, even without the actor realizing this process is occurring.[353] He calls this "social influence" and emphasizes the relationship between an actor's identity and relationship with other actors and its willingness to cooperate.[354] March and Olsen similarly emphasize the complexity between institutions and environments, pointing out that in issues of cooperation, they influence each other and

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[348] Christian Reus-Smit, "The Constitutional Structure of International Society and the Nature of Fundamental Institutions," *International Organization* 51, 4 (Autumn 1997): 555-558.
[349] Brent J. Steele, "Ontological Security and the Power of Self-Identity: British Neutrality and the Civil War," *Review of International Studies* 31, 3 (July 2005): 524-529.
[350] Reus-Smit, "The Constitutional Structure of International Society and the Nature of Fundamental Institutions," 564.
[351] *Ibid.*, 570.
[352] *Ibid.*, 583.
[353] Alastair Iain Johnston, "Treating International Institutions as Social Environments," *International Studies Quarterly* 45 (2001): 499.
[354] *Ibid.*, 499-500.

coevolve.[355] Cooperation can in fact, March and Olsen argue, shape international identities.[356] Interestingly, Johnston argues that "constructivists and institutionalists are both right"; constructivists, he says, rightfully argue that shared understandings of good behavior are necessary to facilitate cooperation, but he agrees that an institutional structure may also be necessary to measure whether actors are behaving consistently with the understanding.[357] Being part of an institution that emphasizes cooperation will influence actors in that institution toward cooperating.[358] Once actors become accustomed to cooperating as being a regular part of their identity and interactions with other actors, they are likely to continue to cooperate, out of habit of the cooperative practice.[359]

Some constructivist literature addresses international relations cooperation in real world examples. Tsygankov suggests that changing norms on the state, society, and international levels affect foreign policy and cooperation of states, by examining Russian foreign policy under President Dmitri Medvedev.[360] Cho and Kurtz examine the ASEAN Investment Regime and argue in favor of constructivism for understanding interstate cooperative regimes, as it offers the fullest understanding of the social structure that informs state action and international communities with shared goals and

[355] James G. March and Johan P. Olsen, "The Institutional Dynamics of International Political Orders," *International Organization* 52, 4 (Autumn 1998): 956.
[356] *Ibid.*, 963.
[357] Johnston, "Treating International Institutions as Social Environments," 502.
[358] *Ibid.*, 509.
[359] Ted Hopf, "The logic of habit in International Relations," *European Journal of International Relations* 16, 4 (2010): 539-543.; Emanuel Adler and Vincent Pouliot, "International practices," *International Theory* 3, 1 (2011): 1.
[360] Andrei P. Tsygankov, "Contested Identity and Foreign Policy: Interpreting Russia's International Choices," *International Studies Perspectives* 15 (2014): 19.

norms.[361] Finnemore and Sikkink recognize that even rational choices are influenced by norms, and actors know this, which explains why they sometimes try to influence norms through "strategic social construction."[362] Even cooperation as an action chosen by a state, then, is governed by norms. As Hurd argues, actors follow rules either because of fear of enforcement (coercion), the rule benefits the actor (self-interest), or the actor feels the rule is legitimate and should be obeyed (legitimacy).[363] On a micro-level this is visible in the classroom setting, where all three of these may operate at once, as students recognize the teacher as an authority figure.[364] Militaries function because members respect rules at least in part because of norms, which also inform the way they operate in conflict and peace.[365] This troika governing rule-following is also applicable on a macro-level in the realm of international relations.[366]

Epistemic community theorists, like Haas, operate under a constructivist framework, highlighting the importance of norms and shared identity, and arguing that experts in a field influence policy (and by extension cooperation) by providing information at the national and transnational level.[367] They argue that decision makers, when lacking this information, can make disastrous missteps that harm cooperation.[368] But epistemic communities can create and maintain social institutions, which support

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[361] Sungjoon Cho and Jürgen Kurtz, "International Cooperation and Organizational Identities: The Evolution of the ASEAN Investment Regime," *Northwestern Journal of International Law & Business* (2016): 6.
[362] Martha Finnemore, and Kathryn Sikkink, "International Norm Dynamics and Political Change," *International Organization* 52, 4 (Autumn 1998): 888.
[363] Ian Hurd, "Legitimacy and Authority in International Politics," *International Organization* 53, 2 (Spring 1999): 379.
[364] *Ibid.*, 380.
[365] John A. Gentry, "Norms and Military Power: NATO's War Against Yugoslavia," *Security Studies* 15, 2 (April-June 2006): 187.
[366] Hurd, "Legitimacy and Authority in International Politics," 380.
[367] Peter M. Haas, "Introduction: Epistemic Communities and International Policy Coordination," *International Organization* 46, 1 (Winter 1992): 3-4.
[368] *Ibid.*, 28.

cooperation with a given issue-area even when power relations have changed to make coordination unnecessary.[369] Thus, even when conditions have changed to make cooperation unnecessary based on a rational viewpoint, if an epistemic community has shaped the norms in thinking about and dealing with a particular issue toward cooperating, then cooperation will tend to continue. Adler provides an example of epistemic community-led cooperation in the build-up to the U.S.-Soviet 1972 ABM treaty, which he argues came about not merely because of a change in balance of power and not due to any shared cultural or political goals, but because of American experts selected by the U.S. government.[370] Agents (the experts), he says, "coordinate their behavior according to common practices that structure and give meaning to changing international reality" so that the same norms that create structure also influence agent behavior, while recognizing the importance of agent action in the shaping of policy.[371]

In addition to epistemic community literature, intergovernmental networks (IGN) theory is also useful for this analysis. One can understand institutions like the United Nations and international treaties to be the highest level of formalization of international cooperation. Epistemic communities, on the other hand, are generally understood as networks operating independently of governments, through informal or non-state channels of communication. In between these two, and with some overlap among them, sits a layer of low-level continuing cooperation between governmental employees, including through informal agreements and memoranda of understanding,

[369] *Ibid.*, 4.; Peter M. Haas and Ernst B. Haas, "Learning to Learn: Improving International Governance," *Global Governance* 1 (1995): 269.
[370] Emanuel Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control," *International Organization* 46, 1 (Winter 1992): 102.
[371] *Ibid.*, 103-104.

which retains some level of autonomy in policymaking abilities, at least at this lower level.[372] This low-level cooperation operates through sets of intergovernmental networks, also sometimes referred to in the literature as "transgovernmental networks," or the actors in "transgovernmental relations," which is not to be confused with "transnational relations," as the latter more often refers to nongovernmental organizations.[373] IGN theory recognizes that, as Slaughter writes, "networks of government officials – police investigators, financial regulators, even judges and legislators – increasingly exchange information and coordinate activity to combat global crime and address common problems on a global scale."[374] Each network has its own goals and methods of operating, but, ultimately, they allow government officials to have a broader reach, establish positive relationships between government officials from different states, build cooperation, increase information flow about best practices in the field, and spread technical knowledge and professional socialization.[375]

In certain fields, like science, there is often overlap between IGNs, which are fundamentally public, and epistemic communities, which can be private, but also penetrate into the public and within these networks. Gual Soler shows in her analysis of two Latin American scientific cooperation networks (IGNs) that science in particular lends itself to the blurring between public and private; IGNs form "spaces" for

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[372] Tobias Bach and Eva Ruffing, "Networking for Autonomy? National Agencies in European Networks," *Public Administration* 91, 3 (2013): 713.
[373] Robert O. Keohane and Joseph S. Nye, "Transgovernmental Relations and International Organizations," *World Politics* 27, 1 (October 1974): 10.; Rainer Baumann and Frank A. Stengel, "Foreign policy analysis, globalisation and non-state actors: state-centric after all?" *Journal of International Relations and Development* 17, 4 (October 2014).; Simon Hollis, "The necessity of protection: Transgovernmental networks and EU security governance," *Cooperation and Conflict* 45, 3 (2010): 312.
[374] Anne-Marie Slaughter, *A New World Order* (Princeton, NJ: Princeton University Press, 2004), 1.
[375] *Ibid.,* 3-4.

communities of knowledge-keepers, in this case the epistemic community of scientists, to interact.[376] This is also the case with regard to outer space. It is difficult to draw a clear line between the epistemic community and the IGN in this thesis. It seems clear that members of the extensive epistemic community of scientists in this period were interacting in a similar manner as an IGN; whether or not every part of that interaction at all points throughout history was entirely public and thus under the domain of a true IGN is debatable. For this reason, the analysis of this paper will use the terminology of epistemic community literature, with the understanding that it includes in many cases the same networks as explained by IGN theory. In this particular case, epistemic community literature is broad enough to incorporate the important mechanisms of IGN theory.

Conclusion

The neoliberal institutionalist approach corrects some of the deficiencies of neorealism by showing that even in an anarchic system that faces states with security issues, states still can cooperate and often do so with the help of institutions. Constructivism builds upon the examination of institutions, but criticizes the way that both neorealism and neoliberal institutionalism lack of a full examination of motive and the importance of norms in influencing actors' engagement in cooperation, as they focus entirely on self-interest, without recognizing the role of norms in bargaining for these interests.[377] When two actors meet to negotiate, they do not do so in a vacuum, but

[376] Marga Gual Soler, "Intergovernmental Scientific Networks in Latin America: Supporting Broader Regional Relationships and Integration," *Science & Diplomacy* 3, 4 (December, 2014): 12-13.
[377] Harald Müller, "Arguing, Bargaining and All That: Communicative Action, Rationalist Theory and the Logic of Appropriateness in International Relations," *European Journal of International Relations* 10, 3 (2004): 395.

come to the table having been socialized to conduct encounters in a particular way and develop rules guiding their future interactions, even while trying to negotiate to support the interests of each.[378] Constructivists also critique neoliberal institutionalists and realists for not effectively explaining times when states do not act self-interestedly. Epistemic community literature operates as a sub-set of constructivism, focusing on transnational networks of policy experts who facilitate international cooperation. Understanding these approaches to cooperation and weighing the merits of each is important for recognizing the reasons for cooperation as well as the best ways to shape policy to support cooperation.

In understanding the transition from competition to cooperation – i.e. emergence of cooperation – the three theories previously discussed differ rather significantly. According to a neorealist framework, cooperation can only arise out of a rational decision prompted by self-interest by two states, who come together and loosely agree to cooperate, at least until one decides that cooperation no longer serves him. This cooperation is unlikely to occur, as states are most concerned about relative gains over each other, unless both states think they are gaining more than the other (although this would clearly be impossible in reality and so would likely result in nothing more than very short-term cooperation that ends once it becomes clear who gained more) or when states gain about equally. If there is little fear of defection or only small gains to be had, then states will likely have an easier time agreeing to cooperate. Given the right circumstances, like an outside threat to the security of two states, two states may come to an agreement to cooperate, with reservations.

[378] *Ibid.*, 403.

Neoliberal institutionalists similarly see the emergence of cooperation as an effect of a rational choice by states, prompted by self-interest in an anarchic world. These states create institutions rationally to achieve the preferred outcome by holding the other state(s) to the deal. It seems likely, then, in the still security-focused anarchic world, that states would hesitate before cooperating, but would ultimately be more likely to cooperate in this world than in the neorealists', as they would feel more confident that their security would be protected by the framework of the institution. It also suggests that to have this level of confidence in the institution, states would create and use institutions with monitoring and verification functions and shared expectations about current and future cooperation. Thus, based on a neoliberal institutionalist framework, these institutions will either precede cooperation or be created around the same time as the emergence of cooperation and sustain it.

Constructivism's emergence of cooperation comes from identities of actors along with norms and rules that influence the creation of institutions and also change those institutions over time. Cooperation is likely to emerge in a constructivist world if the actors involved have a self-identity (reflecting attitudes about social status and self-esteem) that encourages cooperative action. The creation of cooperation, which can occur through an institutional structure, relies on a shared understanding of proper behavior in a partnership, and the fact that an actor is part of an institution that emphasizes cooperation will likely influence that actor to increasingly cooperate.

With regard to maintenance of cooperation, similar ideas resonate. If the prospect of agreeing to cooperate is minimal in the neorealist system, the likelihood of maintaining that cooperation is even less. At the slightest fear of being backstabbed, a

state would rationally decide to end an agreement, and because states act rationally to preserve and increase their power and security in a neorealist world, states would likely be unable to maintain any sort of cooperation for long. States only maintain cooperation as it suits them in the fight to make the largest relative gains. The neoliberal institutionalist framework suggests states will be likely to maintain cooperation when using institutions to facilitate cooperation, because institutions have consequences that dissuade actors from backing out of agreements and so states involved in cooperation in outer space for example would be less likely to backstab if they had an institution in place to protect themselves (and the other party). Constructivists argue that actors are likely to continue cooperating once they are accustomed to it as a normal part of their identity and interactions with other actors. Thus, as with emergence, maintenance of cooperation seems more likely under constructivism than neoliberal institutionalism, but more likely under neoliberal institutionalism than under neorealism.

In the realm of outer space, cooperation has come in the form of formal cooperation through institutions and informal cooperation within an epistemic community. Two questions must be answered to determine the reason for U.S.-Russian space cooperation: 1. What explains the transition from competition to cooperation? And 2. What explains the maintenance of cooperation, particularly amidst a poor relationship in earth-bound foreign policy dealings? The theories of international relations provided here help to sort through these questions. This chapter does not seek to declare one of these theories to be true or false. Instead, it provides a set of tools in the form of international relations theories with which to analyze this case and determine the causes of cooperation emergence and maintenance. Thus, some

conclusions will be reached in the overall thesis regarding the relative utility of these theories in this case study, but this chapter does not provide a full judgement on that matter so as not to be over-hasty in its conclusions. The relevant ideas and findings from the theories will be of use in the following analysis chapter in order to understand the case of U.S.-Russian space cooperation.

Chapter 4: Analysis of the Causes of Cooperation in Outer Space

This chapter highlights the critical junctures of movement between competition and cooperation as well as instances of prolonged cooperation and examines the causes of these shifts with the assistance of theories of international relations. Historical institutionalism has created "critical juncture theory," which posits that there are often long periods of institutional stability that are suddenly punctuated by phases of change, which are called critical junctures.[379] Identifying critical junctures can help to explain major changes in institutions and policies over time.[380] Critical juncture theory is useful in this chapter for recognizing important historical events that mark critical turning points in U.S.-Russian space cooperation.

This chapter identifies seven critical junctures: the early involvement of the scientific community; the creation of the UN Committee on the Peaceful Uses of Outer Space; the creation of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, aka the Outer Space Treaty; the end of the Space Race and development of the Apollo-Soyuz project; the creation of the Strategic Defense Initiative; Gorbachev's leadership

[379] Giovanni Capoccia and R. Daniel Kelemen, "The Study of Critical Junctures: Theory, Narrative, and Counterfactuals in Historical Institutionalism," *World Politics* 59, 3 (April 2007): 341.
[380] Jeffrey Kopstein and David A. Reilly, "Geographic Diffusion and the Transformation of the Postcommunist World," *World Politics* 53, 1 (October 2000): 3.

and the end of the Cold War; and the development of the International Space Station. The chapter is subdivided by these critical junctures in order to examine the reasons for emergence or breakdown of cooperation at these critical junctures, using the lessons from the previous chapter regarding constructivist, neoliberal institutionalist, and neorealist frameworks. The chapter ends with a summary of findings in its conclusion.

The governments' perceptions of status and military threats and linking technological capability symbolically to ideological beliefs hindered cooperation and even turned away from cooperation toward competition at times, while the scientific community's beliefs about the proper purpose of activity in space, government leaders' agreement with these beliefs, early codification of rules of space practice, and respect for outer space treaty law helped to turn toward cooperation. This analysis finds that although some periods of upper-level cooperation have been fleeting and matched the general spirit of U.S.-Russian relations, as a neorealist might expect, many periods of cooperation have outlasted cooperative U.S.-Russian relations in general, and are better explained through constructivism and neoliberal institutionalism. Perhaps most significantly, this analysis finds that low-level cooperation between the scientific communities in the US and USSR/Russia has continued, without any substantial interruptions, from the earliest days of space activity into the present day.

Ultimately, this analysis shows that emergence of space cooperation was due to a determined epistemic community that supported and advocated for the norm of recognizing outer space as a peaceful, cooperative, scientific environment, within their own governments and through informal cooperation, along with the creation of formal institutions that uphold this norm. Maintenance of low-level space cooperation, which

has been quite consistent since its early emergence, has also been due to support from the scientific community and formal institutions. Maintenance of high-level space cooperation, which has been less consistent over time, but has in recent decades become quite stable and lasting, has also been supported by the efforts of the scientific community and formal institutions. Additionally, this high-level cooperation required the entrenchment of the space cooperation norm in the upper-government level, which varied over time due to the process of socialization, habit-formation, geopolitical interests, and status considerations.

The Scientific Community

As discussed in chapter two, the USSR and US entered the era of space development in an environment of competition following World War II that manifested in the Cold War. This initial environment of rivalry continued with the space race, where competition stemming from highly military-focused governments' desire for perceived dominance in outer space muffled the international scientific community's hopes for efficient technological advancement through collaboration. Kennedy's 1961 speech declaring American commitment to land a man on the moon before the USSR and connecting this technological competition to a deeper ideological fight between "freedom and tyranny" shows the depth of the animosity between the states and the space race as an extension of this animosity.[381] This relationship might seem at first glance to fit within a realist understanding of the world, as though both states fought for power in an anarchic system, with space seeming untouched at this point by the institutions to which other theories give credence. But that oversimplifies the situation

[381] Ezell and Ezell, *The Partnership*, kindle loc. 832-844.

between the two countries and mischaracterizes the reality of the period. In fact, even as Sputnik was launched in a competitive mood, the International Geophysical Year was occurring with UN sponsorship, showing the depth of cooperation in which the scientific community believed.[382] The Antarctica agreement, which became a model for the Outer Space Treaty, and which occurred in the midst of the Cold War through the UN, also showed the cooperation between scientists in the international community that often seems to be overlooked in discussions of the space race.[383]

The space race itself, which did involve a high level of competition within the American and Soviet governments, fits better within a constructivist and neoliberal institutionalist examination, as both states held onto their own beliefs about what the best system was; Kennedy's appeal to the public with words like "freedom and tyranny" show that the public was also moved by an appeal to their values. The space race provided an outlet for governments to display the superiority of their ideologies, symbolized by technological advancements and incredible feats in space.[384] The competition escalated, just as a realist might expect, as each state put more resources toward launching the first satellite, then the first man in space, and so on until the moon landing. But proving the dominance not only of military might but of ideology remained an important part of the equation in the space race, something for which realism does not account and for which instead we must turn to constructivism, which points to the importance of values and beliefs in shaping one's actions.[385] The dominance of

[382] Gorman and O'Leary, "An ideological vacuum," 73.
[383] Dembling and Arons, "The Evolution of the Outer Space Treaty," 419-425.
[384] Gorman and O'Leary, "An ideological vacuum," 74.
[385] Reus-Smit, "The Constitutional Structure of International Society and the Nature of Fundamental Institutions," 564, 583.

American values or Soviet values lay in the ability of their technologies to prove superior and although the Outer Space Treaty prohibited claiming ownership over the moon, the choice by NASA to hoist an American flag on the moon was a display of American superiority nonetheless.[386]

Combining a constructivist understanding of the function of epistemic communities with neoliberal institutionalism helps to understand how this ideological competition taking place between two societies could occur amidst the beginnings of cooperation in space including Kennedy's 1963 call for space cooperation in his address to the UN General Assembly, the signing of the "The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," and ongoing cooperative project discussions between Soviet and American scientists. Even as the Cold War continued, cooperation still emerged and sustained, primarily through institutional tools and norms surrounding the scientific nature of space activities.

The international scientific community saw space as a scientific environment, rather than a battlefield, which started to become codified in formal institutions early on, even while the space race continued. This dichotomy of military and scientific pressures helps to explain the disjointed actions and words that major government leaders produced which sometimes seemed to favor cooperation or competition even as other actions and words suggested the opposite. Eisenhower and his Secretary of State John Foster Dulles's approach seemed to mix the cooperative technological goals of the scientific community with the security fears and dominance goals of the military.[387] The

[386] Gorman and O'Leary, "An ideological vacuum," 83-84.
[387] Burrows, *Deep Black*, 141.

UN Committee on the Peaceful Uses of Outer Space came about with their support in 1959, in part as an attempt to safeguard American scientific freedoms in space, much like scientists hoped would be the case for scientific endeavors of all countries; it comes as no surprise that the Antarctic Treaty, setting aside Antarctica as a scientific preserve, came about in this same year.[388] Eisenhower himself compared the two in a 1960 address to the UN.[389]

The idea of seeing outer space as more similar to Antarctica than an extension of a battlefield was clearly rooted in the discussions within the international scientific community, an epistemic community which influenced top leadership to at least recognize the scientific side of outer space and not just the military. Even while noting the technical difficulties of cooperation in space, NASA scientists compared scientific ventures in space to those in Antarctica.[390] Frutkin, Blagonravov, and other American and Soviet scientific leaders established rapport with each other in an effort to find common projects through which to cooperate and then communicated these ideas to their governments.[391] The upper-level government bureaucracies were ultimately where science and military norms met and sometimes clashed in the process of determining what sort of frontier space would be. Even in cases of renewed competition, however, the norms regarding space as a scientific realm that scientists supported still had an impact in keeping space from turning into a warzone.

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[388] *Ibid.*
[389] Ezell and Ezell, *The Partnership,* kindle loc. 764.
[390] *Ibid.,* 1201-1208.
[391] *Ibid.,* 758.

UN Committee on the Peaceful Uses of Outer Space

The formal institutions codifying these scientific and cooperative ideas were the next step in the rather gradual shift from competition to cooperation, beginning with the Committee on the Peaceful Uses of Outer Space. Neoliberal institutionalism teaches that institutions come about from a desire to cooperate, but can then help to reinforce shared understandings of issues through the creation of shared contracts, and reduce fear of exploitation.[392] The time and effort states take to join together and create these institutions is an indicator of the trust they place in the institutions' abilities to facilitate cooperation and their effectiveness.[393] The 1959 creation of the Committee on the Peaceful Uses of Outer Space was an important formal institutionalization of the idea of outer space as a place for peaceful, scientific uses, but still recognized that outer space could be seen as a security issue in need of an institution ensuring its uses are peaceful. In fact, even today this committee is one of the largest in the UNGA, highlighting the important role of institutions in issues of outer space.[394]

Determining a critical juncture in the transition from competition to cooperation thus becomes difficult in examining the era of the space race. Although both countries continued to attempt to beat the other to various milestones, in the background, scientists kept lines of communication open in order to discuss collaborative possibilities and institutions like the UNCOPUOS and the Outer Space Treaty came about, codifying their visions of space as a scientific, peaceful environment for the use

[392] Marks et al., "Discovering Cooperation," 2.
[393] Koremenos, Lipson, and Snidal, "The Rational Design of International Institutions," 762.; Abbott and Snidal, "Why States Act through Formal International Organizations," 3.
[394] "COPUOS History," *United Nations Office for Outer Space Affairs,* http://www.unoosa.org/oosa/en/ourwork/copuos/history.html.

of scientists from all nations.[395] Perhaps the creation of the UNCOPUOS as an institution upholding these scientific norms in the context of outer space can be understood as a major critical juncture, because it led to the creation of other important, cooperation-upholding institutions like the Outer Space Treaty, which together facilitated the continuation of cooperation over time, even during periods of renewed tension in U.S.-Russian relations.

One might argue that the Cuban Missile Crisis itself was a turning point from competition to cooperation. It did seem to at least make the idea of cooperation more palatable for the top leaders in each government. The Cuban Missile Crisis was a wake-up call of the very real possibility of nuclear disaster and the necessity of improved diplomacy in staving off future crisis. Kennedy's call to the Soviet Union for help, against the advice of his hawkish generals, and Khrushchev's response to his foreign minister, "Yes, help. We now have a common cause, to save the world from those pushing us toward war," were clear indicators that both leaders were ready for a less dangerous, negative relationship.[396] The slight shift away from such heated relations is understandable from the measurement of each side's interests – sharing space technology would split the costs and allying in space might provide some common ground on which to connect, opening up lines of communication and lessening chances of future disaster. But in reality, while this was an important event in shaping government actions, to call the Cuban Missile Crisis the immediate turning point toward cooperation would oversimplify the relationship between foreign policy and space

[395] Ezell and Ezell, *The Partnership*, kindle loc. 500, 507, 758, 1010; Dembling and Arons, "The Evolution of the Outer Space Treaty," 419-425.
[396] Sergei Khrushchev, "How My Father And President Kennedy Saved The World: The Cuban Missile Crisis as seen from the Kremlin," *American Heritage* 53, 5 (October 2002): 1.

technology and overlook the independence of the scientific community. Scientists on both sides had been taking part in discussions about cooperative scientific ventures even before Sputnik made its first orbit.[397] They sought to model outer space presence on the polar regions, preserving it as a place for technological research rather than military gain.

After the Cuban Missile Crisis, Kennedy's 1963 speech to the UN emphasized scientific research and the benefits of a cooperative approach between the US and USSR.[398] This speech showed a transition in his own thinking toward cooperation from his 1961 declaration of plans to win the race to the moon, which seemed to stem from increased communication with his own scientific community along with a recognition of the serious consequences that could arise from too great a clash.[399] Constructivism helps to explain this shift, as an actor's identity and beliefs shape its worldview and thus the actions it decides to take.[400] Kennedy was a leader who was particularly open to ideas, which fits with his increased acceptance of the cooperation proposed by scientists, and loathe to permit escalation in conflict, resulting in his refusal to send in troops to East Berlin or Laos.[401] His openness to the ideas about scientific and peaceful uses of outer space supported by his NASA scientists helped to change the way he himself understood the realm of outer space through the process of socialization, in

[397] Ezell and Ezell, *The Partnership*, kindle loc. 507.
[398] *Ibid.*, 1173.
[399] *Ibid.*, 1187.
[400] Steele, "Ontological Security and the Power of Self-Identity," 524-529.
[401] J. Richard Snyder, "Introduction," in *John F. Kennedy: Person, Policy, Presidency*, ed. J. Richard Snyder (Wilmington, Delaware: Scholarly Resources, 1988), x.; Arthur M. Schlesinger, Jr., "Interview with Arthur M. Schlesinger, Jr." 1987 in *John F. Kennedy: Person, Policy, Presidency*, ed. J. Richard Snyder (Wilmington, Delaware: Scholarly Resources, 1988), 4.

which an actor is inducted into the norms and rules of a given community.[402] This speech is also an important marker of the importance Americans placed upon the UN, seeing it as an effective stage upon which to come to meaningful agreements. In June 1960, Kennedy told the US Senate in his "A Time of Decision" speech that he sought to strengthen the United Nations and give it a greater role in solving international conflicts.[403]

Although the Soviet response to this transition to a more cooperative mindset seemed mixed, it still fits within a constructivist framework as it was linked to attitudes toward status.[404] Initially, they did not answer Kennedy's proposition in the UNGA at all, ignoring Kennedy's proposal and not covering it in the media. Interestingly, the 1973 Moscow-published book *President Kennedy's 1036 Days*, by Anatolii Gromyko, examining the Kennedy presidency discusses Kennedy's June 10, 1963 address at American University, which makes the case that there is no rational reason to have total war when great powers can destroy each other's forces with a few nuclear weapons; the book argues that Kennedy's speech showed his departure from traditional, cold-war, American political dogma toward a reexamination of attitudes toward the USSR and a less hateful, hardline stance.[405] It then covers the U.S. government's agreement "in the summer of 1963 to the Soviet Union's proposal to enter into negotiations for a ban on nuclear tests," based on Kennedy's initiative. It does not, however, discuss Kennedy's UNGA speech, and skips forward to the October 17th UNGA resolution agreed upon by

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[402] Jeffrey T. Checkel, "International Institutions and Socialization in Europe: Introduction and Framework," *International Organization* 59, 4 (Autumn 2005): 804.
[403] Gromyko, *Through Russian Eyes*, 96-97.
[404] This refers to Johnston's linkage between an actor's attitude regarding cooperation and attitudes regarding perceived status and social standing of the self and the other. Johnston, "Treating International Institutions as Social Environments," 499.
[405] Gromyko, *Through Russian Eyes*, 215-218.

the US and USSR to refrain from putting nuclear weapons in outer space.[406] While this omission seems somewhat puzzling – after all, it is just a part of the general move toward outer space cooperation taking place in the upper echelons of government in 1963 – examining what Gromyko did include helps to illuminate a possible explanation. Gromyko includes only agreements which the Soviet Union proposed or which both parties came to on seemingly equal footing, at least according to his portrayal. Including a speech in which Kennedy was the explicit proposer of a cooperative peace plan would have gone against Soviet propaganda, (which even into 1973 still promulgated the image of the USSR as the stronger, smarter figure who recognized the inevitability of the capitalist America's collapse into socialism and merely wished to extend an olive branch toward cooperation, while keeping up a shield in case America, portrayed as a weaker, irrational child of a state, who could not sense its own inevitable surrender to socialism, attempted to harm the world using nuclear weapons). Instead, Moscow emphasized its own proposals for peace and portrayed Kennedy as a leader who was coming to his senses, but was still burdened by hawkish advisors who were at fault for hampering cooperation.[407]

The Kremlin's hiding of Kennedy's cooperation proposal from its own people was likely part of its strategy to seem like the dominant player who sets the rules of the game and tied directly to its perception of its own status in relation to the United States. The open discussion of Kennedy's speeches that lacked proposals suggests that the Soviets may have been open to an agreement with Kennedy in the future as long as it did not appear to have begun on American terms. This focus on perceptions of power

[406] *Ibid.*
[407] *Ibid.*

and status fits exactly with constructivism and shows why it was difficult to come to a cooperative agreement on a large-scale government level, even though scientists had already been collaborating and discussing on a smaller-scale for years.[408] The American and Soviet governments' desire to prove their respective ideologies superior operated in conjunction with their fear of seeming like the lower-status player and thus hampered their ability to easily cooperate.[409] Scientists, as they did not represent an entire ideology of capitalism or socialism, did not feel the weight of this status competition, and instead operated as their own epistemic community, sharing scientific norms across national boundaries, and thus connecting them more easily internationally in general.[410]

The Kremlin's use of formal institutions (namely UN agreements) to work with the U.S. showed that the USSR agreed with the U.S. with regard to the effectiveness of formal institutions in bolstering the likelihood of each party upholding their side of the agreements. The USSR chose to use methods linked with formal institutions in order to work toward cooperation following the Cuban Missile Crisis, as with its continued involvement in the UNCOPUOS, while picking and choosing when to open the door to cooperation in order to preserve its image as a higher status player. At the same time, it accused the U.S. of doing the same thing, demanding that global issues be fixed on

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[408] To illustrate the importance of perceptions of status in the international system, Eyre and Suchman found that third world countries preferred certain weapons systems (controlling for rational strategic need) because they tied those systems to the status of being a "modern" state. Dana P. Eyre and Mark C. Suchman, "Status, Norms, and the Proliferation of Conventional Weapons: An Institutional Theory Approach," in *The Culture of National Security*, ed. Katzenstein (New York: Columbia University Press, 1996), 107-111.

[409] Gorman and O'Leary, "An ideological vacuum," 73.; Johnston, "Treating International Institutions as Social Environments," 499-500.

[410] For example, norms like "universalism," which says that impersonal cognitive criteria and not personal biases should determine whether a scientific claim is accepted or rejected, and "communism," which says that scientific knowledge ought to be communal so that the scientific community as a whole can build upon new research in order to come closer to determining the truth, have united the international scientific community even in times of national ideological disputes. Nico Stehr, "The Ethos of Science Revisited: Social and Cognitive Norms," *Sociological Inquiry* 48 (1978): 173-175.

American terms – "a clear departure from the spirit of Kennedy's realistic statements."[411]

Kennedy's UNGA speech, highlighting that America was reaching out to the Soviet Union in the formal institutional setting that both countries recognized as meaningful and powerful in providing a forum for cooperation, and the Soviet Union's rejection of this narrative, in favor of one that highlighted its own role as the dominant player extending an olive branch to the less enlightened and less powerful U.S., show the importance of perceptions of status in determining whether cooperation would take place. Neither state wished to seem the less proactive, weaker player, slowing cooperative goals that the scientific community insistently championed and which they were gradually institutionalizing and would come to be internalized by each state in the future.

The Outer Space Treaty

Another critical juncture toward cooperation in outer space came in the 1967 "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies" (aka. The Outer Space Treaty), which set the principles governing the law of outer space.[412] Unlike other types of international law which often find roots in custom, the lack of custom regarding operations in outer space meant that treaties set the standard for outer space law.[413] The creation of the 1967 Outer Space Treaty was rooted in the scientific community's push for treating both Antarctica and outer space as scientific research environments rather

[411] Gromyko, *Through Russian Eyes,* 219.
[412] Dembling and Arons, "The Evolution of the Outer Space Treaty," 419-425.
[413] Vladlen S. Vereshchetin and Gennady M. Danilenko, "Custom as a Source of International Law of Outer Space," *Journal of Space Law* 13, 1 (1985): 22.

than military zones, illustrating the power of an epistemic community in setting norms.[414] Eisenhower had agreed with this categorization, suggesting in a 1960 speech to the UN General Assembly that the principles of the Antarctic Treaty apply to outer space.[415]

The U.S. proposed banning the use of outer space for military purposes as early as 1959, arguing that outer space was a distinctly separate issue from general disarmament, while Soviet proposals beginning of in 1960 for ensuring peaceful uses of outer space linked it to other disarmament issues.[416] This difference in proposals makes sense, given that the U.S. did not want to rid itself of foreign bases where it stationed short-range and medium-range ballistic missiles and the USSR did not want to close off the possibility of gaining its own military advantage in space without assurance that the U.S. would be disarming and reducing the threat of missile attack on the USSR.[417] Although this disagreement about disarmament seemed to put the two states at an impasse, the fact that even in 1959 at least through 1962 (when the proposals tapered off) both governments were submitting proposals to make space a non-military environment shows that the scientific community's framing of outer space as a scientific arena was at least in part accepted in governments; the speech by Eisenhower and later Outer Space Treaty showed that the Antarctic model supported by the scientific community did help to shape the way Soviet and American leaders approached the outer space issue.

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[414] Dembling and Arons, "The Evolution of the Outer Space Treaty," 419-425.
[415] "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies: Narrative," *U.S. Department of State*, https://www.state.gov/t/isn/5181.htm.
[416] *Ibid.*
[417] *Ibid.*

The Outer Space Treaty set the standards for uses of outer space, ensuring they be peaceful, and thus setting the stage for a more cooperative focus. These institutionalized standards created a path dependency, which institutionalism explains is a sort of stable pattern, in this case regarding peaceful uses of outer space, informing the policies regarding outer space to follow.[418] This treaty came about in part due to the beliefs of the scientific community, the Antarctic model, and government acceptance of these ideas (along with security fears) as discussed above.

The treaty also came about due to a unique tendency in outer space issues to codify laws before activities went too far against what governments wanted and the beliefs of governments that international law was an effective way to govern outer space.[419] The codification of outer space law before much establishment of custom in dealing with outer space resulted from a few factors. In part, it was due to the small number of states taking part in outer space activities, which helped to reach consensus on certain issues relatively quickly.[420] The nature of outer space activity problems, in that they tend to be of a technical nature and can require technical cooperation, also helped to push for the creation of detailed rules regarding rights and obligations of states, while custom would be too general and broad in obligations.[421] Legal regulations also came about more quickly than with other areas of international law because states were anticipating problems that would arise from the practice of states in exploration and use of outer space.[422] Custom still played some role in creating space law, as

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[418] Paul Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," *The American Political Science Review* 94, 2 (June 2000): 252.
[419] Vereshchetin and Danilenko, "Custom as a Source of International Law of Outer Space," 22.
[420] *Ibid*.
[421] *Ibid.*, 23.
[422] *Ibid*.

customary rules of general international law and customs preceding the 1967 Outer Space Treaty like free use of outer space by states with the capability, sovereignty not extending to space, no national appropriation of space, and states retaining jurisdiction over their own craft in space became codified later in treaty law.[423] Recognizing the importance of customs and norms that became codified and were followed by states afterward shows the importance of constructivism and neoliberal institutionalism in analyzing U.S.-Russian outer space relations.

End of the Space Race and Fruition of the Apollo-Soyuz

Although the space race era saw little cooperation in practice, with a majority of cooperation taking place in unpublicized international scientific communities, the post-moon landing period saw in both the US and the USSR an increase in receptivity of government officials to leading scientists' proposals for cooperation. This transition was another critical juncture in shifting toward greater cooperation. After the Apollo 11, the U.S. felt it had met Kennedy's 1961 goal; the Soviet Union did not have a further goal in space and had by this point turned more attention toward improving the poor economic conditions with which Khrushchev left the country.[424] The finishing of the space race ended the perceived need for either state to show its high status through beating the other at making technological advancements in space and other issues (economics, especially) took over the primary focus in the government. This amounted to a lowering of stakes in the space game, as constructivism explains, because actions in

[423] *Ibid.*, 23-24.
[424] "Apollo to the Moon: End of an Era," *Smithsonian National Air and Space Museum,* https://airandspace.si.edu/exhibitions/apollo-to-the-moon/online/later-missions/end-of-era.cfm.; Valerie Bunce, "The Political Economy of the Brezhnev Era," *British Journal of Political Science* 13, 2 (April 1983): 129-131.

space were no longer tied to the perceived status of the players, and so each felt more free to cooperate without it negatively impacting their self-esteem.[425] It opened Soviet officials to Keldysh's ideas for developing compatible equipment and procedures with the U.S. that he had been working on with Paine.[426] It led to Nixon's public support for space cooperation and call for technical negotiations between the US and USSR.[427] The public no longer saw spaceflight as necessary for proving dominance in the Cold War; some thought scientific exploration without the competitive undertones should be the next step, while others thought human spaceflight had served its purpose and money should not be wasted on more outer space ventures.[428] Once there was no longer a perceived race in which status depended on beating the other to a particular benchmark, it became easier for government officials concerned with security to let the scientific community take more control over the activities in space and to support these scientific ventures with high-level agreements about cooperative or peaceful activities in space.

This cooperation resulted in the Apollo-Soyuz Test Project, which took place in 1975, but had its roots in the communications between the scientific community in the U.S. and USSR decades earlier. Paine's Deputy Administrator George Low began official negotiations for a joint program in 1970 and continued to negotiate until reaching an agreement, which Premier Kosygin and President Nixon signed as part of the 1972 SALT accords.[429] When the last lunar mission finished in 1972, the leftover Apollo rockets and craft went toward Skylab – meant for scientific research,

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[425] Reus-Smit, "The Constitutional Structure of International Society and the Nature of Fundamental Institutions," 583.
[426] Ezell and Ezell, *The Partnership*, kindle loc. 1915.
[427] *Ibid.*, 1920.
[428] "Apollo to the Moon: End of an Era."
[429] Ezell and Ezell, *The Partnership*, kindle loc. 2461.; Evans, *At Home in Space*, 2.

symbolizing the scientific focus of space activity in the post-space race era – and the Apollo-Soyuz mission – marking the end of competition and beginning of meaningful, operationalized cooperation in space.[430] The Apollo-Soyuz was the result of decades of support from the scientific community for a more collaborative view of space activity, the ending of status-linked competitive activities due to a lack of clear goals for space activity beyond the lunar landing set by governments and a need to focus on economics and other earthly issues, and the formal institutionalization of norms of space practice through treaty law. It is the clear marker of cooperation in the history of space activities between the Soviet Union and U.S.

SDI Competition and Low-Level Scientific Cooperation

A critical turning point away from cooperation, marking the swing of the pendulum back in the direction of competition on the macro/government level, was Ronald Reagan's SDI. Military satellite programs on both sides quietly advanced in the shadow cast by the publicized Apollo-Soyuz mission and continued to advance alongside the increase in ICBM stocks.[431] Carter and Brezhnev's SALT II accord did little to quell rising fears that the other side might create effective ICBM defense systems, which would end the promise of mutually assured destruction and thus destabilize the security system between the two.[432] The USSR feared the technological advancements of US weaponry and the US feared the size of the Soviet arsenal.[433] The military technological advancements and ending of the cooperative space mission

[430] "Apollo to the Moon: End of an Era."
[431] Pahl, *Space Warfare and Strategic Defense*, 19.
[432] *Ibid.*, 16.
[433] *Ibid.*, 23.

helped to create an environment of fear and led to a crumbling of the spirit of cooperation in space.

Constructivism explains that perceptions about an actor's social standing, environment, and identity inform the way it will act.[434] This environment of fear resulted from the public perception on the side of the U.S. that the larger number of Soviet weapons was a greater threat than technological advancements, and the Soviet perception that America's technological advancements were a stronger, greater threat than their own larger arsenal. The perceptions of what makes a greater threat and a worry about being the lesser-player in the game of missiles, which had been born in the period since the ending of the space game, drove both states to take a more defensive and less trusting stance. The 1979 falling of Skylab, a symbol of scientific, peaceful uses of outer space for which the U.S. was unwilling to fund a restoration project, was a fitting harbinger for the era to come.[435]

Reagan's platform noted the inequality in disarmament, which had affected the American arsenal more than the Soviet arsenal, and popular opinion once again felt more fear for the Soviet space program's possible technology than awe at the American and Soviet cooperation.[436] In the Soviet Union worries about instability hung in the air in Brezhnev's period of economic stagnation followed by his death in 1982 and fears about Reagan moving away from the détente propelled the USSR to become more defensive as well.[437] Reagan's SDI program clearly cut the cooperative tie between the

[434] Johnston, "Treating International Institutions as Social Environments," 499-500.; Steele, "Ontological Security and the Power of Self-Identity," 524-529.
[435] Pahl, *Space Warfare and Strategic Defense*, 16.
[436] *Ibid.*, 41-44, 6.
[437] *Ibid.*, 44.; Hughes-Wilson, *A Brief History of The Cold War*, 300.

countries and met the perceived need for bolstered security that the American public felt. The Soviet Union's stagnation only continued in the turnover of Soviet leaders, from Brezhnev, to Andropov, and then to Chernenko.[438] Although they continued to run military technology improvement programs, lack of a clear mission from the upper tiers of power coupled with inefficiencies in the overly large bureaucracy contributed to a lag in Soviet technology. In some ways, this period in the early to mid-1980s was an echo of the space race, albeit with a much less involved Soviet player that was struggling with its own domestic economic problems. Once again, the goal to have greater status helped to propel the US to set the terms of disarmament and outer space defense programs, and beliefs about ideological differences also played an important role, as the US sought to defeat the "evil empire" by neutralizing its security threat through SDI.[439]

A realist might argue that the heightened American and Soviet tensions were in this case entirely rational, as the USSR had more missiles than the US and America's technological advancements, thus making it prudent for each side to offset the perceived advantages of the other. The SDI era does seem to almost fit within the predictions of a realist framework, as it was focused on the Soviet threat. But realism fails to explain why Reagan would have bothered to uphold the Outer Space Treaty, which clearly limited his policy options – a seemingly irrational move. The US has emphasized the Outer Space Treaty's "peaceful uses of outer space" as meaning "nonaggressive;" Reagan's SDI program limited itself within the confines of nonaggression in order to

[438] Hughes-Wilson, *A Brief History of The Cold War,* 300-302.
[439] The term "evil empire" was used by Reagan to refer to the Soviet Union in a March 8, 1983 address to the National Association of Evangelicals, emphasizing a hardline stance against the USSR. Ronald Reagan, "Evil Empire Speech," *Voices of Democracy,* March 8, 1983, http://voicesofdemocracy.umd.edu/reagan-evil-empire-speech-text/.

avoid violating this treaty.[440] If Mearsheimer's argument that institutions are weak and merely reflect current power distributions were true, it seems unlikely that Reagan would have limited his own strategic military options in order to uphold this formal institution.[441]

Additionally, realism fails to explain the cooperation that did occur in this period. The security-focused rivalry suggested by SDI and the personalities and policy priorities of Reagan and his Soviet premier counterparts muted open cooperation like that of the Apollo-Soyuz mission. Nevertheless, there remained lower-level cooperation between scientists and technical experts. Roald Sagdeev, director of the Space Research Institute of the Soviet Academy of Sciences from 1973 to 1988 and science advisor to Gorbachev writes that certain low-profile cooperative ventures were approved by the Kremlin and White House during the 1980s including coordinated use of U.S.-Canadian-French SARSAT and Soviet COSPAS satellites for search and rescue efforts for ships and airplanes in distress and NASA-Soviet space biology and medicine experiments continued.[442] Soviet academicians Oleg Gazenko and Anatoly Grigoriev and NASA scientist Arnauld Nicogossian led a cooperative program in which U.S. medical devices were used in primate experiments on the 1983 Cosmos 1514 mission.[443] This low-level scientific cooperation, reminiscent of the cooperative talks spearheaded by Blagonravov, Frutkin, and other scientists in the early days of the space race, continued throughout a difficult and tense period in US-Soviet relations. Soviet

[440] George Bernhardt, Sandra M. Gresko, and Thomas R. Merry, "Star Wars versus Star Laws: Does SDI Conform to Outer Space Law; The Reagan Legacy and the Strategic Defense Initiative: Note," *Journal of Legislation* 15, 2 (May 1, 1989).
[441] Mearsheimer, "The False Promise of International Institutions," 7.
[442] Sagdeev, "United States-Soviet Space Cooperation during the Cold War."
[443] *Ibid.*

and American scientists also continued meeting at the Committee on Space Research, established in 1958, and through the International Astronautical Federation.[444] These discussions led to a Soviet-American cooperative project in 1981 to explore Halley's Comet along with the European Space Agency.[445] Various private groups like the Planetary Society, created by Carl Sagan, NASA Jet Propulsion Laboratory Director Bruce Murray, and physicist Louis Friedman and the Association of Space Explorers, consisting of astronauts and cosmonauts served as forums for collaborative scientific discussion and facilitated the continuation of communication and cooperative projects.[446] Later, these cooperative ventures served as the example for cooperation between Russian space station Mir and the U.S. shuttle programs and the ISS.[447]

Realism would predict that the security threat posed by the enemy in this period of heightened tension would eliminate cooperation even on these lower levels. Cooperation and technology sharing poses a threat as it opens your operations to another actor's eyes – in this case doubly threatening given the rivalrous nature of the partners' relationship in general. And yet, the cooperation continued. Constructivism better explains this phenomenon, as it shows how cooperation can persist out of habit, once the norm of cooperation on a particular issue – outer space activities, in this case – becomes entrenched into the actor's identity and beliefs.[448] The scientific community, the epistemic community of experts in this case, supported the norm of cooperation and advocated for it in the government long enough for the countries to become socialized

[444] *Ibid.*
[445] *Ibid.*
[446] *Ibid.*
[447] *Ibid.*
[448] Hopf, "The logic of habit in International Relations," 539-543.; Adler and Pouliot, "International practices," 1.; March and Olsen, "The Institutional Dynamics of International Political Orders," 956.

into thinking about scientific cooperation in these terms, as constructivism explains.[449] Thus, the scientific community's low-level cooperation was exempted from the tension and security threats of the SDI era.

Gorbachev and the End of the Cold War

The tides turned back toward a more openly cooperative relationship with Gorbachev's ascent to power. Gorbachev's own background as an agricultural specialist favored economic focus over military and this prioritization manifested itself in perestroika and glasnost.[450] The creation of the Mir ("peace") space station in 1986 seemed to symbolize this value in the outer space realm. The Cold War ended on a cooperative note, signaled through Gorbachev's statement to Bush ensuring the USSR would not start a new war with the US and wishing for cooperation between the two.[451] The collapse of the Soviet Union helped both players to feel as though they could start anew without the ideological clash that plagued earlier relations; this turning of a new leaf helped the governments see the space relationship as less rivalrous, which was displayed through the scaling back and transformation of the SDI program and the increase in scientific space program expenses.[452] The agreement between Yeltsin and

[449] Checkel, "International Institutions and Socialization in Europe," 804.; Haas, "Introduction," 3-4.; Haas and Haas, "The Emergence of Cooperation," 102.
[450] "History: Mikhail Gorbachev," *BBC* (2017). http://www.bbc.co.uk/history/people/mikhail_gorbachev.
[451] Hughes-Wilson (Col.), *A Brief History of The Cold War*, 360. It is difficult to say when exactly the Cold War ended. It is generally considered to be sometime after the fall of the Berlin Wall, as the Soviet Union began to collapse, although there is not a clear date for demarcation. Some consider it to have been ended when Russia declared independence and the Soviet Union dissolved in 1991. Thomas Risse-Kappen, "Ideas do not Float Freely: Transnational Coalitions, Domestic Structures, and the End of the Cold War," *International Organization* 48, 2 (Spring 1994): 185-186.; Julia Ioffe, "The End of the End of the Cold War," *Foreign Policy*, December 21, 2016, http://foreignpolicy.com/2016/12/21/the-end-of-the-end-of-the-cold-war-russia-putin-trump-cyberattacks/.
[452] Elements of the SDI program went toward the THAAD, Aegis, and Patriot systems and the Israeli Iron Dome, David's Sling, and Arrow systems. David Hafemeister, "The Defense: ABM/SDI/BMD/NMD," in *Physics of Societal Issues: Calculations on National Security, Environment, and Energy*, 2nd ed. (New York: Springer, 2014).; Marc Selinger, "The road to Iron Dome," *Aerospace America* (April 2013).

Bush to initiate cooperative manned space programs cemented that the nature of the space relationship would include cooperation.[453]

Although, naturally, the military continued satellite programs geared toward military support (reconnaissance, communication, etc.), it is important to recognize that these programs have never included military weapons capable of striking an enemy. Even in the SDI era, which might be considered the closest the world has come to a truly militarized, strike-capability satellite technology, rather than just support systems, the system was still unable to strike the enemy – only the enemy's weapon that had just been fired.[454] Reagan's inclusion of the word "defense" in the program title likewise shows America's reluctance to label this capability as offensive in any way, helping them to remain within the guidelines of the Outer Space Treaty. Being a part of an institution, constructivism shows, will shape actor's beliefs and values toward alignment with the beliefs and values supported by the institution.[455] Once the actor becomes used to acting in accordance with that institution's standards, it will tend to continue to do so in the future out of habit, as a constructivist lens explains.[456] The emphasis on SDI as being a "defensive" program shows the extent to which the norm declaring outer space to be for peace that the Outer Space Treaty codified and to which the U.S. adhered, had become engrained in the American government. Although the media dubbed the program "Star Wars," which implies a set of offensive weaponry on both sides in space (like the film series), the program itself was still focused on defense

[453] Hall and Shayler, *Soyuz: A Universal Spacecraft*, 345.
[454] Richard Ranger (Vice President of Programs, DDES Corporation), Interview, March 14, 2017.
[455] Johnston, "Treating International Institutions as Social Environments," 509.
[456] Hopf, "The logic of habit in International Relations," 539-543.; Adler and Pouliot, "International practices," 1.

rather than offense, showing the value a more hawkish administration (in comparison to its predecessor) placed on upholding the tenets of the Outer Space Treaty.

The SDI program did not go into effect in space, as the perceived need for the defense program disappeared with the collapse of the Soviet Union.[457] Since then, military involvement in space has been limited to a support capacity on both sides or posturing without actual attack, supporting the norm of space as a peaceful, scientific realm. The lessons learned from the SDI program went toward the improvement of anti-satellite systems, which can shoot down satellites from a terrestrial position (but as of the present have not been used on enemy satellites), as well as proximity-sensing capability for satellites so that they can either disrupt enemy operations without damaging enemy property or sense interference and avoid compromising operations.[458] These systems help states to show off technological prowess and support status claims without violating the peaceful use of space. This shows the endurance of the norm of space being a scientific, peaceful realm supported by scientists as early as the 1950s and the strength of formal institutions in governing space operations. Norms, the standards of behavior that are expected of a group, tell actors which practices are unacceptable (they do not meet the norm) and shape an actor's identity to the extent that the actor thinks in terms of those norms, often subconsciously, in order to operate within those standards.[459] The scientific community's norms surrounding proper uses of outer space (for scientific, peaceful, and not offensive-military purposes) became institutionalized through their codification into the UNCOPUOS and the Outer Space Treaty, which held

[457] Pike, "Strategic Defense Initiative."
[458] Ranger, Interview.
[459] Jeffrey T. Checkel, "International Norms and Domestic Politics: Bridging the Rationalist-Constructivist Divide," *European Journal of International Relations* 3, 4 (1997): 473-475.

such a strong influence that even a hawkish government's militarized space program was limited in its development so that it would still fall within these standards of peace.

International Space Station

The shift in focus of American and Russian space programs toward space stations in which scientific research could take place also came about due to the pervasiveness of this scientific norm. That outer space activity should have a peaceful, scientific purpose was a norm which the scientific community had continued to champion, bolstered by formal institutions (COPUOS, Outer Space Treaty, etc.), even during the SDI era and which had become more palatable for the American and Russian governments since the end of the Cold War and fall of the Soviet Union due to a decrease in perceived military threat. The Discovery link-up with Mir in 1994 and the hiring of Russian scientists for American space projects following the collapse of the USSR, even when those scientists were merely recreating work that NASA had American scientists already building, cemented this norm in the post-Soviet age, leading to the Intergovernmental Agreement on Space Station Cooperation and International Space Station.[460] This agreement helped Russia maintain its status as an important player in the world, easing the sting of the collapse of the Soviet Union.

These programs also benefitted U.S. security by providing an outlet for Soviet scientists to earn a living by producing technology that would benefit the world, rather than through programs that might further destabilize it. On the other hand, hiring Russian scientists to essentially recreate work that NASA was already having American scientists create was a waste of money in terms of gaining a material product. The U.S.

[460] Evans, *Partnership in Space*, 375.; U.S. Congress, Office of Technology Assessment, *U.S.-Russian Cooperation in Space*, iii.; "Partners Sign ISS Agreements."

wanted to engage Russian scientists, keeping them from working in areas like weapons of mass destruction, but did not entirely trust them to make a product that fit U.S. technical specifications perfectly, which often differed significantly from Soviet standards.[461] Thus on the one hand, it seems entirely self-interested and security-focused to hire these scientists, decreasing the possible threat of them working for more nefarious countries, but on the other hand, spending money on a double-product seems a less-than-self-interested decision. And so, it is difficult to determine how much established norms of cooperation between the two scientific communities played a part in this decision as compared to self-interested security motives. But the fact that the U.S. came to the conclusion that it could and should hire Soviet scientists in their field of work (rather than any other method of dissuading them from working for a rogue-country) shows that the norm of cooperation in the realm of outer space, which the scientific community had supported and which had been codified into international formal institutions, had become entrenched enough in the American government in order to allow consideration of this arrangement as a sound option.

Doubling of work happened again with the Interim Control Module for the ISS, which was originally designed in the 1980s, but then redesigned in order to accommodate Russian technology in the late 1990s, and was itself already a redundant back-up, because its function was to be replaced by Russia's Zvezda module regardless.[462] Again, distrust over the reliability of the Russian space industry in a weak economy led to spending extra money on the doubling of work, but the fact that the

[461] Ranger, Interview.
[462] "Interim Control Module will be ready to fly in December, says NASA."; "NRL Revamping Control Module for NASA Space Station."

U.S. chose to allow Russia to design its own module for use with the ISS and then the U.S. redesigned its own original module (in case of Russian failure) to incorporate Russian technological requirements showed the commitment to cooperation that was an automatic, sub-conscious "given" within the Russian and American space programs by this point, due to the strength of the scientific epistemic community's norms of cooperation and the strength of the formal institutions that codified these norms.

Getting Russia on board with the ISS was important in establishing the nature of the U.S.-Russian relationship as collaborative rather than mirroring the tension of the U.S.-Soviet relationship. The optimism of incoming American and Russian presidents about the goal of getting U.S. and Russia to have a more positive relationship overall has helped to ensure the peaceful space relationship, which always remains as a symbol of the possibilities for U.S.-Russian relations, even when they become strained on the ground.[463] This persistence is due in part to the treaties upholding this relationship, explained by neoliberal institutionalism, and the purpose of outer space activities, which tend to be peaceful due to the internalized norm of peaceful uses of outer space that has also been supported by institutions like the Outer Space Treaty, along with the continued coordination of the scientific communities across state borders, which epistemic community theory has shown to be important in the development and maintenance of the norm of cooperation and scientific uses of outer space over time.

Language requirements are an interesting example of the uniqueness of the cooperative relationship between Russia and the U.S., as English and Russian, but not languages of other countries, are required for astronauts in cooperative programs. The

[463] Stent, *The Limits of Partnership*, x.

Shuttle-Mir program required knowledge of Russian and English by both sides, which makes sense given that these two countries were the only ones taking part.[464] Even before the retiring of the shuttle program meant American travel to the ISS required the Russian Soyuz craft, "Runglish" was the language of choice, with crew members being required to speak both languages, even though other countries are involved in the ISS program.[465] "Runglish" has been deemed the "unofficial" language of the ISS, with non-Russian and non-American astronauts being required to speak it.[466] In fact, the term "Runglish" was actually coined in 2000 onboard the ISS.[467] Often the language the addressee is most comfortable with (English for Americans and most Europeans, for example) will be the language of choice (rather than Italian for Italian astronauts).[468] Russian cosmonauts are required to have a good command of English before joining the space program and American astronauts are given extensive training to reach a "high intermediate" level of Russian in the U.S. before going to Russia for more language training.[469] Russia's place of importance alongside the U.S. has been clearly cemented in the norms and rules surrounding language use. Not only has it become a practical necessity, as Russian cosmonauts must function in the ISS's official English language

[464] "Bilingual Blues," *NASA*, https://history.nasa.gov/SP-4225/bilingual/bb.htm.
[465] "Space station crew talks in 'Runglish,'" *The Topeka Capital-Journal*, October 10, 2000, http://cjonline.com/stories/101000/new_runglish.shtml#.WMjV86JOk2w.
[466] "Next ISS Crew Conducts Final Exam in Soyuz Simulator," *NASA*, April 30, 2013, https://www.youtube.com/watch?v=Jt4BZalMbqs&feature=youtu.be&t=3m11s.
[467] Olga Bondarenko, "Does Russian English Exist?" *American Journal of Educational Research* 2, 9 (2014): 833.
[468] "Russkii v kosmose. Dokumental'nyi fil'm," *Rossiia 24*, April 14, 2014, https://www.youtube.com/watch?v=2yJYkC50JWg.
[469] "Novosti – Kosmonavt-ispytatel' Roskosmosa Muzhtar Aimakhanov prokhodit podgotovku v sostave gruppy spetsializatsii I sovershenstvovaniia," *Nauchno-issledovatel'skii isnytatel'nyi tsentr podgotovki kosmonavtov imeni IU. A. Gagarina*, Sept. 10, 2014, http://www.gctc.ru/main.php?id=2672; "Astronaut Candidate Program," *NASA*, 2015, https://astronauts.nasa.gov/content/broch00.htm.

and American astronauts must be able to interact with the Soyuz's official Russian language, but it is also an indicator of status and importance in outer space.

Although the U.S. had the technological prowess to blackball Russia from further involvement with space projects, it went out of the way to rewrite its ISS agreement in order to include Russia. It is interesting to note that although much of the cooperation between Russia and the U.S. has largely been bilateral throughout history, given the prominence of both states in outer space ventures, even as the ISS project began with many other states and not Russia, once Russia was included in the project, it immediately became an important enough player to merit bilateral agreements that have been regularly renewed and added onto between the U.S. and Russia.[470] Furthermore, the U.S. made Russian a required language for the ISS and ISS-related astronaut training programs, even as English remains the official ISS language, symbolically placing Russia in a powerful position in the space realm. Russia's status as an important player in space has only been given greater importance as the U.S. became entirely reliant on Russian RD-180 rockets and abandoned its own shuttle program.[471] This decision, along with the one to hire Russian scientists in duplicating NASA projects upholds the formal institutions based upon the principles originally codified by the Outer Space Treaty and informal norms about the importance of scientific cooperation

[470] See: "U.S. Department of State, *Space Cooperation, High Energy Neutron Detector: Agreement Between the United States of America and the Russian Federation,* (September 18, 2006).; U.S. Department of State, *Space Cooperation, International Space Station: Protocol Between the United States of America and the Russian Federation*, (July 1, 2006).; U.S. Department of State, *Space Cooperation, Customs Procedures: Agreements Between the United States of America and the Russian Federation Extending the Agreement of December 16, 1994*, (October 4, 2012).; U.S. Department of State, *Space Cooperation: Agreements Between the United States of America and the Russian Federation Amending and Extending the Agreement of June 17, 1992*, (April 3, 2013).
[471] Dilanian, "Why Does the U.S. Use Russian Rockets to Launch Its Satellites."; Pearlman, "NASA's Space Shuttle Program Officially Ends After Final Celebration."

in outer space. The choice to continue to uphold this cooperative system is not one that is consciously and rationally reevaluated every time a new administration comes to power or even every time the administrations realize that earthly cooperation will not be as easy as they had hoped. Instead, the cooperative system, characterized today by Russia's financial dependency and America's transportation and rocket technology dependency, is the default which governments in the present automatically adhere to out of habit.[472] The juxtaposition between the purely scientific, unofficial communications about the possibility of cooperation during the 1960s and the high level of technological and financial interdependency that even includes the private sector in the modern day shows the power of norms shaped by an epistemic community in impacting habit formation and entrenching the system in cooperation.[473]

Concluding Thoughts

The framework of neoliberal institutionalism and epistemic community-focused constructivism helps to explain why the U.S. and Russia have decided to cooperate in the past and have maintained space cooperation in the midst of sanctions, territorial disputes, and other conflicts. Certain periods of cooperation have begun and ended quickly, much like a neorealist might expect, fluctuating along with the general relationship at the time, like with the Apollo-Soyuz mission that lined up with détente. But other periods of cooperation have outlasted periods of warmth (or at least thaw), and would seem to be based on irrational state action judging on self-interest, as with the U.S.'s retiring of the shuttle program in favor of complete reliance on the Russian Soyuz for access to the ISS. Neorealism's focus on self-interest (and coercion as a

[472] See: Hopf, "The logic of habit in International Relations."
[473] See: Haas and Haas, "Learning to Learn," 269.; Hopf, "The logic of habit in International Relations."

subset of that motive, as coercion involves a threat that self-interest bars a state from wanting to allow) is useful then in part for understanding the motives for space cooperation (emergence and maintenance), but lacks the additional pieces of the puzzle – norms, epistemic communities, and institutions – that have played a part in the cooperation between the U.S. and Russia in outer space. Neoliberal institutionalists, on the other hand, specifically discuss the sorts of institutions, like treaties and organizations, which have been an integral part of the cooperation between the U.S. and Russia. Neoliberal institutionalism accounts for the institutions that have been created in the emergence and especially maintenance of cooperation. Epistemic community theory helps to fill in the gaps in neoliberal institutionalism with regard to emergence by helping to explain why norms about outer space practices became formally institutionalized and emerged in the first place. Given the important role the scientific community played in creating the cooperative environment and setting the tone as a cooperative scientific one that led to the Apollo-Soyuz mission, it is necessary to remember that when government leaders make decisions using a cost-benefit analysis, they do so within a frame of mind that includes values and beliefs about proper uses of outer space and respect for formal institutions. The norms of outer space use were rooted in beliefs about the nature of scientific advancements that the scientific community supported in pushing the government to assimilate these ideas and the formal institutions played a crucial role in upholding these norms even as relations became more strained.

A key question to examine is what determines which pattern – sustained cooperation or fleeting cooperation punctuated by competition – holds in each case. The

clearest example of sustained cooperation is the low-level collaboration and dialogue that began at least as early as the International Geophysical Year and has continued, without significant interruption, to the present day. Even through fluctuations in U.S.-Soviet/Russian relations, through the space race, détente, SDI, the Soviet collapse, and recent disagreements and conflict over earthly events like Chechen conflicts, Ukrainian conflicts and Russian annexation of Crimea, and the Syrian war, which have had negative consequences like arms races, sanctions, and removal from international institutions (like removal of Russia from the G8), the scientific community, including and especially those working for the official Russian branches of government (either military during the USSR or the Russian space industry more recently) and NASA, have continued to meet through various private and public formal institutions like the Committee on Space Research, UNCOPUOS, the International Astronautical Federation, and the Planetary Society to discuss cooperative ventures.[474] In this case, cooperation has held throughout, regardless of the general population's thoughts toward the other country and the government's official stances regarding the other, due to the strength of norms in the epistemic community.[475]

Following the space race, scientists also engaged in cooperative projects and have done so ever since, even in times when the U.S.-Russian relationship was rather negative, like during the early 1980s.[476] The scientific community engaged with leaders in the government early on in order to boost the institutionalization of cooperative, peaceful, scientific norms surrounding the proper uses of outer space.[477] The

[474] Sagdeev, "United States-Soviet Space Cooperation during the Cold War."
[475] Haas, "Introduction," 3-4.
[476] Sagdeev, "United States-Soviet Space Cooperation during the Cold War."
[477] Haas, "Introduction," 3-4.; Haas and Haas, "Learning to Learn," 269.

codification of these norms led to the socialization of the governments over time into the mindset of viewing space cooperation as a given, from which they would deviate only after consciously deciding upon a need to do so, as with SDI; however even in those cases, they still tempered their deviances from the institutionalized framework in order to not entirely ignore those standards. This shows the importance of the scientific community in shaping government beliefs and in turn policies over time as the norms this epistemic community championed became more engrained in the states' identities through the process of socialization.

But what of the cooperation events that were fleeting? Why did the socialization process of norm-transfer not prove effective in these cases? A large part of this answer is simply not enough time elapsed and the newness of the institutionalized norm of space cooperation. In the Apollo-Soyuz mission, often touted by both governments as the golden-child of cooperation and certainly one of the most publicized cooperative ventures between the U.S. and Russia/the Soviet Union, it seems that the general belief in détente and the ending of the space race, which decreased fears about status, fostered an environment in which government officials felt secure enough to entertain the idea of using the framework used by the epistemic community of scientists on a large-scale. Institutionalists like Eyre and Suchman and constructivists like Johnston point to the importance of status in determining state action.[478] But once the collaborative project ended, so too did large-scale cooperation for many years. This tells us that the governments had not been completely socialized into the attitudes and beliefs of the scientific community at this period. Socialization requires an actor to be steeped in the

[478] Eyre and Suchman, "Status, Norms, and the Proliferation of Conventional Weapons," 107-111.; Johnston, "Treating International Institutions as Social Environments," 499.

beliefs, norms, and values of a group and to internalize these itself.[479] Identities tend not to be quickly changed, as actors unconsciously hold onto many of their values and norms and simply act on these aspects of their identity out of habit.[480] Changing an actor's identity takes time. It is likely that the space race had left its mark in both governments, so that although they now felt less need to dominate each other through a status game, both still held onto their differing identities, which included a starkly contrasting ideology and different beliefs about how best to organize outer space operations in their own country (with NASA being a civilian branch, and the Soviet space program being overseen by the military).

This situation starkly contrasts with the current high level of cooperation and even dependency between the U.S. and Russia, which has come about through institutions, path dependencies, epistemic community beliefs, socialization, and habit formation. The current strength of cooperation shows that cooperation has become more institutionalized over time. Epistemic community theory shows how the scientific community spread its norms into both governments using formal institutional codification through UN agreements as well as through informal interactions with government leaders in which they touted the benefits of a cooperative framework.[481] Over time, the path dependency has grown for the institutions upholding outer space activities as peaceful, cooperative ventures and governments have grown more in the habit of allowing cooperation, to the point where the norm of space cooperation has become so entrenched that the governments have decided to become entirely

[479] Checkel, "International Institutions and Socialization in Europe," 802-804.
[480] Hopf, "The logic of habit in International Relations," 539-543.
[481] Haas and Haas, "Learning to Learn," 269.

cooperative and dependent on one another in the ISS project.[482] This shows the importance of having continued efforts of socialization over time in affecting the recipient of the socialization effort.[483] The difference in strength of cooperation between the Apollo-Soyuz era (weak) and the present day (strong) not only shows the effectiveness of epistemic communities and institutions in shaping and strengthening norms, but also suggests that these processes take a rather long time to become entrenched. As such, it is not out of place to assume that as long as the scientific community continues to uphold these norms (which is likely) and the strength of the institutions upholding these norms continues (which is also likely), U.S.-Russian space cooperation will also continue. The following chapter will explore what these findings mean for the future of U.S.-Russian space cooperation as well as the future of space cooperation in general.

Chapter 5: Conclusion

This thesis has sought to explain why space cooperation between the Soviet Union/Russia and the United States emerged in history and why it has continued into the present, even amidst otherwise tense U.S.-Russian relations. Chapters two and three provided historical background regarding U.S. and Russian activities in space and theories of international relations, respectively. The fourth chapter combined these tools in order to analyze reasons for space cooperation's emergence and maintenance. This chapter concludes the thesis by examining the findings of the analysis in answering the

[482] Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," 252.; Hopf, "The logic of habit in International Relations," 539-543.; Adler and Pouliot, "International practices," 1.
[483] Checkel, "International Institutions and Socialization in Europe," 804.

research question and exploring the significance of these conclusions for the present and future of space cooperation.

Outer space cooperation has been an interesting success story. This analysis has shown the reasons for the successful emergence of space cooperation – namely, the role of a determined epistemic community in supporting the norm of outer space as a cooperative, peaceful, scientific environment through informal cooperation and the creation of formal institutions in setting this standard. Maintenance of lower-level space cooperation has been largely consistent in some form since its emergence, due to the norms of collaboration supported by the scientific community and formal institutions supporting these actions. On the other hand, maintenance of large-scale space cooperation has not been consistent since its emergence, with certain periods of large-scale, publicized cooperation ending quickly after the project's completion (e.g. the Apollo-Soyuz Mission) and other periods of large-scale, publicized cooperation continuing (e.g. the ISS, U.S. reliance on Russian rockets and the Russian Soyuz). This difference is accounted for in the different levels of entrenchment of the space cooperation norm in the upper-government level in a given time period, due to process of socialization, habit-formation, geopolitical interests, and considerations of status. This explains the contemporary environment of strong space cooperation, which has remained constant in spite of the periodic ups and downs in U.S.-Russian relations. These findings are significant not only for the future of U.S.-Russian space cooperation, but also for the future of space cooperation with other countries, and the increasing involvement of the private sector into outer space activities, which will be discussed in greater detail below.

The significance of this finding applies to future space cooperation with Russia. Based on these findings, it is likely that space cooperation with Russia will continue unless a large-scale interruption occurs (e.g. the UN loses legitimacy, thus weakening the Outer Space Treaty; scientists are restricted from communicating; etc.). This does not imply there are not still some tensions in the space relationship; U.S. Congressmen have voiced concerns about reliance on Russian RD-180 rockets, particularly as Russian-American relations have soured over Ukraine and Syria, with support for an alternative, American solution coming from SpaceX (and those members of Congress to whom they contribute).[484] On the other hand, in a 2015 hearing in the House of Representatives Committee on Armed Services, Subcommittee on Strategic Forces, former NASA Administrator Michael Griffin explained that the reliance has become so entrenched in NASA that the Atlas 5 launch system operated jointly by Lockheed Martin and Boeing, which carries various types of satellites, orbiters, and other space vehicles into orbit, is entirely dependent on the Russian RD-180 rockets and would have to be retired completely were the use of RD-180 to be discontinued.[485] Scientists and policymakers have lamented that this "solution" (the ending of reliance in order to make a statement about disapproval over other areas of U.S.-Russian relations) would leave the U.S. unable to meet its own legal requirement for two independent systems of national security space launch capability.[486]

Clearly, the decades long entrenchment of the norm of cooperation and scientific activity in outer space has led to a pragmatic difficulty for those who seek to end it. In

[484] Dilanian, "Why Does the U.S. Use Russian Rockets to Launch Its Satellites."
[485] U.S. Congress, House of Representatives, Committee, *Assuring National Security Space*, 36-37.
[486] *Ibid.*

all likelihood, even if Russian-American relations continue to deteriorate, scientists will continue to argue in favor of cooperation, if not explicitly for the greater norm of cooperation and scientific projects in space, then for, as former NASA Administrator Michael D. Griffin says, the "decades of government investment" in systems based in cooperation with Russia; it would, Griffin argues, "require a decade or more to realize [an American replacement], and [this] neither can nor should be done in haste."[487] Scientists in the U.S. and Russia continue to work together, with the ISS as a main point of cooperation, which will, due the socialization of the U.S. and Russia into acceptance of norms supporting space cooperation, that have fundamentally altered the space systems of both countries to require this cooperation, likely continue to operate and serve as a symbol of the extraordinary results of international cooperation.

There is a small possibility that large-scale cooperation could be interrupted, given the right geopolitical conditions (e.g. a status-based power match reigniting between the two governments, with strong leaders), if the ISS were to require retirement and the question of a new ISS to come about during this sort of political environment, which might subject it to delayed or decreased funding. Norms are not stagnant; this is what allowed the norm of space cooperation to take hold initially, and it also suggests the possibility that the norm of space cooperation could be smothered in the upper-government level over time. This possibility seems less likely than the ending of large-scale cooperation following the Apollo-Soyuz mission, however, because even as tensions have heightened to a level that some have called "proxy wars," these norms have continued to hold, an observation that drew me to this research question in the first

[487] *Ibid.*

place.[488] Institutional power in upholding norms of cooperation will also help to prevent the ending of large-scale cooperation between Russia and the U.S. The low-level cooperation between scientists will almost certainly continue to exist regardless of the political environment, due to the strength of the epistemic community in upholding these norms of scientific cooperation in space and the institutional power in protecting these norms.

The effectiveness of the entrenchment of norms of scientific ventures and cooperation in space to the point of creating a system that requires cooperation to function also has implications for other countries, and emerging space powers in particular. While Russia and the U.S. were working bilaterally as early as the 1950s on a low level, "middle-range" space powers (France, Japan, China, Britain, and India) were a decade behind in basic satellite production, with the "new entrants" (Israel, Brazil, North Korea, Iran, and South Korea) attempting and only sometimes achieving this in the very recent past.[489] Although the European Space Agency, Canada, and Japan are involved in the International Space Station, their number of space launches has paled in comparison to the U.S. and Russia; this is less surprising when remembering that these states lacked the Cold War strategic need that drove the American and Soviet military space programs.[490] The U.S. and Russia have already begun working with emerging space powers, as with the International Space Station. Instances of cooperation between non-rivalrous emerging space powers and the U.S. are less

[488] Mazzetti, Barnard, and Schmitt, "Military Success in Syria Gives Putin Upper Hand in U.S. Proxy War."; "Russia & US will engage in 'global war', unless 'proxy' Syria conflict resolved – Turkey's deputy PM."; "Syria's 'proxy war' rages in towns near Aleppo, Syria."
[489] Brian Harvey, Henk Smid, and Theo Pirard, *Emerging Space Powers: The New Space Programs of Asia, the Middle East, and South America* (New York: Springer-Praxis, 2010), 543.
[490] *Ibid.,* 544.

difficult than the emergence of cooperation between the rivalrous U.S. and Soviet Union, because geopolitical interests and status competitions have not blocked the scientific community in these countries from upholding their norm of cooperation. Thus, it is likely that cooperation can and will continue to flourish between emerging, non-rivalrous space powers.

Does U.S.-Russian space cooperation's perseverance in spite of negative relations mean that there is room for the U.S. to cooperate with other rivalrous emerging space powers? Here, the answer is less clear. Interestingly, although the U.S. spends almost three times more than the rest of the world's space spending combined, followed by Europe in a very distant second place, China and Russia tie in third place, each spending about half as much as the European Space Agency.[491] This suggests that China is an important power in space, and its ratification of the Outer Space Treaty and involvement in the UNCOPUOS since 1980 seem promising, but the possibility of cooperation seems less likely than with the U.S. and Russia.

First, for the U.S. and China, this is in part because of the time Russian-U.S. space cooperation has taken to emerge; both sides of a bilateral relationship have to come to agreements in order to move forward with a partnership, and while norms of using outer space for scientific, cooperative purposes have become entrenched in the American and Russian systems, this cooperative orientation cannot be shifted to a U.S.-China system overnight, just as it could not be suddenly changed to a purely American or Russian system, as discussed earlier.

[491] *Ibid.,* 545.

Second, it seems as though the norms of space cooperation and peaceful uses of outer space are not necessarily present in the Chinese space program, evidenced by its 2007 launch of an anti-satellite weapon, which many viewed as an offensive posturing, asserting its dominance, as well as having the unfortunate side-effect of creating a huge amount of dangerous space debris, which jeopardizes the space assets of all countries.[492]

Third, the U.S. Congress has passed legislation that bans NASA scientists from working with or using funds for any Chinese officials, organizations, and scientific experts, although there has been confusion about to what extent this ban operates.[493] As a major factor in creating the strong and lasting space cooperation between the U.S. and Russia was the consistent dialogue and cooperation between scientists from both countries, this limitation suggests the power of an epistemic community in leading to U.S.-Chinese cooperation is miniscule. Likewise, this ban means a block of space-related bilateral agreements between the U.S. and China, which weakens the possibility of cooperation, as they lack a basic framework for cooperation.[494] It also eliminates the opportunity for scientific cooperation to socialize China into acceptance of peaceful norms regarding outer space activities. China is not currently even allowed onboard the ISS, although other, less active players like South Africa, Brazil, and Malaysia, are

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[492] U.S Library of Congress, Congressional Research Service, *China's Space Program: Options for U.S.-China Cooperation*, by Jeffrey Logan, RS22777 (2008): 1.; Ranger, Interview.
[493] Ian Sample, "US scientists boycott Nasa conference over China ban," *The Guardian*, October 4, 2013, https://www.theguardian.com/science/2013/oct/05/us-scientists-boycott-nasa-china-ban.; U.S. Department of Justice, Office of Legal Counsel, *Unconstitutional Restrictions on Activities of the Office of Science and Technology Policy in Section 1340(A) of the Department of Defense and Full-Year Continuing Appropriations Act, 2011*, by Virginia A. Seitz, Vol. 35 (2011).
[494] Leonard David, "US-China Cooperation in Space: Is It Possible, and What's in Store?" *Space.com*, June 16, 2015, http://www.space.com/29671-china-nasa-space-station-cooperation.html.

allowed.[495] The U.S.-China relationship lacks the tools that create and maintain lasting space cooperation.

Other rivalrous emerging space powers will likely face similar difficulties in establishing cooperation, especially given that the scientific community seems to have less freedom to establish connections with high-risk scientific communities than they did in the 1950s and 1960s. This additional freedom was an important part of the emergence of the U.S.-Russian space relationship, and contemporary government crackdowns on establishing scientific connections with rivalrous states, as with the American ban of Chinese scientist cooperation, hinder the emergence of cooperation with other rivalrous emerging space powers.

The Chinese-Russian relationship, although warmer to the idea of cooperating, faces a more materialistic challenge, which is the level of entanglement between the U.S. and Russian space programs (meaning it would be more difficult for Russia to compromise on technology like it did in the Apollo-Soyuz program) and budget restrictions, as the U.S. is by far the leader in the market.[496] If cooperation were to occur, it would likely be on a very basic level in which China buys RD-180 rockets from Russia, and it is not unlikely that this might occur, as high-level leaders have already met to discuss this possibility.[497] Cooperation with less contentious countries on a more multilateral level is already occurring through the ISS and will likely continue to

[495] Jeffrey Kluger, "The Silly Reason the Chinese Aren't Allowed on the Space Station," *Time*, May 29, 2015, http://time.com/3901419/space-station-no-chinese/.
[496] Tim Daiss, "Russia and China Discuss Joint Outer-Space Exploration, Moon And Even Mars," *Forbes*, July 14, 2016, https://www.forbes.com/sites/timdaiss/2016/07/14/russia-and-china-discuss-joint-outerspace-exploration/#636177751c27.; Harvey, Smid, and Pirard, *Emerging Space Powers*, 543.
[497] Daiss, "Russia and China Discuss Joint Outer-Space Exploration, Moon And Even Mars."

do so, given the power of the scientific community through formal institutions which uphold their norms of scientific, cooperative uses of outer space.

Questions of activity by the private sector in outer space are not new, but as they become more possible, the issue of how this industry fits in with U.S.-Russian space cooperation is increasingly important. In 1985, long before Virgin Galactic came about, Dula argued for the need to determine how private sector activities fit into a state-based system of formal institutions regulating outer space activity and argued in favor of a legal code that minimized regulations and recognized capitalist freedom in space.[498] Since then, the United States has emphasized the increasing role private sector will play in outer space exploration, although today private industry still is largely recognized in terms of the umbrella of a particular state.[499] In fact, the private sector for space in the U.S is almost entirely based on U.S. government demand and streamlined through three main companies on the supply side, which chips away at an image of a private space sector that thrives on competition, when in reality it is far more oligopolistic.[500] On the Russian side, Roscosmos, Russia's current space agency and NASA's functional counterpart, is actually a corporation, albeit a state-owned one; this degree of separation began as an institutional reform in 1992 separating civilian and military activities and later a change to a state-owned corporation, giving it an even more civilian nature, like NASA.[501] It is difficult to imagine that the private sector space industry, which is so

[498] Art Dula, "Private Sector Activities in Outer Space," *The International Lawyer* 19, 1 (Winter 1985), 159-160.
[499] "United States Stresses Role of Private Sector in Future Space Activities; Brazil Cautions against Sector's Increasing Existing Inequities," *Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space*, July 20, 1999, http://www.un.org/events/unispace3/pressrel/e20am.htm.
[500] U.S. Congress, House of Representatives, Committee, *Assuring National Security Space*, 36-37.
[501] Elizabeth Howell, "Roscosmos: Russia's Space Agency," *Space.com*, May 17, 2016, http://www.space.com/22724-roscosmos.html.

heavily tied to a government customer, would pose a large threat to U.S.-Russian space cooperation in the near future. The private sector will continue to become more important in space exploration, and it seems to be the most pioneering in its research.[502]

One area in which the private sector's increased strength might chip away at a cooperative program is in the Russian Soyuz craft, on which the U.S. currently relies in order to get to the ISS due to the retiring of its shuttle program, and for which SpaceX and Boeing are currently competing to create an alternative.[503] But space tourism, exploration, and even providing an alternative transport module for the U.S. by the private sector seems unlikely to interfere with a norm of scientific collaboration in space between the U.S. and Russia, which can continue through joint scientific experiments and can even integrate the private sector as it has begun to do, and with the formal institutions which uphold the cooperative partnership.

The U.S. and Russian space programs today are a stark contrast to the 1950s and 1960s. Over the years, they have been involved in low-level cooperation due to the efforts of their scientists in establishing within the system norms of peaceful, scientific, and cooperative activities in outer space. Although at times their large-scale cooperation has seemed to ebb and flow with the general tide of U.S.-Russian relations, since the end of the Cold War there has been a steady increase and continuation of cooperation in outer space, amidst negative periods in U.S.-Russian relations. The deeply entrenched nature of the scientific community's norms of outer space and the formal institutions

[502] U.S. Congress, House of Representatives, Committee, *Assuring National Security Space*, 36-37.
[503] The Boeing and SpaceX crew transports have been delayed by at least two years, however. U.S. Government Accountability Office, *NASA Commercial Crew Program: Schedule Pressure Increases as Contractors Delay Key Events*, GAO-17-137 (Washington, DC, 2017). http://www.gao.gov/products/GAO-17-137.

upholding these standards suggests that cooperation is likely to continue between the U.S. and Russia and this cooperation will continue to be unique from and more entrenched than cooperative ventures with emerging space-power states and the private sector.

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