THE OUTER SPACE AS A DOMAIN OF COMPETITION AND COOPERATION FROM THE COLD WAR TO TODAY

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ABSTRACT

THE OUTER SPACE AS A DOMAIN OF COMPETITION AND COOPERATION FROM THE COLD WAR TO TODAY

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In the 20th century, breakthroughs in technology and science enabled remarkable space exploration. The Soviet Union launched Sputnik-1, the first artificial satellite, in 1957, signaling the beginning of a new phase called the Space Age. The dominant view during the Cold War era was to view space activities from a military perspective, while seeking arms control at the international level. In the end, it turned out to be a geopolitical competition between the United States and the Soviet Union. With the advent of neoliberal economic policies in the 1980s and the end of the Cold War, space became commercialized. Investment in the space sector expanded beyond states to include private companies and other developed and developing countries. As a result, a multipolar space industry began to emerge. Since the early 2000s, Russia and China have challenged the United States' efforts to establish a unipolar world order, leading to geopolitical confrontations that extended into space. The United States launched the Artemis program in 2017, with the goal of fostering international cooperation during its development. Through the use of Artemis agreements, the United States sought to enforce its policies by forcing participating states to adhere to its guidelines. This thesis examines how space exploration has

evolved and progressed from the Cold War to the present. It also examines how global competitive dynamics are shaping space policy in the 21st century. It suggests that competition in space is likely to increase.

Keywords: space activities, space law, Artemis Accords, space age, international competition in outer space

ÖZ

SOĞUK SAVAŞ'TAN GÜNÜMÜZE REKABET VE İŞBİRLİĞİ ALANI OLARAK UZAY

TETİK, Bilgesu
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20. yüzyılda yaşanan teknolojik ve bilimsel gelişmeler sayesinde uzay keşifleri mümkün hale gelmiştir. 1957 yılında Sovyetler Birliği Sputnik-1 isimli ilk yapay uyduyu uzaya göndererek Uzay Çağı'nın başlangıcının ilk sinyalini vermiştir. Soğuk Savaş döneminde egemen görüş, uzay faaliyetlerini askeri bir perspektifle ele almak ve uluslararası düzeyde silah kontrolü arayışında bulunmaktı ve bu durum Amerika Birleşik Devletleri ile Sovyetler Birliği arasında jeopolitik bir rekabete dönüştü. Neoliberal ekonomi politikalarının 1980'li yıllarda ortaya çıkışı ve Soğuk Savaş'ın sona ermesiyle birlikte, uzay ticarileşmiştir. Uzay sektörüne yatırımlar, devletlerin yanı sıra özel şirketleri ve diğer gelişmiş/gelişmekte olan ülkeleri de içine alacak şekilde genişlemiş ve böylelikle çok kutuplu bir uzay endüstrisi ortaya çıkmıştır. 2000'li yılların başından itibaren Rusya ve Çin, Amerika Birleşik Devletleri'nin tek kutuplu bir dünya düzeni oluşturma çabasına meydan okumuş ve bu durum uzay alanında da jeopolitik olarak karşı karşıya gelmelerine yol açmıştır. Amerika Birleşik Devletleri, 2017 yılında Artemis programını başlatmış ve programı geliştirme sürecinde ise uluslararası işbirliğini teşvik etmeyi hedeflemiştir. Amerika Birleşik Devletleri Artemis Anlaşmaları aracılığıyla, politikalarını uygulamak için katılan

devletleri kendi kurallarına uymaya zorlamayı amaçlamıştır. Bu tez, uzay keşfinin Soğuk Savaş'tan günümüze kadar nasıl geliştiğini ve ilerlediğini incelemektedir. Ayrıca, 21. yüzyılda küresel rekabet dinamiklerinin uzay politikasını nasıl şekillendirdiğini ele almaktadır. Bu tez uzaydaki rekabetin yüksek olasılıkla artacağına işaret etmektedir.

Anahtar Kelimeler: uzay çalışmaları, uzay hukuku, Artemis Antlaşmaları, uzay çağı, uzayda uluslararası rekabet

To Laika and the Lives Lost in the Name of Science

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LIST OF ABBREVIATIONS

ABM	Anti-Ballistic Missile Treaty
APSCO	Asia-Pacific Space Cooperation Organization
ASAT	Anti-Satellite Weapon
BMD	Ballistic Missile Defence
BRI	Belt and Road Initiative
CASC	China Aerospace Science and Technology Corporation,
CGWIC	China Great Wall Industry Corporation
CHM	Common Heritage of Mankind
CIA	Central Intelligence Agency
CNSA	Chinese National Space Administration
COMSAT	Communications Satellite Corporation
COPUOS	United Nations Committee on the Peaceful Uses of Outer Space
CSA	Canadian Space Agency
EEC	European Economic Community
ELDO	European Launcher Development Organisation
ESA	European Space Agency
EU	European Union
FOBS	Fractional Orbital Bombardment System
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
GSLV	Geosynchronous Satellite Launch Vehicle
ICBM	Intercontinental Ballistic Missile
ILRS	International Lunar Research Station
INCOSPAR	Indian National Committee for Space Research
INF	Intermediate-Range Nuclear Forces

INSAT	Indian National Satellite
ISS	International Space Station
IRBM	Intermediate-Range Ballistic Missile
JAXA	Japan Aerospace Exploration Agency
LEO	Low Earth Orbit
MAD	Mutual Assured Destruction
MTCR	Missile Technology Control Regime
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NMD	National Missile Defense
OST	Outer Space Treaty
PPP	Public-Private Partnerships
PSLV	Polar Satellite Launch Vehicle
R&D	Research and Development
RAE	Royal Aircraft Establishment
RKA	Russian Space Agency
SALT I	Strategic Arms Limitations Talks
SDI	Strategic Defense Initiative
SLG	China's Space Leading Group
SLS	Space Launch System
TMD	Theater Missile Defense
UK	United Kingdom
UN	United Nations
USA	United States of America
USSR	Union of Soviet Socialist Republics

CHAPTER 1

INTRODUCTION

1.1. The Subject of the Thesis

Throughout history, space has captured the fascination of humanity and served as a source of inspiration for narratives, mythologies, cave arts, paintings, poems, and novels. This accumulation of culture, combined with a sense of curiosity, has influenced scientific research in this field. In Jules Verne's 1865 novel "From the Earth to the Moon", he dreamed about humans that go to a journey to the Moon using a cannon called the Columbiad.[1] This dream eventually became a reality in the 20th century through scientific advancements, and just 104 years after the book's publication, in 1969, humans successfully landed on the Moon for the first time.

However, technological advancements do not only arise from literary inspirations. The development of space technology largely occurred during the intense competition between the United States and the Soviet Union in the Cold War years, and it gained momentum within this context. The Soviet Union's achievements of launching the first artificial satellite (1957), sending the first animal (1957), first human (1961) and the first female astronaut (1963) into space, as well as the first landing on the lunar surface with an unmanned spacecraft (1959), caused the United States to fall behind at the competition. In response to this situation, Americans allocated huge amount of budgets and resources to space science and in 1969, for the

[1] The name "Columbiad" from the novel served as inspiration for the name of the capsule "Columbia" that was used in the Apollo 11 mission. The capsule was used for its command function and ensured the safe return of the astronauts, Neil Armstrong, Buzz Aldrin and Michael Collins to Earth at the end of the mission. Michael Collins, *Carrying the Fire: An Astronaut's Journey* (New York: Rowman & Littlefield, 2019) p. 334; "Apollo 11 Command Module Columbia", National Air and Space Museum, Smithsonian https://airandspace.si.edu/collection-objects/command-module-apollo-11/nasm_A19700102000 (Accessed on 10.07.2023).

first time in history, the US was able to land humans on the Moon. While all of this was happening, five international treaties related to space were signed under the framework of the United Nations, and fundamental principles to guide space research were established. The United States and the Soviet Union found common ground, preventing the Cold War from turning into a war in space.

Following the Moon landing, the United States rapidly adopted a path of privatization in its space exploration efforts, starting in the 1980s but particularly intensifying since the end of the Cold War. The collapse of the Soviet Union and the perceived "victory" of American neoliberal capitalism prompted American policymakers to choose the commercialization of space activities as part of their goal to maintain leadership in space. Since the 1980s, the United States has adopted the principles of free market ideology as the foundation for its domestic laws concerning space activities. As a result, the US government has played an active role in encouraging commercial space activities. With this aim, the US government has been providing incentives, regulatory frameworks, and funding opportunities to encourage the involvement of private companies in the exploration and utilization of outer space. Consequently, the 1990s witnessed a rise in the number of private space companies. This growing trend attracted the attention of billionaire entrepreneurs, leading to the establishment of companies like SpaceX, Blue Origin, and Virgin Galactic in the 2000s. Commercial space areas include space tourism, commercial cargo transportation, commercial crewed launches, and orbital launches and so on and so forth. In addition, celestial bodies in space hold significant potential wealth in terms of valuable minerals. This has led to the establishment of numerous start-ups in the field of space mining. Although it remains largely theoretical at present, it is expected that obtaining minerals from celestial bodies will be possible in the near future.[2]

[2] Chris Taylor, "The Asteroid Boom", Mashable, 2019 https://mashable.com/feature/asteroid-mining-space-economy (Accessed on 10.07.2023); Jeff Foust, "Asteroid mining company Planetary Resources acquired by blockchain firm", Spacenews, October 31, 2018 https://spacenews.com/asteroid-mining-company-planetary-resources-acquired-by-blockchain-firm/ (Accessed on 10.07.2023); Noah Smith, "Giant asteroid has gold worth $700 quintillion. But it won't make us richer", ThePrint, 09 July 2019 https://theprint.in/opinion/giant-asteroid-has-gold-worth-700-quintillion-but-it-wont-make-us-richer/260482/ (Accessed on 10.07.2023); "NASA Prepares to Launch First U.S. Asteroid Sample Return Mission", National Aeronautics and Space Administration,

Despite the United States maintaining a leadership position in the space sector following the end of the Cold War, it is not alone in the field. Alongside Russia, China, India and European Union countries, Japan and Canada have rapidly developed their space technologies. In addition to these actors, many developing countries also attach great importance to space investments and make an effort to catch up with their counterparts speedily.

Even though the Outer Space Treaty has a role as a framework agreement in space law-making process and leads the exploration and use of outer space with its important principles, several issues relating to the law of outer space remained vague and some principles are contentious or require further elaboration and consensus. These include the role of the private sector, the questions of possessory rights relating to space resources and the boundaries of air and space regarding the law-making process. The US filled these ambiguous areas with domestic legal regulations, with the purpose of promoting commercial space initiatives. Although China and European countries have taken steps towards commercialization, the US made the most comprehensive legal arrangements in this field.

In the 2010s, the space industry made a breakthrough with the successful applications of private space companies such as Spacex and Blue Origin. However, it is argued that in order for American space companies to be successful in the free market, the ambiguity regarding the use of space resources in the Outer Space Treaty should be eliminated and the use of the resources extracted from space objects should be made possible.[3] The fact that it is not possible to make a profit from space investments at the moment, the high cost of space activities, the need for research

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Last Updated on August 7, 2017 https://www.nasa.gov/press-release/nasa-prepares-to-launch-first-us-asteroid-sample-return-mission (Accessed on 10.07.2023) ; Katie Kramer, "Neil deGrasse Tyson Says Space Ventures Will Spawn First Trillionaire", NBC News, May 3, 2015 https://www.nbcnews.com/science/space/neil-degrasse-tyson-says-space-ventures-will-spawn-first-trillionaire-n352271 (Accessed on 10.07.2023); "Here's Why Mining Platinum From Asteroids Could Be A Billion-Dollar Opportunity", CBInsights, August 31, 2017 https://www.cbinsights.com/research/asteroid-mining-goldman-sachs-platinum/ (Accessed on 10.07.2023).

[3] Ryan Brukardt, "How will the space economy change the world?", Mckinsey Quarterly, November 28, 2022, https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/how-will-the-space-economy-change-the-world (Accessed on 10.07.2023).

and development that require high technology, and the need for trained personnel to carry out these activities prevent the development of the space sector. For these reasons, under Obama administration, the Commercial Space Launch Competitiveness Act of 2015 was legislated in order to encourage commercialization of space. Act clearly states that

> A U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell it according to applicable law, including U.S. international obligations.[4]

Five years later, Donald Trump administration issued the Executive Order on Encouraging International Support for the Recovery and Use of Space Resources on April 6, 2020. Although the Executive Order is similar to the Commercial Space Launch Competitiveness Act of 2015, it goes beyond the act and does not recognise the status of the outer space as global commons. It also takes position against the Moon Treaty and highlights that Treaty does not create international customary law and should not guide the states arranging space resources utilization activities.[5]

In 2017 during Trump administration, NASA established Artemis Program aiming to send humans to the Moon by 2024. European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA) and Canadian Space Agency (CSA) joined in the program alongside NASA. The program consists of construction of Orion spacecraft, Space Launch System Rocket, Exploration Ground Systems, Gateway project, Human Landing System and eventually Artemis Base Camp. Government space agencies and commercial space companies has been collaborated with the program and signed the Artemis Accords and additional contracts.

"The Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes", shortly known as the Artemis

[4] "Public Law 114 - 90 - U.S. Commercial Space Launch Competitiveness Act" https://www.govinfo.gov/app/details/PLAW-114publ90/related (Accessed on 10.07.2023).

[5] Fabio Tronchetti and Hao Liu, "The White House Executive Order on the Recovery and Use of Space Resources: Pushing the Boundaries of International Space Law?", *Space Policy*, Volume 57, (2021).

Accords, an initiative by the United States, establishes the framework for the guiding principles relating to the exploration and the use of the Moon and other celestial bodies. Principles of space exploration is to be pursued were briefly stated and according to the Accords, most of them are in accordance with the principles drawn by the Outer Space Treaty. Possessory rights in outer space is one of the ambiguous issues in the Outer Space Treaty (OST). The OST only states that:

> the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.[6]

The Moon Agreement goes deeper than this and attempts to establish an international regime on the basis of the status of outer space as Common Heritage of Mankind. Because the Moon Agreement received a small number of ratifications, interpretations over the possessory rights are fragmented.[7] The Artemis Accords takes position in favour of one of the interpretations and claims that the resources extracted from the celestial bodies can be obtained but celestial bodies themselves cannot be subjected to national appropriation.

As of the writing of this thesis, a total of 27 countries with advanced space technologies such as France, India, Canada, Japan, and the United Kingdom have become parties to this non-binding accords.[8] However, significant actors such as China and Russia have criticized the Artemis Accords, stating that the accords aim to protect the interests of the United States in space.[9] As a response, in 2021, Russia and China reached an agreement to establish a research station on the Moon.[10]

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[6] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.4

[7] Jonathan Tjandra, "The Fragmentation of Property Rights in the Law of Outer Space", *Air and Space Law*, 46:3, (2021), p.373-394.

[8] Robert Lea, "Artemis Accords: What are they & which countries are involved?", Space, January 22, 2023 https://www.space.com/artemis-accords-explained (Accessed on 10.07.2023).

[9] Elliot Ji, Michael B. Cerny, and Raphael J. Piliero, "What Does China Think About NASA's Artemis Accords?", The Diplomat, September 17, 2020 https://thediplomat.com/2020/09/what-does-china-think-about-nasas-artemis-accords/_(Accessed on 10.07.2023); Christian Davenport, "Lunar

1.2. Literature Review

The space age, which began with the launch of Sputnik-1 in 1957, has been examined in the literature from various perspectives. Space has been considered as a realm of competition between the United States and the Soviet Union during the Cold War, leading to discussions on national security and international law.

Following the end of the Cold War, the focus of space activities has largely shifted towards the development of the private sector, and efforts have been made to explore avenues for the growth of the space industry. Authors such as Clelia Iacomino[11], Alessandra Vernille[12], Alessandra Vecci, Louis Brennan[13], Joseph N. Pelton[14], and Mark W. McElroy Jr[15] have published their analyses on the commercialization of space and offered recommendations for the industry's development and sustainability.

The literature in the field of space is to be utilized within the scope of the thesis. This part includes some concepts and perspectives.

Paikowsky, by conducting a historical analysis of the development of space activities, distinguishes between the concepts of Old Space and New Space. Old

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relations: The U.S., China and a new brand of space race", The Washington Post, January 14, 2023 https://www.washingtonpost.com/technology/2023/01/14/china-nasa-moon-space/ (Accessed on 10.07.2023).

[10] Mike Wall, "Russia and China just agreed to build a research station on the moon together", Space, March 17, 2021 https://www.space.com/russia-china-moon-research-station-agreement (Accessed on 10.07.2023)

[11] Clelia Iacomino, *Commercial Space Exploration: Potential Contributions of Private Actors to Space Exploration Programmes*, (Switzerland: Springer International Publishing, 2019)

[12] Alessandra Vernile, *The Rise of Private Actors in the Space Sector*, (Switzerland: Springer Cham, 2018).

[13] Louis Brennan and Alessandra Vecchi, *The Business of Space: The Next Frontier of International Competition*, (London: Palgrave Macmillan, 2011).

[14] Joseph N. Pelton, *The New Gold Rush: The Riches of Space Beckon!*, (Switzerland: Springer International Publishing, 2017).

[15] Mark W. McElroy Jr, *The Space Industry of the Future: Capitalism and Sustainability in Outer Space*, (New York: Routledge, 2023)

Space, shaped during the Cold War, continues to exist and is characterized by activities controlled by nations, primarily involving only states. The main actors in Old Space are the superpowers and their allies, driven by national concerns. During the Cold War, the superpowers initially developed space-based intelligence gathering capabilities to monitor their opponents' capabilities and developments, as well as to oversee arms control agreements. Moreover, their objective was to transform their conflicts into a nonviolent public competition through a race to space driven by technology and science.[16]

Paikowsky has observed that in spite of the restrictions and controls pressured by the superpowers, or perhaps because of them, other countries have made efforts to achieve greater independence in terms of access to and use of outer space. The strategic importance and dual civil-military nature of the technology have made the development of space capabilities attractive, and possessing space technology has become a significant indicator for great powers. Although not formally established, Paikowsky argues that strategies based on a stable game of competition and restricted cooperation have separated between those who possess space technology and those who do not, thereby creating the elements of the "space club".[17]

Paikowsky argues that the change in the security environment after the Cold War served as a turning point, as it led to the removal of restrictions on knowledge and technology, thereby increasing the dual-use of space technology and enabling more efficient and cost-effective projects through public-private partnerships (PPP). As time passed, access to space became easier, new developments in space technologies were introduced, the expenses associated with space travel reduced, and the market for space-related activities grew even larger. In the past decade, the increased involvement of the private sector in global space activities has brought about changes in the industry, leading to the emergence of what is known as "New Space". This new phase is characterized by the utilization of innovative technologies,

[16] Deganit Paikowsky, "What Is New Space? The Changing Ecosystem of Global Space Activity", *New Space*, Volume: 5 Issue 2, (2017) p.1-5.

[17] Deganit Paikowsky, *The Power of the Space Club,* (Cambridge: Cambridge University Press, 2017) p.13.

entrepreneurial activities, and the commercialization of research and development projects. These developments have created a new environment beneficial for the growth of the space industry.[18]

McElroy Jr argues that there are currently two significant historic transformations occurring in the world. He asserts that the space industry is undergoing a shift from being government-controlled to being dominated by commercial activities. This transition has led to the emergence of a rapidly expanding industry that generates greater value for a larger population. Additionally, McElroy highlights another historic transformation driven by the need for sustainability, which involves the way capital is implemented across all sectors of the economy. According to McElroy, this transformation is necessary for the future prosperity of humanity, and he believes that the newly emerging commercial space economy should also grow in parallel with this transformation.[19]

Maraš and Dangubić explain in their articles, where they analyze government organizations and private entities in the space sector, that the private sector has not yet reached a point where they can survive on their own without the support and role of the government as a customer. However, the authors anticipate that due to the private sector's limited but growing capabilities, they will be able to conduct various space activities on their own. The significance of this for this thesis is the global phenomenon of space start-up companies, not limited to the United States. Public-private partnerships reduce costs and thereby increase competition. In other words, private sector investments have become a new form of competition for governments in space.[20]

Athar ud Din argues that the Artemis Accords have taken a definitive position towards issues that are contested in existing international space law. While

[18] Ibid.

[19] Mark W. McElroy Jr, *The Space Industry of the Future: Capitalism and Sustainability in Outer Space*, (New York: Routledge, 2023), p.166.

[20] Darija Maraš and Miloš Dangubić, "Cooperation Between Government Agencies and Private Companies in Space: The Case of the United States", *Astropolitics*, Volume 20:2-3, (2022) p.236-237

replicating the framework of international space law, the Accords adopt an authoritative interpretation of unresolved issues, highlighting the potential creation of a parallel system within the legal framework of space exploration and use. Din believes that by advancing an interpretation related to rights over space resources through the Artemis Accords, the United States weakens the core objective of international law, which is to provide a common reference framework for resolving disputes. Through the Artemis Accords, it is argued by Din that the US potentially restrain the role of multilateralism within the United Nations, resulting in an increased level of geopolitical tensions and conflicts. Additionally, Din suggests that the limited access to space resources and the emergence of powerful nations with spacefaring capabilities show that the future of space exploration and exploitation will be primarily characterized by competition rather than cooperation, particularly from a geopolitical perspective.[21]

1.3. The Research Question and Scope of the Thesis

This thesis examines the international politics of using the space in the post-Cold War world. It attempts to highlight the different space policy positions of the major actors. Unlike the Cold War era, space is now being utilized by a wide range of actors with diverse characteristics. This situation has led to the development of different dynamics among countries in terms of space utilization. In this thesis, while examining these dynamics, special attention is to be given to the Artemis Accords, a non-binding agreement initiated under the leadership of the United States, and the question of whether there is polarization in space. To do this, first, the developments during the Cold War is analysed, and the role of space in the context of international relations, the debates that took place during this period, and the ways in which the current international space law rules and principles were established within the framework of these debates is to be examined. Later, the emerging private space sector following the end of the Cold War is to be taken up, and the priorities of not only the United States, China, and Russia, but also other prominent space-capable

[21] Athar ud Din, "The Artemis Accords: The End of Multilateralism in the Management of Outer Space?", *Astropolitics*, Volume 20:2-3, (2022) p.149-150

states in the post-Cold War era is to be examined to define whether there is polarization in space. For this purpose, the Artemis Accords is specifically analyzed, and an evaluation is made regarding the states that have joined and opposed this agreement, taking into consideration the United States' space objectives in the 21st century.

1.4. Methodology

Both qualitative and quantitative research methods have been utilized in this thesis. The space law treaties signed under the United Nations, which serve as a source of international law, and the regulations made by states in their domestic laws have been looked into. Additionally, the Artemis Accords, a non-binding agreement that is of great importance for this thesis, have been among the sources used. In addition to primary sources, secondary sources such as articles, books, reports, memoirs, and official speeches within the scope of the thesis have also been utilized. Statistical data has been used to examine the development of the private sector.

1.5. The Organization of the Chapters

After conducting a literature review and outlining the research question and scope of the thesis, and outlining the methodology in the first chapter, the second chapter focuses on examining the historical background of outer space activities. The objective of this chapter is to explore the motivations that drove countries like the US, USSR, China, India, and various European countries to engage in space activities during the Cold War era.

The third chapter examines the United Nations treaties signed during the Cold War years, as well as the discussions that took place prior to the signing of these treaties. Additionally, this chapter evaluates the debates that occurred regarding the unresolved issues within the treaties.

The fourth chapter is dedicated for the examination of the rise of commercialization in outer space after the Cold War. This chapter also covers the space initiatives of

developing countries, in addition to the United States, Russia, China, India, and the European Union. Subsequently, this chapter focuses on the Artemis Program initiated by NASA in 2017. The Artemis Accords, which regulate the participation of other states aiming to join the Artemis Program, is examined lengthy in this chapter. This analysis aims to explore the current state of space activities and examine potential directions for future international relations in the field of space.

Finally, Conclusion chapter presents the findings of the thesis.

CHAPTER 2

HISTORICAL BACKGROUND: THE OUTER SPACE DEBATE IN THE COLD WAR

2.1. Introduction

Approximately 70 years ago, human activities expanded from the boundaries of land, sea, and atmosphere into the depths of space. This was a significant achievement for human civilization. However, space technology not only served as a source of human well-being but also applied a profound influence as a means of military power in modern society. The exploration of space during the Cold War era had significant security implications and fired rapid technological advancements driven by competition. The launch of Sputnik 1 served as a remarkable demonstration of the Soviet Union's advancements in ballistic missile technology and gave rise to a new threat: the potential increase of an arms race, including the proliferation of nuclear weapons, into outer space. Military activities in space transformed the strategic landscape of the Cold War. Nevertheless, despite the use of space for military purposes during this period, a regime gradually emerged that restricted the weaponization of space and limited the use of force over time. This section will examine the initial phase of the space age and explore the underlying motivations for various states, including the United States and the Soviet Union, to engage in space research.

2.2. International Space Politics and the Debates

2.2.1. History of Space Exploration

The events of the Space Age occurred within the framework of the Cold War competition between the US and the Soviet Union, their respective allies, and the

non- aligned nations, whose allegiances were sought by both sides.[22] While space research initially emerged in the aftermath of World War II with military concerns, it rapidly transformed into a competition driven by motives of prestige, technological advantage, and enhancement of technical and scientific capabilities. The framework of contemporary international space law, which is still valid this day, took shape in this context.

The development of space technology can be traced back to the era of World War II, when significant advancements were made in rocket technology, particularly with the creation of the V-2 rocket by Germany. Notably, German rocket scientists, including Wernher Von Braun, who was the mastermind behind the German V-2 rocket, surrendered to American forces in May 1945 and subsequently joined the United States Army to contribute to the development of ballistic missiles.[23] In 1960, von Braun and his team of scientists were assigned the task of designing and constructing rockets for the newly established National Aeronautics and Space Administration (NASA). The Saturn rocket series, developed under their leadership, played a pivotal role in enabling humanity's journey to the Moon in the late 1960s.[24]

Before the historic lunar landing, the Soviet Union achieved a significant milestone by successfully launching the first artificial satellite, Sputnik-1, into orbit on October 4, 1957. Recognizing the political significance and international influence garnered by this achievement, the launch of Sputnik-2 was planned to coincide with the 40th anniversary of the October Revolution. On November 3, 1957, the spacecraft was successfully launched into space.[25]

The successful launch of Sputnik-1 was closely associated with concerns surrounding the threat of nuclear weapons within the context of Cold War rivalry.

[22]Anne Millbrooke, "History of the Space Age", in *Handbook of Space Engineering, Archaeology, and Heritage* eds Ann Darrin and Beth L. O'Leary (Boca Raton: CRC Press, 2009), p. 195.

[23] "Biography of Wernher Von Braun", National Aeronautics and Space Administration, https://www.nasa.gov/centers/marshall/history/vonbraun/bio.html (Accessed on 06.04.2023).

[24]Annie Jacobsen, *Operation Paperclip: The Secret Intelligence Program that Brought Nazi Scientists to America* (New York and Boston: Little, Brown and Co, 2014) p. 345.

[25] Roald Sagdeev, "Sputnik and the Soviets", *Science*, Vol. 318: 5847 (2007): p. 51-52.

Lule's research examines the impact of Sputnik-1's launch on the American public, highlighting various factors that contributed to heightened anxiety. The series of unsuccessful attempts by the United States to launch satellites into space enlarged fears of potential Soviet nuclear attacks on American soil. Additionally, the author suggests that domestic political factors further heightened anxiety. The perceived national embarrassment resulting from the shortcomings of the American space program was exploited as a point of criticism during the 1960 presidential campaign against the Eisenhower administration.[26]

Despite several unsuccessful attempts, the US succeeded in launching their first satellite, known as "Explorer-1", into orbit in 1958. However, the Soviet Union's successful moves in the space race led to the perception that the United States was lagging behind in space domain. Luna 1 became the pioneering spacecraft to land in the Moon in 1959.[27] In 1961, Yuri Gagarin became the first human in space with Soviet spacecraft, Vostok 1.[28]. In 1966, Luna 9 accomplished two achievements: the first soft landing on the lunar surface and the successful transmission of photographic information from the Moon back to Earth.[29].

In an effort to prevent falling behind in the space race, the US expedited its effort in the field of space exploration. National Aeronautics and Space Act of 1958 was signed by the President Eisenhower with the aim of conducting the aeronautical and space activities of the United States. By creating the National Aeronautics and Space Administration (NASA), the Act stated its objectives as:

[26] Jack Lule, "Roots of the Space Race: Sputnik and the Language of U.S. News in 1957", *Journalism Quarterly*, 68 (1991): 76–86.

[27] "Luna 1", National Aeronautics and Space Administration https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=1959-012A#:~:text=Luna%201%20was%20the%20first,the%20surface%20of%20the%20sphere. (Accessed on 05.04.2023).

[28] "Yuri Gagarin: First Man in Space", National Aeronautics and Space Administration https://www.nasa.gov/mission_pages/shuttle/sts1/gagarin_anniversary.html (Accessed on 05.04.2023)

[29] "Luna 9", National Aeronautics and Space Administration https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=1966-006A (Accessed on 05.04.2023).

> (1)The expansion of human knowledge of phenomena in the atmosphere and space; (2) The improvement of the usefulness, performance, speed, safety, and efficiency of aeronautical and space vehicles; (3) The development and operation of vehicles capable of carrying instruments, equipment, supplies and living organisms through space; (4) The establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes. (5) The preservation of the role of the United States as a leader in aeronautical and space science and technology and in the application thereof to the conduct of peaceful activities within and outside the atmosphere. (6) The making available to agencies directly concerned with national defenses of discoveries that have military value or significance, and the furnishing by such agencies, to the civilian agency established to direct and control nonmilitary aeronautical and space activities, of information as to discoveries which have value or significance to that agency; (7) Cooperation by the United States with other nations and groups of nations in work done pursuant to this Act and in the peaceful application of the results, thereof; and (8) The most effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities, and equipment.[30]

During his presidency from 1961 to 1963, John F. Kennedy played a crucial role in transforming the American Space Program and ensuring its success in the space race. At the beginning months of Kennedy's presidency, Yuri Gagarin had already completed a successful orbital journey around Earth in April 1961. It should be emphasized that Kennedy recognized the need for the American public to fully grasp the profound political and psychological implications of the space race. As the Eastern and Western powers competed for influence over emerging nations in the post-World War II era, Kennedy was concerned about the Soviet Union's advancements in space exploration and the potential impact on American leadership, particularly in terms of scientific progress. In response, Kennedy significantly increased the budget allocated to outer space activities and oversaw the construction of numerous research facilities. These initiatives resulted in a rapid acceleration and expansion of the space program.[31] In his well-known speech titled “We choose to go

[30] “National Aeronautics and Space Act of 1958 (Unamended)”, Public Law number 85-568, (Signed by the President on, Washington, D.C, National Archives and Records, July 29, 1958) https://history.nasa.gov/spaceact.html (Accessed on 06.04.2023).

[31]Roger D. Launius, “Kennedy's Space Policy Reconsidered: A Post-Cold War Perspective”, *Air Power History* , Vol. 50: 4 (2003) p.16-29.

to The Moon", Kennedy declared his intentions to successfully execute a manned lunar landing mission. He interpreted the importance of governing space under a "banner of freedom and peace" rather than a "hostile flag of conquest", outlining his objectives and core principles as follows:

> We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man, and only if the United States occupies a position of pre-eminence can we help decide whether this new ocean will be a sea of peace or a new, terrifying theater of war. I do not say that we should or will go unprotected against the hostile misuse of space any more than we go unprotected against the hostile use of land or sea, but I do say that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours.[32]

In 1961, President John F. Kennedy issued a national challenge to land astronauts on the lunar surface within a decade. To achieve this ambitious goal, NASA launched the Apollo Program, which succeeded the first successful landing of humans on the Moon in 1969. The Apollo Program facilitated a total of 11 spaceflights, during which American astronauts made several historic moon landings between 1969 and 1972. A total of 12 astronauts participated in these missions, conducting scientific research and exploration activities during their time on the lunar surface. One of the notable achievements of the Apollo missions was the collection of lunar rock samples, which were later brought back to Earth for detailed analysis and study. This mission significantly enhanced our understanding of the moon's geological history.[33] Following the success of the Apollo missions, although the United States perceived itself as the "winners" of the Space Race, the following era after Apollo did not encourage the American space program to strive for further achievements. Instead, NASA entered the next phase of American space exploration, aiming to achieve

[32] "Address at Rice University on the Nation's Space Effort", John F. Kennedy Presidental Library and Museum https://www.jfklibrary.org/learn/about-jfk/historic-speeches/address-at-rice-university-on-the-nations-space-effort (Accessed on 07.04.2023).

[33] "Apollo Missions" National Aeronautics and Space Administration https://www.nasa.gov/specials/apollo50th/missions.html (Accessed on 10.07.2023).

similar accomplishments to the lunar landings but facing challenges such as inadequate budget and decreasing public interest.[34]

2.2.2. The Militarization of Space vs Weaponization Debate

The militarization of space and weaponization of space are interconnected yet distinct concepts. The militarization involves utilizing space technology to support military operations on Earth, including activities such as communication, monitoring, and intelligence gathering, as well as the development of space-based assets like satellites for military purposes.[35] The militarization of outer space can contribute not only to military purposes but also to civilian ones as well. The Global Positioning System (GPS), as a part of dual-use technology, stands out as a highly successful instance of the militarization of outer space.[36]

On the other hand, weaponization indicates the deployment of devices with the capability to destroy objects on Earth or in space. It involves placing such devices in outer space.[37] However, an internationally accepted definition for space weapons and space weaponization does not exist.[38] Furthermore, the question of whether space has been weaponized or not remains one of the most debated topics in the field. While the majority agrees on the weaponization of space has not occurred yet, there are also experts who oppose this idea. The lack of clear boundaries between outer space and

[34] Dora Holland and Jack O. Burns, "The American Space Exploration Narrative from the Cold War Through the Obama Administration", *Space Policy*, Volume 46, (2018,) p.10.

[35] P. N. Tripathi, "Weaponisation and Militarisation of outer space", *CLAWS Journal*, (Winter 2013) p.194 https://indianarmy.nic.in/WriteReadData/Documents/Weaponisation.pdf (Accessed on 10.07.2023).

[36] Jon Amilbia Piqué, "The Problem of the Prevention of the Weaponisation of Outer Space", (Master Thesis, Saint Petersburg State University, 2020), p.8.

[37] Tripathi, "Weaponisation and Militarisation of outer space" p.194.

[38] Although a definition does not exist, a classification was made by RAND Corporation. According to this classification, space-based weapons consist of "directed-energy weapons, kinetic-energy weapons targeting missiles, kinetic-energy weapons targeting surface targets, space-based conventional weapons targeting surface targets". For more detail, Robert Preston, Dana J. Johnson, Sean J. A. Edwards, Michael D. Miller, Calvin Shipbaugh, *Space Weapons Earth Wars*, (Santa Monica, CA: RAND, 2002), p. Xvi https://www.rand.org/pubs/monograph_reports/MR1209.html (Accessed on 10.07.2023).

airspace, the dual-use nature of space technologies, and the presence of technologies such as satellites and anti-satellite systems form the basis of this debate. For example, the Soviet Union had long objected to the United States' Space Shuttle technology, arguing that the shuttle could be used as a weapon capable of targeting satellites, a sort of an anti-satellite weapon (ASAT).[39] Due to the scope of this thesis, further details regarding the meaning of weaponization matter will not be discussed here.

During the Cold War, there were two main debates regarding the security dimension of space weapons: the first one focused on the transformation of the concept of bombardment satellites carrying nuclear weapons from science fiction to a tangible reality and the second topic of discussion was the projects related to space-integrated defense systems against nuclear missiles.[40] In March 1983, President Reagan announced the Strategic Defense Initiative (SDI) program, thus initiating SDI, an anti-ballistic missile program aimed at shooting down nuclear missiles in space.[41] Also known as "Star Wars", SDI aimed to create a space-based shield that would turn nuclear missiles ineffective. SDI posed a threat to the American and Soviet policy of mutually assured destruction (MAD) doctrine, which relied on deterrence.[42]

The weaponization of space has emerged as one of the most significant and contentious issues in international politics in the post-Cold War era. After the end of the Cold War, the issue of space weaponization has once again taken center stage in international competition. Unlike the bipolar competition of the Cold War era, this competition now contains a multipolar and multifaceted landscape, involving not only the United States and Russia but also China, India, European Union countries, and private companies. This topic will be examined in more detail in Chapter 4.

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[39] Paul B. Stares, "The Reagan Presidency: Towards an Arms Race in Space, 1981–1984", *Space Weapons and U.S. Strategy Origins and Development*, (London: Routledge, 1985) p.220-250.

[40] Preston and Johnson, "Space Weapons Earth Wars" p. 1.

[41] "President Reagan's SDI Speech", Atomic Archive, March 23, 1983 https://www.atomicarchive.com/resources/documents/missile-defense/sdi-speech.html (Accessed on 10.07.2023).

[42] "Strategic Defense Initiative (SDI)" Atomic Heritage Foundation, July 18, 2018 https://ahf.nuclearmuseum.org/ahf/history/strategic-defense-initiative-sdi/ (Accessed on 10.07.2023).

2.2.3. Nuclearization of Space Debates

Since the beginning of the Space Age, countries, primarily the United States, have developed numerous strategies regarding the military use of space technologies, adhering to various doctrines, namely: the sanctuary doctrine, the survivability doctrine, the high-ground doctrine and the space control school. In this section, these doctrines are to be briefly examined.

The Sanctuary doctrine of space advocates for keeping space free from weapons. The doctrine supports the prohibition of anti-satellite weapons and argues that the ideal military applications in space are systems that enhance strategic stability and support strategic arms control.[43] The fundamental principle of the Sanctuary doctrine is deeply rooted in the concept of deterrence strategy. The deterrence strategy is based on the belief that meaningful defence against nuclear weapons is not possible. According to the deterrence strategy, the sole defence against nuclear war is the threat of reciprocal retaliation.[44] The deterrence strategy is built on the assumption that that both parties will avoid from constructing weapon systems of such magnitude that the other side's retaliatory capabilities would be turned ineffective. Space vehicles have the ability to see inside the borders of sovereign states due to their legal overflight capability. Followers of this doctrine claim that without space technologies, the acceptance of arms limitation agreements would not have been possible. This is because the ability to observe the interior of borders allows for a certain level of control over states.

Therefore, space systems have provided significant stability in relations between the two superpowers. As a result, it can be concluded that the only way to preserve the legal right of states to pass through space is to define it as a sanctuary free from

[43] Peter Lang Hays, Struggling Towards Space Doctrine: U.S. Military Space Plans, Programs, and Perspectives during the Cold War, (Ph.D thesis: Fletcher School of Law and Diplomacy, 1994) p.20-22.

[44] David E. Lupton, *On Space Warfare: A Space Power Doctrine*, (Air University Press, 1988) p. 29-30.

war.[45] Followers of the doctrine have not reached general agreement on the elements that can be considered as sanctuaries, but they agree that the development of weapons with the capability to destroy satellites would be an obvious violation.[46]

The Sanctuary doctrine was an influential doctrine in space activities for approximately 25 years from the 1957 to 1980. While the fact that space remained mostly free from weapons during these years indicates the success of this doctrine, it may not be sufficiently explanatory in certain aspects. For instance, the development of the "fractional orbital bombardment system (FOBS)" technology by the Soviets in the 1960s and the ASAT technology developed by the United States demonstrate that countries possess weapons not only for military purposes but also for political objectives.[47]

The deployment of space assets to support the deterrent strategy had significant value for military, but they also suffered from serious deficiencies in terms of survivability, reliability, and usability. Developing space technology was a costly effort. Furthermore, these assets were not designed with the purpose of survival in war; their design was conducted towards functioning in a peaceful sanctuary. If warfighting capabilities were to be reliant on space systems, the enemy would undoubtedly attempt to disrupt those capabilities. The solution to this problem was to enhance the survivability of the systems. However, the foundation of the sanctuary doctrine was based on the idea that space should not possess military assets beyond supporting the deterrent strategy, and thus did not require survivable entities. This dilemma led to the belief that space forces, as their nature, were more vulnerable compared to forces operating in other environments.[48]

The origin of the high-ground doctrine lies in the belief that the deterrent strategy is seriously flawed. High-ground doctrine followers argue that the fundamental

[45] Ibid. 20.

[46] Ibid. 31.

[47] Ibid.

[48] Ibid. p. 38.

principle of the deterrent strategy has become a dogma that inhibits the development of effective defences. Considering the Mutual Assured Destruction (MAD) doctrine as a mutual suicide threat, they claim that this strategy is impractical both militarily and morally. According to the high-ground doctrine, space can play a critical role in determining the outcome of a battle, and space forces can eventually become dominant over terrestrial forces.[49] This school is influenced by President Reagan's Strategic Defence Initiative (SDI) project and is associated with space-based ballistic missile defence, warfighting, and defence for strategic deterrence. Ballistic missile defence (BMD) is considered the best opportunity to compete with the Soviet Union. Critics of the high ground school argue that this strategy may encourage an open arms race in space, leading to increased tensions, proliferation of weapons, and an increased risk of conflict.[50]

The space control school advocates treating space as a military theatre, drawing analogies from the air and maritime domains, with the goal of gaining control over the space environment through offensive and defensive operations. The school is associated with enabling military missions such as reconnaissance, force enhancement, and force application, as well as non-military functions like space exploration and commercial exploitation. Critics of this school argue that it may lead to an arms race in space that does not enhance global security.[51]

2.3. American Space Policy during the Cold War

The Cold War was a period of intense political and military tension between the United States and the Soviet Union. Both nations were engaged in a struggle for dominance, and space became a significant factor in this struggle.

During the Cold War, the fundamental principle of U.S. foreign policy towards the Soviet Union was the adoption of the “containment doctrine”. The containment

[49] Ibid. p. 52.

[50] Matthew James Mowthorpe, *the Militarisation and Weaponisation of Space*. (PhD Thesis: University of Hull, 2002) p.26.

[51] Ibid.

doctrine was implemented through the Truman Doctrine, the Marshall Plan, and NATO, with NATO serving as a fundamental deterrence mechanism through its nuclear-sharing program to safeguard Western Europe from Soviet threat. Space technologies were also utilized primarily to serve this purpose.[52]

How to conceptualize and pursue space as a military mission area was one of the most debated issues within the US Air Force. From the late 1940s to the mid-1950s, the Air Force paid little attention to space and had no coherent doctrine for understanding its potential contributions to national security. There were various reasons why the United States did not show much interest in space at the beginning. Firstly, the military had to make huge budget cuts after World War II and they could not prioritize the unknown military potential of space over their core missions due to the financial restrictions. Secondly, many important scientific and military leaders thought that space technology which could contribute to national security, like Intercontinental Ballistic Missiles (ICBMs), would take many years to develop. Lastly, before the Cold War became more intense and the US realized that the Soviet Union was putting substantial resources into ballistic missile development, the US did not want to invest much attention or funding into programs that had unclear military potential and undefined missions. When these factors were combined, the US did not invest much effort into ballistic missile or space-related technologies during President Truman's tenure. However, after President Eisenhower took office, efforts in these areas were significantly increased.[53]

Eisenhower's space policy had three primary objectives that guided the United States' approach to space exploration. The first objective was to leverage the potential of space to gather intelligence on the Soviet Union through satellite reconnaissance, with the aim of obtaining valuable information from the closed state. The second objective involved developing policies to establish a new international legal framework that would legitimize satellite overflight for peaceful purposes, including

[52]"North Atlantic Treaty Organization (NATO)", National Aeronautics and Space Administration, https://history.state.gov/milestones/1945-1952/nato (Accessed on 10.07.2023).

[53] Hays, "Struggling towards space doctrine", p.65.

reconnaissance missions. The third objective focused on exploring space for scientific efforts, seeking to expand our knowledge and understanding of the cosmos. A crucial aspect during this period was the necessity for the United States to develop powerful rocket boosters capable of launching satellites or warheads over intercontinental distances, as these technological advancements formed the foundation for achieving all three goals.[54] The launch of Sputnik gave the U.S. military a reason to study the need for an Anti-Satellite (ASAT) capability and by November 1957, all departments of the military had put forward some type of ASAT proposal.[55] The launch of Sputnik-1 established the right to satellite overflight of national territories as an integral part of international law, as there was no opposition to its overflight.[56] The Eisenhower administration considered the legitimacy of satellite overflight to be a crucial policy goal. The earning of this overflight right was significant for US space policy in its efforts to conduct satellite reconnaissance over the Soviet Union.[57] At that time, it was crucial for the United States to create boosters that could carry satellites or warheads across long distances, which was essential for achieving all of their objectives. After the launch of Sputnik-1, on 29 November 1957, General Thomas D. White proclaimed that "… whoever has the capability to control space will likewise possess the capability to exert control of the surface of the earth".[58] In 1958, General White introduced the term "aerospace," which depicted air and space as an integrated area without a dividing line between them and claimed both as the Air Force's responsibility. Although not all senior leaders agreed with this concept, it became part of formal Air Force doctrine and figured prominently in the service's rhetoric. However, the Air Force remained deeply divided over space.[59]

In 1957, none of the branches of the military had a comprehensive doctrine regarding the potential military applications of space, except for the development of space

[54] Mowthorpe, "The militarisation and weaponisation of space", p.16.

[55] Ibid.

[56] Ibid.

[57] Ibid.

[58] Cited by Benjamin S. Lambeth, "Air and Space Versus 'Aerospace'", *Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space,* (RAND: 2003) p.36.

[59] Ibid.

reconnaissance, which was considered acceptable. The establishment of the National Aeronautics and Space Administration (NASA) on October 1, 1958, provided additional motivation for the United States to enter space from a civil perspective. The Eisenhower administration's policy aimed to designate space as a peaceful environment, thus downplaying the consideration of other military missions in space.[60]

The announcement on October 4, 1957, that the Soviet Union had successfully launched Sputnik-1 and become the first nation to dare to space had a profound impact on U.S. space policy for several years. The administration intensified its efforts to bring future space developments under international control through the United Nations. For the military services, Sputnik-1 marked a shift in perception, as space was no longer seen as a strategic backwater but as a potential avenue for increased power and prestige. The shock of the Sputnik launch provided justification for the U.S. military to explore the need for an Anti-Satellite (ASAT) capability. Each branch of the military proposed its own ASAT concept before November 1957.[61]

During the March 2012 meeting of the American Physical Society in Boston, Richard L. Garwin presented on "Purcell's Work in Helping the Government". It revealed that in the early days of the Cold War and the space race, the Air Force and CIA engaged in fierce competition over space intelligence strategies and initiatives. They competed to become the sponsor of the successful program and the firm responsible for creating intelligence satellites. The Navy also played important role and was the first to receive "electronic intelligence" from space through satellites.[62] The Purcell Report issued in 1958 during Eisenhower presidency established the basic principles for how the US military would use space, focusing on passive military benefits. According to the Report, reconnaissance, communication, and weather forecasting

[60] Mowthorpe, "The militarisation and weaponisation of space", p.17.

[61] Ibid.

[62] Richard L. Garwin, "Purcell's Work in Helping the Government", (March meeting of the American Physical Society: Boston, MA, February 29, 2012) https://rlg.fas.org/Purcell_p1.pdf_(Accessed on 10.07.2023).

were the useful areas regarding the military applications of space. However, it rejected the idea of developing space weapons.[63]

The U.S. had two space programs: one was hidden and focused on developing spy satellites, while the other was open and emphasized peaceful purposes. The success of the hidden program contributed to the public perception that the U.S. was behind in the space race, which triggered a crisis of public confidence. This had a lasting impact on the development of U.S. military space doctrine and combined with the nuclear weapon threat.[64]

The Kennedy administration's emphasis on the perceived missile gap between the United States and the Soviet Union provided encouragement to the military, particularly the Air Force, to expand their presence in space during the heightened tensions of the U.S.-U.S.S.R. competition in 1961 and 1962. However, as the Kennedy administration came to an end, decisions were made to cancel the Air Force's manned space vehicle and shift the focus away from a race to the moon. These decisions signalled a shift in the U.S.'s approach to space exploration, moving towards a more civil-oriented path.[65]

During this period, the Kennedy administration played a significant role in negotiating the United Nations General Assembly Resolution 1884 (XVIII) on October 17, 1963. This resolution aimed to prevent the placement of nuclear weapons or weapons of mass destruction in outer space. It set the groundwork for the Johnson administration to negotiate the Outer Space Treaty of 1967, which had a profound impact on the development of subsequent military space doctrine.[66] One of the concerns surrounding the Outer Space Treaty was the issue of verification. The treaty's provisions, such as the prohibition of military installations on celestial bodies and the ban on weapons of mass destruction in space, placed significant limitations

[63] Mowthorpe, “The militarisation and weaponisation of space” p.17.

[64] Hays, “Struggling towards space doctrine” p.63.

[65] Ibid p.19.

[66] Ibid p.20.

on the notion that space could be openly utilized as a strategic high ground for deterrence or warfare. The Outer Space Treaty conveyed a clear message that civilian leadership in the United States did not consider space to have substantial military utility, except as a sanctuary for reconnaissance satellites.[67]

President Johnson continued the Anti-Satellite (ASAT) programs initiated by the Kennedy administration, believing that ASATs would serve as a safeguard against Soviet orbital weapons.[68]

Shortly after assuming office, President Nixon established a Space Task Group to conduct a thorough assessment of the future plans for the U.S. space program. The resulting report, published in September 1969, reflected the administration's emphasis on cost-consciousness. It was announced that the Department of Defense would only be authorized to pursue new programs if they could demonstrate that they were more cost-effective to be conducted in space.

The recommendations of the report[69] seemed to align with actions that were already being taken, including the cancellation of the underfunded Manned Orbital Laboratory in June 1969. This signalled a shift towards prioritizing financially cautious decisions within the space program.

The SALT I agreements, including the Treaty on the Limitation of Antiballistic Missile Systems and the Interim Agreement on the Limitation of Strategic Offensive Arms, signed in May 1972, had significant implications for military space policy. These agreements had a direct impact on the role of reconnaissance satellites as a means of verification and introduced unclear restrictions on ABM (Antiballistic Missile) systems. The SALT I agreements marked a shift in the U.S. military's approach to space policy, moving away from the concept of space control and

[67] Ibid p.20.

[68] Ibid p.20.

[69] "50 Years Ago: After Apollo, What? Space Task Group Report to President Nixon", National Aeronautics and Space Administration, September 18, 2019 https://www.nasa.gov/feature/50-years-ago-after-apollo-what-space-task-group-report-to-president-nixon (Accessed on 26.07.2023).

embracing the idea of space as a sanctuary. The emphasis on using reconnaissance satellites for verification purposes highlighted the importance of these assets in ensuring compliance with arms control agreements. Additionally, the limitations placed on ABM systems reflected a shift in the strategic balance and the recognition of the need to prevent an arms race in space.[70] The period of détente during the Cold War, which began in the 1960s and extended throughout the 1970s, culminated in various arms control agreements subsequent to the Strategic Arms Limitation Talks (SALT). These agreements include the signing of the SALT-1 and SALT-2 Treaties, followed by the Anti-Ballistic Missile Treaty of 1972, which aimed to constrain the proliferation of nuclear weaponry-carrying ballistic missiles. However, the SALT II Treaty failed to secure approval from the American Senate and the détente era concluded in 1979 with the Soviet Union's invasion of Afghanistan.

President Reagan assumed office in 1981, and his administration's military space policy remained relatively unknown during the election period and transition. However, a space policy review was conducted, and by the summer of 1982, the National Security Decision Directive 42 outlined the primary objectives of U.S. space policy. These objectives were similar to those of the previous administration in terms of improving satellite vulnerability, but there was a subtle shift in emphasis regarding ASAT policy. While the Carter administration had advocated for an ASAT arms control agreement, the Reagan policy focused on studying space arms control options without committing to a specific agreement. The new emphasis was on developing an ASAT capability to deter threats against U.S. space systems and to prevent adversaries from enhancing their space-based forces. Additionally, there was a requirement to establish a program capable of detecting threats to U.S. space forces and providing contingency plans in case such threats materialized.[71] The introduction of the Strategic Defence Initiative in March 1983 marked the initiation of a research and development program aimed at exploring the possibility of using space for strategic defence purposes. This initiative, combined with the tragic Challenger disaster in January 1986, prompted a reassessment of U.S. space policy, resulting in a

[70] Ibid p.21.

[71] Ibid p.23.

revised policy in January 1988. The revised policy outlined four fundamental criteria that would shape U.S. space policy going forward.[72] Firstly, it aimed to deter and, if necessary, defend against enemy attacks by utilizing space assets. Secondly, it sought to ensure that hostile nations would be unable to disrupt or impede U.S. utilization of space. Thirdly, the policy aimed to neutralize, if required, any hostile space systems that posed a threat to U.S. interests. Lastly, it aimed to enhance the operational capabilities of United States and Allied forces through the effective utilization of space-based resources.[73]

Reagan put emphasis on maintaining American leadership in space research by following in the footsteps of his predecessors.[74] However, differently from past American space policies, the Reagan era witnessed decreasing in federal spendings and the implementation of legal regulations aimed at privatization.[75] The NASA Authorization Bill of 1991 implemented significant regulations regarding the commercialization of space. According to this bill, the United States reasserted its commitment to achieving leadership in space science, space exploration, and space commercialization. Enabling access to NASA's launch market in order to incentivize investment in the American private sector within the space domain, 1991 bill states that:

> (1)the United States commercial launch industry is technically capable of providing reliable and cost efficient access to space and is an essential component of national efforts to assure access to space for Government and commercial users; (2) the Federal Government should encourage, facilitate, and promote the United States commercial launch industry, including the development and enhancement of commercial launch facilities, in order to ensure United States economic preeminence in space; (3) the interests of the

[72] Ibid.

[73]Dana J. Johnson, "The Impact of International Law and Treaty Obligations on United States Military in Space", *High Technology Law Journal*, vol. 3:1 (1988).

[74] U.S. Congress, "H.R.5154 - 98th Congress (1983-1984): National Aeronautics and Space Administration Authorization Act, 1985" July 16, 1984. https://www.congress.gov/bill/98th-congress/house-bill/5154. (Accessed on 31.08.2023)

[75]Edward C. Henry, *the United States of Sol: Privatization as a Tool of American Hegemony in the Solar System*, (Master Thesis: University of Massachusetts, Boston, 2018). p.36 https://scholarworks.umb.edu/masters_theses/510 (Accessed on 10.07.2023).

> United States will be served if the commercial launch industry is competitive in the international marketplace; (4) commercial vehicles are effective means to challenge foreign competition (…)[76]

Before the 1980s, the primary objective of the United States regarding outer space was to compete the Soviet Union's leadership in the space race. After gaining American leadership, the objective shifted towards its preservation.[77] With the end of the Cold War, the competitive environment temporarily disappeared as the US remained sole leader in space. This led to a shift in the US policy. Through the Commercial Space Act of 1998, the United States aimed to transform the International Space Station into a market and thereby reduce cost while creating profit. The Act clearly states its goals that:

> The Congress declares that a priority goal of constructing the International Space Station is the economic development of Earth orbital space. The Congress further declares that free and competitive markets create the most efficient conditions for promoting economic development, and should therefore govern the economic development of Earth orbital space. The Congress further declares that the use of free market principles in operating, servicing, allocating the use of, and adding capabilities to the Space Station, and the resulting fullest possible engagement of commercial providers and participation of commercial users, will reduce Space Station operational costs for all partners and the Federal Government's share of the United States burden to fund operations.[78]

The encouraging of the commercialization of space has been the focus of space policies of all US presidents, starting with Reagan. However, it must be emphasized at this point that while the commercialization of space and the development of the space industry have been aimed, all these activities must be organized under American leadership. There have been significant shifts in the prominent aspects of American space policy, as well as changes in the prioritization of these aspects over

[76] S.2287 - National Aeronautics and Space Administration Authorization Act, Fiscal Year 1991 101st Congress (1989-1990).

[77] Henry, "The United States of Sol", p. 48.

[78] U.S. Congress, Commercial Space Act of 1998, Public Law 105-303, 105th Congress https://www.congress.gov/105/plaws/publ303/PLAW-105publ303.pdf (Accessed on 20.05.2023).

time. However, the continuation of American hegemony on space has remained unchanged as the main objective since the Eisenhower administration until today.[79]

The space activities and policies of the United States in and after the year 2000 will be addressed in the chapter 4.

2.4. Soviet Union's Space Policy

The origins of the Soviet Union's rocket and space programs can be traced back to the ideas of scientist and writer Konstantin Eduardovich Tsiolkovsky, who lived between 1857 and 1935. One of Tsiolkovsky's most revolutionary ideas in the field of rocket science was the proposal that humans could fly into outer space by using liquid- propellant rockets. One of his significant contributions was the Tsiolkovsky Equation, which states that as long as a rocket is sufficiently large and the ratio of the mass of the driving force to the mass of the entire rocket is massive enough, the rocket can carry any wanted payload and achieve any wanted speed.[80] Another scientist who pioneered rocket science is Ukrainian Yuri Vasilyevich Kondratyuk. One of his major contributions was the discovery of ideas that would make lunar landings possible. For instance, the concept of using two different vehicles (a main spacecraft in lunar orbit and a lander on the Moon surface) in lunar missions was his idea, and American scientists also adopted this concept during the Apollo missions.[81] Rocket science and space exploration were among the popular subjects in Soviet society in the 1920s, leading to the emergence of a generation of young individuals with an interest in rocketry. This trend resulted in the establishment of small rocket science societies[82] in Moscow and Leningrad during the 1920s and 1930s.

[79] Henry, "The United States of Sol", p. 44.

[80] Asif A. Siddiqi, "Chapter One: Presage", *Challenge to Apollo: The Soviet Union and the Space Race, 1945–1974*, (Washington D.C: National Aeronautics and Space Administration, 2000), p.1.

[81] Ibid. p.2.

[82] One of the prominent figures who emerged from these communities is Sergey Pavlovich Korolev. Later becoming the key person shaping the Soviet Space Program, Korolev was involved in "The Group for the Investigation of Reactive Engines and Reactive Flight" (GIRD), founded by the famous Soviet scientist Friedrich Tsander.

Tsiolkovsky from the Soviet Union and Hermann Oberth from Germany are recognized as pioneers who contributed to the popularization of rocket science in their respective countries. Additionally, Robert Goddard, an American scientist who constructed the world's first liquid-fuelled rocket, also had a significant impact.[83]

In the 1920s and 1930s, spaceflight communities in the three countries showed interest in each other's work. For instance, Tsiolkovsky and the space advocacy groups in the Soviet Union were aware of Goddard's and Oberth's work in the 1920s. In the same way, German publications often referenced the works of Goddard and Tsiolkovsky in relation to spaceflight. Both countries experienced a short but dense "space craze" that influenced various social and cultural groups, but it faded out by the mid-1930s.

Enthusiasts from both countries constantly communicated with each other to share information. In contrast, prior to the early 1930s, the United States did not have any organized groups or publications that popularized space research. The popularization in the United States emerged in the early 1930s with the establishment of the American Interplanetary Society.[84]

Early rocket programs of Soviets came to an end in 1937 with the peak of Stalin's purges. These purges had a devastating impact, resulting in the near-total annihilation of the Soviet Union's finest scientists, engineers and academics. Suspicion and distrust spreaded society at every level, while millions faced the constant threat of execution or detention in labour camps.[85] The beginning of World War II made a significant impact to the Soviet Union. The German invaders speedily advanced across Soviet territory towards major cities of the country. While the purges had caused a major setback for Soviet science field, the war unexpectedly provided an

[83] Asif A. Siddiqi, "Challenge to Apollo", p.10.

[84] Asif Siddiqi, "Deep Impact: Robert Goddard and the Soviet 'Space Fad' of the 1920s", *History and Technology,* Vol. 20: 2 (2004), p. 98.

[85] Asif A. Siddiqi, "Challenge to Apollo", p. 10.

opportunity for rocketry efforts to be organized, thus upbringing a new generation of engineers who gained valuable experience under wartime conditions.[86]

At the beginning of the war, the Soviet Union did not support the establishment of a program for the development of ballistic missiles to assist its military equipment. Despite this lack of interest in domestic efforts, there was a focus on acquiring German rocket technology during the same period. The most advanced rocket program during World War II was under the administrative leadership of German General Walter Dornberger. With Wernher von Braun leading the operations, German group successfully developed the A-4 ballistic missile, which became one of the most feared weapons of World War II by the end of the war. Commonly known as the V-2[87] due to its German name meaning "vengeance weapon," this missile was successfully launched in 1942. Another weapon, the Fieseler Fi-103, also known as the "flying bomb" or V-I, was part of a German campaign to force Great Britain into surrender. Although casualties were relatively low, these two missiles aroused a huge sense of fear among the civilian population.[88]

At the end of World War II in May 1945, the Soviet Union was in a state of almost complete devastation. By the end of 1945, approximately 27 million Soviet people had lost their lives. Additionally, over 1,700 cities in the country had been destroyed, and the industrial infrastructure was pushed to its limits. Half of the housing that existed at the beginning of the war had been annihilated, and the agricultural sector's productivity had reached famine levels. Although they were living under difficult conditions, the young engineers of the pre-war period gradually regrouped and resumed their work after the war.[89]

As the war in Europe came to a close in the late spring of 1945, all major allied powers swiftly began searching and harnessing the advancements in German military

[86] Ibid p.15.

[87] In this thesis, the term "V-2" is used and will be used to refer to this weapon due to its more common usage.

[88] Ibid. p.18.

[89] Ibid p. 23.

technology. This proved to be a disappointment for Soviet officials who had anticipated acquiring significant information about the German rocketry program. Later, the Soviets would discover that almost all the key German engineers involved in the V-2 program had intentionally surrendered to the American forces. Wernher von Braun, particularly, known as the most talented and influential engineer among the Germans, had begun planning for this move even before the war's end. On January 1945, von Braun and other engineers had initiated preparations to relocate to a region with a high likelihood of being occupied by U.S. forces. By the beginning of May, they were captured by the U.S. Army. In addition to the 525 members of the rocketry team, they also possessed documentation covering thirteen years of rocket-related research. The parts of the V-2 rockets were shipped to the American zone within a few days, while the remaining components were destroyed before Soviet arrival.[90]

In the post-1945 period, the capitalist world underwent a significant transformation, with the capitalist bloc being acknowledged as united under the leadership of the United States.[91] The aftermath of the Second World War gave rise to a new geopolitical order around the USSR and the US. The US managed a reorganized capitalist world economy, and a fresh wave of social conflict and communist revolution emerged, extending beyond the boundaries of Europe.[92] Due to the complete opposition of their socio-economic characteristics, the domestic politics and socio-economic systems of superpowers are mutually antagonistic. The sustainability and continuation of each system, both within their own countries and in their interactions with the international community, are jeopardized by the existence and expansion of the opposing system.[93] The characteristics and dynamics of the Soviet socio-economic system were perceived as a challenge to the prosperity and values associated with the American way of life rooted in liberal-democratic

[90] Ibid p. 24.

[91] Richard Saull, "The Cold War Transformed: Geopolitical Restructuring and a New Wave of Social Revolution, 1945–49", *Rethinking Theory and History in the Cold War: The State, Military. Power and Social Revolution,* (London: Frank Cass, 2001) p. 50.

[92] Ibid.

[93] Ibid. p.9.

capitalism. The Soviet Union's expansion represented a fundamental challenge to the US economy, which operated under a liberal-republican capitalist framework. This expansion jeopardized potential and established markets, thereby posing a significant threat to the economic stability and prosperity of the United States.[94] While the growth of the Soviet system posed a political risk for the United States, the spread and influence of liberal capitalism were similarly regarded as a political danger to the Soviet Union. Any leakage of capitalism into the USSR and/or the Soviet bloc had the capacity to weaken and question the established political structures centered on the communist party's exclusive control over political and economic power.[95] In this new world order that emerged after the Cold War, the competition expanded to contain outer space in a relatively short period of time.

The issue of defending the territory of the Soviet Union after a destructive war was clearly prominent for Soviet policymakers. Soviet efforts were initiated to develop a national agenda concerning ballistic missiles in the post-war period. While the world's most powerful land force at the end of World War II might have been possessed by the Soviet Union, this power suddenly became secondary following the destruction of Hiroshima and Nagasaki by atomic bombs in August 1945, which revealed the United States' definite military superiority over all other countries.[96] Although work on the development of nuclear weapons had already been underway during the war, the bombings in Japan prompted Stalin to prioritize and expedite these efforts. Just two weeks after the Hiroshima bombing, the Central Committee and the Council of Ministers secretly established the Special Committee on the Atomic Bomb, tasked with directing and coordinating all works related to the fast development of nuclear weapons. Recognizing that possessing nuclear weapons was only half of the project, parallel efforts were focused on developing a delivery system for these explosives. Taking inspiration from the impressive American B-29 bomber, Soviet leadership began exploring the feasibility of creating similar aircraft for the

[94] Melvyn P. Leffler, *The Specter of Communism: The United States and the Origins of the Cold War, 1917–1953* (New York: Hill & Wang, 1994). p.62.

[95] Saull, “Rethinking Theory and History in the Cold War” p.9.

[96] Asif A. Siddiqi, “Challenge to Apollo”, p. 36.

transportation of nuclear weapons. It is evident that Stalin, unwilling to dismiss even the most unlikely possibilities, also showed interest in missiles as potential weapons of war, likely influenced by the remarkable performance of the German V-2 rocket.[97] Three years after the end of the war, the Soviets were able to establish a level of capability that was at least equivalent to the achievements of Germany during the war. Furthermore, they embarked on ambitious efforts in the field of launch vehicles, artificial satellites, and even human spaceflight on vertical trajectories. The Soviets had nearly surpassed the German origins of their missile program and attempted to the development of intercontinental ballistic missiles (ICBMs), effectively establishing the groundwork for the emergence of the Soviet space program.[98]

Stalin's death in 1953 made a sign of the beginning of a new era in the history of the Soviet Union. Given Stalin's significant role in approving or cancelling development projects for weapons, the new members of the Politburo were unready to operate the institutional and operational challenges posed by the emerging long-range ballistic missile program. Among the post-Stalin leadership, Nikita Sergeyevich Khrushchev emerged as the most powerful leader of the Communist Party in the country. His lack of experience in defence sector, created a climate of considerable ambiguity in the chain of command within the missile programs from 1953 to the first launch of Sputnik in 1957. This atmosphere of uncertainty facilitated the determination to develop and launch the first artificial satellite.[99]

On October 4, 1957, a historic milestone was achieved in the human history. For the first time, humans successfully launched a self-produced object beyond the Earth's atmosphere into the heavens. This event brought a new phase of the Cold War, characterized by the possibility of Soviet dominance in the realm of outer space, which in turn held significant implications for global power dynamics. The USSR managed to send a message to all over the world: it was a formidable force worthy of consideration. In 1957, there was effectively no established Soviet space program.

[97] Ibid p.36.

[98] Ibid. p.69.

[99] Ibid.p. 119.

Long-term objectives were absent, there was no governing body overseeing the space program, financial planning was lacking, and there was no defined agenda or direction. This period of uncertainty persisted for several years.[100]

Following the Sputnik, three projects contributed to the development of the Soviet Union's space program: the Object K spacecraft, the military reconnaissance satellite effort, and the lunar probe program. However, with the establishment of NASA in 1958, the United States presented a much more organized and long-term vision for their space program. Under the leadership of Korolev, the Soviet team made an effort to adapt to the institutional improvements in the United States and made requests to the Soviet leadership, which resulted in some modifications.[101]

Despite the success of Sputnik, the majority of funding in the sector continued to be primarily focused on the development of long-range ballistic missiles. The Soviet space program, in contrast to the Soviet missile program, was still in its early stages. However, this situation was largely misunderstood in the West. Intelligence reports from this period provided no direct evidence of priority given to the Soviet space program, but it was inferred that the Soviet space exploration program held a very high priority. In reality, in 1959, there was no official general policy or primacy for the Soviet space program. The Soviet program was primarily military-oriented and focused on ballistic missile development.[102]

The superpowers, the United States and the Soviet Union, had distinct approaches to space exploration. Unlike the United States, the Soviet Union did not establish a separate civilian space program apart from its military efforts. Furthermore, there was no equivalent legislation to the United States' 1958 Space Act, which established the National Aeronautics and Space Administration (NASA) as a non-military agency. In the Soviet Union, all launch sites and ground control centers were under

[100] Ibid.

[101] Ibid p.204.

[102] Ibid. p.205.

military supervision, and the responsibility for all aerospace programs lay with the Central Committee of the country's Communist Party.[103]

The Soviet perspective on military activities in space was influenced by the ideas presented in the writings of Soviet general and military theorist Vasily Sokolovsky.[104] The military utilization of space by the Soviet Union progressed in three different directions. Firstly, the establishment of space satellite systems was aimed at ensuring combat effectiveness for all branches of the armed forces. Secondly, the objective was to prevent other countries from using space. Thirdly, the development of strategic offensive systems for conducting warfare in space was pursued.[105] The utilization of space to facilitate Soviet tactical and strategic operations was achieved through the deployment of satellite systems that provided navigation support for troop positioning, resupply operations, and target identification. Additionally, these systems offered command, control, and communication assistance, weather forecasts for planning purposes, reconnaissance capabilities for target identification and strike assessment, as well as intelligence gathering functions.[106]

The prevention of space utilization for military, political, or economic profit was primarily aimed at NATO. The uninterrupted operation of satellite-supported supply lines and communication links between the United States and Europe held crucial importance and constituted a primary objective for Soviet strategists.[107]

Until 1962, the Soviet Union was opposed to satellite reconnaissance, but it ceased its opposition in 1962. This change in stance was influenced by the failure to garner support for a ban on satellite reconnaissance at the United Nations. Additionally, during this period, the Soviet Union began utilizing its own photoreconnaissance technologies, which resulted in the acquisition of photographs starting in 1962.[108]

[103] Roald Sagdeev, “Sputnik and the Soviets”

[104] Mowthorpe, “The militarisation and weaponisation of space”, p.71.

[105] Ibid p. 73.

[106] Ibid p.74.

[107] Ibid p.74.

[108] Ibid p.75.

The increasing deployment of space resources by the Soviet military in the 1970s presented an indirect challenge to the United States by assisting the Soviet Union's overall capabilities in warfare. Following the stopping of Soviet satellite tests in 1971, there was a notable redirection of efforts towards reconnaissance satellites, with a specific emphasis on the development of an ocean surveillance system capable of effectively monitoring the movements of US and NATO warships. The Soviet Armed Forces played a crucial role in facilitating space operations. They were responsible for managing launch sites, operating tracking stations, and conducting the training of cosmonauts, thereby offering crucial support to the overall functioning of the Soviet space program.[109]

During the early 1980s, the Soviet Union put forward two arms control treaties with the objective of preventing the escalation of military activities in space. These initiatives were introduced in the aftermath of the Soviet Union's invasion of Afghanistan. The United States declined to participate in discussions regarding arms control measures. During the years between 1983 and 1984, the Soviet Union merged its opposition to the Strategic Defense Initiative (SDI) with a campaign aimed at prohibiting the testing and deployment of antisatellite weapons. However, this campaign was abandoned in 1985.[110]

The Soviet Union's utilization of space can be classified as coherence to the sanctuary school of space power. By deploying photoreconnaissance satellites and ocean surveillance satellites, the Soviets demonstrated their commitment to the principles of the space sanctuary doctrine. As a result, they advocated for the demilitarization of space, emphasizing the use of reconnaissance satellites for arms control objectives. This strategic alignment aimed to reinforce international agreements and promote a weapon-free environment in outer space.[111]

Nevertheless, the Soviet Union pursued the development of both the Fractional Orbital Bombardment System (FOBS) and an anti-satellite (ASAT) capability. These

[109] Ibid p.76.

[110] Ibid p.76.

[111] Ibid p.77.

two space systems indicate that Soviet military thinking contained viewpoints aligned with the "high ground school of space," which regards space as the ultimate domain for deploying weapons. The FOBS system, with its capability to deliver weapons of mass destruction within a remarkably short duration, fits well within this high ground perspective. While emphasizing the ASAT technology aligns with the high ground perspective, when unified with the Soviet military strategy, it also demonstrates compatibility with the space control school that views space as an additional geographical domain for conducting military operations.[112]

The Soviet space program made use of three distinct cosmodromes, Kapustin Yar, Plesetsk, and Baykonur, for the purpose of launching spacecraft. The geographical locations of Kapustin Yar and Plesetsk within the borders of Russia ensured that there were no controversies or conflicts arising from ownership disputes over these sites. This was particularly important considering the dissolution of the Soviet Union in1991, which could have potentially caused complications in terms of site ownership. Baykonur stands as the only cosmodrome situated beyond the borders of Russia, in Kazakhstan, and Russian authorities held the belief that the potential loss of Baykonur would deliver a significant blow to Russia's space program. Baykonur's location in the southern region capitalizes on the Earth's rotational energy, which facilitates the placement of satellites into orbit. This geographical advantage enables the utilization of larger payloads or less strong launch vehicles for missions. Moreover, Baykonur remains the only facility capable of executing manned space launches. Although some officials in Russia advocated for the expansion of Plesetsk and the transfer of missions from Baykonur to Plesetsk, the proposition to convert Plesetsk into a secondary Baykonur was dismissed due to its extreme costs. Russian President Yeltsin made a request for a lease term of 99 years, whereas Kazakhstan expressed a desire for a shorter commitment due to its intention to assume operational control of the site once it attained the necessary technical and economic capacity.[113] As a result, a signed agreement granted Moscow a 20-year lease[114] for

[112] Ibid p.77.

[113] Ibid p.88.

the cosmodrome.[115] It is important to highlight that an agreement between Russia and Kazakhstan was ratified by both parties, further extending Russia's rental term for the spaceport until 2050.[116] However, the issue of Baykonur continues to occasionally strain the bilateral relations between Russia and Kazakhstan.

Despite the distribution of the Soviet Union's space infrastructure across multiple republics, the majority was concentrated in three specific regions. Russia possessed the largest share, comprising around 80 percent of the total capacity. Ukraine held five percent, which included essential facilities for Zenit (SL-16) launch vehicle production and tracking stations. Meanwhile, Kazakhstan accounted for fifteen percent of the infrastructure, including the Baykonur Cosmodrome. This allocation of assets resulted in disruptions to the supply chain of crucial materials to production facilities, triggered territorial jurisdiction disputes, and retained the effective control of satellites already deployed in orbit.[117]

2.5. Chinese Space Program during the Cold War

Chinese interest in space is a longstanding pursuit that dates back to the country's establishment in 1949. From the early stages, China recognized the potential of space activities in supporting economic development and bridging communication gaps across its vast territories. Similar to the European nations during the 1960s, China grasped the interconnection between space exploration, technological advancements, industrialization, and economic growth. Understanding this relationship, China has strategically pursued space initiatives to foster technological development,

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[114] "Agreement between the Russian Federation and Republic of Kazakhstan on the basic principles and conditions of use of the Baikonur spaceport" (translated text), March 28, 1994 https://cis-legislation.com/document.fwx?rgn=8648 (Accessed on 10.07.2023).

[115] "Russia to Lease Space Site in Kazakhstan", The Los Angeles Times, 29 March, 1994 https://www.latimes.com/archives/la-xpm-1994-03-29-mn-39821-story.html (Accessed on 10.07.2023).

[116] "Kazakhstan Finally Ratifies Baikonur Rental Deal With Russia" Astana, Kazakhstan RIA Novosti, April 12, 2010 https://www.spacedaily.com/reports/Kazakhstan_Finally_Ratifies_Baikonur_Rental_Deal_With_Russia_999.html (Accessed on 10.07.2023).

[117] Mowthorpe, "The militarisation and weaponisation of space" p.73.

industrialization, and drive economic progress. China observed and recognized the wide range of advantages that the United States and other technologically advanced nations obtained through their space efforts. The Apollo program generated a wide range of advantages, as well as enhanced prestige that turned into geopolitical influence. China, recognizing the strategic value of space capabilities, became keenly aware of their significance following the successful utilization of space systems by the United States during the 1991 Gulf War. The extensive deployment of the Global Positioning System (GPS) and other space-based systems for activities such as intelligence, surveillance, command, communication, and reconnaissance demonstrated the effectiveness of space assets in military operations. This realization prompted China to prioritize the development and utilization of its own space capabilities to pursue strategic objectives.[118]

China displayed an interest in space-related matters prior to the launch of Sputnik, although space researches did not officially start before it. Before the launch of Sputnik, there were some Chinese researchers who were already trained in the field of space sciences. Zhao Jiuzhang, one of the most prominent figures in Chinese space sciences, was a physicist who received education in the United States. The research conducted by him laid the foundation for several fields of study in China, including air-mass analysis, trade wind zone thermo-dynamics, and physical mechanisms related to charged particles and magnetic fields.[119] One of the other significant scientists who conducted research in the field of space for China was Qian Xuesen. As an engineer who participated in the missile program in the United States, Qian primarily contributed to the fields of missile and rocket technology.[120]

Yanping Chen examines the Chinese space policy as four distinct periods.[121] According to him, although the first period, from 1956 to 1966, was marked by

[118] Joan Johnson–Freese, "China's Space Ambitions: It's Not All About the U.S*", Georgetown Journal of International Affairs*, Vol. 15, No. 1 (Winter/Spring 2014), p.140.

[119]Zhihui Zhang, "A Historical Review of China-U.S. Cooperation in Space: Launching Commercial Satellites and Technology Transfer, 1978 – 2000", *Space Policy*, Vol 50, (2019).

[120]Mark A. Stokes, *China's Strategic Modernization: Implications for the United States SSI* (Carlisle Barracks, Pa.: Strategic Studies Institute, U.S. Army War College, September 1999), p. 170.

[121] Yanping Chen, "China's Space Policy: A Historical Review", *Space Policy*, Vol. 7: 2, (1991), p.116.

political turbulence, China was able to set up its space programme. Some of the events that took place during this period were the anti-Rightist campaign, the Great Leap Forward, and the withdrawal of Soviet support. Many intellectuals, including many scientists and engineers were imprisoned and lost their jobs during the anti-Rightist campaign in between 1957 and 1959. However, space-related research was considered critical for national defence and was not affected as other sectors.[122] On the other hand, The Great Leap Forward, a social and economic campaign launched by Mao Zedong in 1958, had the potential to negatively impact China's space program. There was a risk that resources allocated to the space program would be shifted to help meet more immediate economic needs. Efforts moved slowly but Chinese space exploration activities continued. The program altered its focus to improving the launching capabilities of sounding rockets, which are smaller and simpler than satellites. By doing this, the program avoided taking on tasks that it was not yet capable of achieving.[123] The second period, from 1966 to 1976, was dominated by the Cultural Revolution, but On April 24, 1970, China achieved a significant milestone by successfully launching its first satellite using the Long March-1 rocket. Space program went successful because it was supported by the important actors in Chinese politics.[124]

The third period, from 1976 to 1986, it was the time for China to focus on economic development and justify the space programme's contributions to society. Despite this, the space programme survived. Finally, the fourth period, from 1986 to the present, saw a commitment to making the space programme the cornerstone of national science and technology development. According to a report sent to Deng Xiaoping by Premier Zhao Ziyang on 25th September 1986, the future goals of China's space program included building a space station, developing a heavy launch vehicle, and establishing a space transportation system.[125] Thanks to the support from important figures in Chinese politics throughout its history and the symbolic value of being a

[122] Ibid.

[123] Ibid.

[124] Ibid.

[125]Ibid.

spacefaring country as part of an exclusive club, China's space program has remained consistent despite political, economic, and social changes in the country.[126]

During the space race, the United States and the Soviet Union perceived each other as military threats. However, China, as a non-nuclear state, viewed both of them as potential threats. During the 1950s, China's interest in developing a space program was primarily driven by military concerns. This was largely influenced by the United States' nuclear threats and the need for a credible deterrent. Without a reliable defence against American nuclear bomber forces, China recognized the importance of establishing a strategic nuclear deterrent. Consequently, Mao Zedong pursued the development of space technology as a means to achieve this goal. However, the actualization of such a program faced significant challenges and delays. China's technological infrastructure was severely underdeveloped due to decades of external conflicts and internal civil wars, which hindered progress in the field of space technology.[127]

Rocket technology was considered a priority project in the 12th Long-term Program for the Development of Science and Technology, dating back to 1956.[128] In 1956, the Fifth Academy of the Department of Defence was established to develop China's space program. It was responsible for this function until 1964 when some of its duties were transferred to the Ministry of the Seventh Machinery Industry. Later, this organization underwent several name changes and developed into what is now known as the "China Aerospace Science and Technology Corporation."[129] In 1957, China signed a bilateral agreement with the USSR to acquire Soviet missile technology and to establish three R&D institutions focused on missile development. However, political tensions between the two countries led to the withdrawal of Soviet technical assistance in 1960. As a result, China decided to develop its missile

[126] Ibid.

[127] Erik Seedhouse, "Rising Dragon", *The New Space Race: China vs. USA*, (New York: Praxis, 2010) p. 12-13.

[128] Yun Zhao, "National Space Law in China", p.7.

[129] "History", China Aerospace Science and Technology Corporation http://english.spacechina.com/n16421/n17138/n382513/index.html (Accessed on 10.07.2023).

technology independently, with the Fifth Academy focusing on building short to medium-range missiles.[130] At the same time, China faced a critical situation with millions of people in rural areas suffering from extreme poverty and famine. However, amidst the escalating nuclear arms race between the United States and the Soviet Union, China's isolation and vulnerability grew more pronounced. Faced with this desperate scenario, China felt compelled to prioritize the development of missile technology, regardless of the associated costs and sacrifices.[131] China allocated resources to develop nuclear weapons and ballistic missiles due to their strategic importance, as well as prioritizing satellite technologies, because of military reasons and tensions with the Soviet Union.[132] China's first attempt to launch a missile failed in 1962, but it succeeded in launching a fully operational medium-range missile in 1966.

During the 1960s, China developed its sounding rocket technology and, under the leadership of Zhao Jiuzhang, also carried out significant work in space science. Magnetic fields, radiation belts, charged particles, and plasma are some of the important physics research topics studied during this period.

After the launch of Sputnik, Dr. Qian and his colleagues began a plan called 'Mission 581' to develop China's own satellite-building and launching capabilities. One of the main goals was to establish institutes dedicated to satellite and launch design. The First Design Institute was created in August 1958, and later renamed The Institute for Generator Design of the Chinese Academy of Sciences. China became the fifth country to launch an independent satellite with the successful launch of its first satellite, Dongfanghong-1, on April 24, 1970.[133] After the successful launch of its first satellite, China began working on manned space missions.

With the end of the Cultural Revolution in 1976, China began to open up to the outside world. In 1979, Vice Premier Deng Xiaoping visited the United States and

[130] Zhihui Zhang, “Space Science China”, p.7.

[131] Erik Seedhouse, “The New Space Race”, p.13.

[132]Zhihui Zhang, “Space Science China” p.7

[133]Yun Zhao, “National Space Law in China” p.7.

signed an agreement with American President Carter on science and technology. During the visit, Deng also toured important space facilities in the United States. During the Deng Xiaoping era, China accelerated its space programs and carried out joint research with scientists from many countries, especially the United States and European countries. Regarding China's policy during this period, Deng stated, "Atomic bombs, missiles, hydrogen bombs, and application satellites are several things which are so crucial that a country having them or not will change the importance of the country in the world."[134]

Following the destruction of the U.S. Space Shuttle Challenger in 1986[135], explosions of the rockets Titan[136] and Delta[137] same year, U.S. President Ronald Reagan allowed to the launch of American satellites on Chinese rockets.[138] The China Great Wall Industry Corporation (CGWIC) started promoting China's launch services after global space failures in 1986 made the Long March family of launch vehicles attractive to the international market.[139] The first commercial launches involved experimental payloads for French and German companies.[140] In 1991, China's Space Leading Group (SLG) was established to coordinate and oversee all space activities and attract foreign contracts. The Chinese National Space

[134] Cited by Zhihui Zhang and Bruce Seely, "A Historical Review of China-U.S. Cooperation in Space: Launching Commercial Satellites and Technology Transfer, 1978-2000", *Space Policy*, 50, (2019)

[135] "The Challenger Space Shuttle Disaster, 30 Years Later" The New York Times https://www.nytimes.com/interactive/2016/01/29/science/space/challenger-explosion-30-year-anniversary.html (Accessed on 10.07.2023).

[136] "Titan Rocket Explodes over California Air Base", The New York Times https://www.nytimes.com/1986/04/19/us/titan-rocket-explodes-over-california-air-base.html (Accessed on 10.07.2023).

[137] "Delta Rocket Explosion Clouding Celebration of U.S. Manned Flight", The New York Times https://www.nytimes.com/1986/05/05/us/delta-rocket-explosion-clouding-celebration-of-us-manned-flight.html (Accessed on 10.07.2023).

[138] "Satellite Sales Split Agencies", The New York Times https://www.nytimes.com/1988/08/31/business/satellite-sales-split-agencies.html (Accessed on 10.07.2023).

[139] "China: Possible Missile Technology Transfers Under U.S. Satellite Export Policy -- Actions and Chronology", CRS https://www.everycrsreport.com/reports/98-485.html (Accessed on 10.07.2023)

[140] Wang Chunyuan, "China's Space Industry and Its Strategy of International Cooperation", Stanford University Center for International Security and Arms Control, July 1996, p. 5 https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/img-3261431-00012.pdf (Accessed on 10.07.2023).

Administration (CNSA) was established in 1993 as the executive agency responsible to the Premier who also sits on the Space Leading Group. The revenues earned by China's commercial launches are shared between two government organizations, COSTIND and CASC, with profits shared between entities involved in manufacturing the launch vehicle, CGWIC, and CASC headquarters.[141]

China's Long March launch services conveyed a clear message to the international community: that it was aiming to establish itself as a formidable player in the global space services market.[142] Moreover, for the very first time in the history of the Chinese space programme, information about its operations and accomplishments was shared with external parties. This included opening up research, manufacturing, and launch facilities to foreign observers.[143]

Although China aimed to achieve significant gains in the global market and aspired to be recognized as one of the key players in the field of space, it was not possible to accomplish this during the Cold War, as the competition remained primarily focused on the two superpowers.

2.6. European Space Program during the Cold War

As previously discussed in this thesis, although the German V-2 rockets used in World War II played a pioneering role in rocket technology, following the conclusion of the war, this technology was predominantly acquired by the United States, with the Soviet Union also obtaining a smaller portion of it.

The Second World War had profound implications for both the geopolitical and social dynamics within the global arena. On one hand, the Soviet Union emerged as a dominant force in geopolitics following their victory over Germany and following

[141] Ibid.

[142] Marcia S. Smith, "China's Space Program: A Brief Overview Including Commercial Launches of U.S.-Built Satellites", CRS Report for Congress (Washington, D.C.: The Library of Congress, 23 June 1998), CRS-3. https://www.everycrsreport.com/files/19980903_98-575_05fb2d841adab0b0fa7670eee5ba1679578923cb.pdf (Accessed on 10.07.2023).

[143] Ibid.

occupation of parts of Eastern Europe. Simultaneously, the United States experienced a rise in both military and economic power, solidifying its position as a formidable player on the international stage. The war brought about significant shifts in the social landscape across Europe and other regions. Consequently, Western Europe, which was a major global power, was defeated in the war and replaced by the United States and the Soviet Union as the primary superpowers. This transformative event, the Second World War, brought a new political reality focused on the USSR and the US.

Space served as a crucial arena for political and military competition between the United States and the Soviet Union. The primary objective of both the US and the Soviet Union was to display the dominance of their space programs to Third World nations, emphasizing the superiority of their ideologies, the impact of their political systems, the technological developments of their industries, and the military might they possessed. It should be noted that Europe did not possess equivalent capabilities to compete with the American and Soviet efforts. Nevertheless, certain influential European countries held considerable potential to start the space age during the late 1950s and initiated modest national space programs.[144]

The aggressive utilization of the V-2 rocket by the Nazis during World War II led to a prohibition on Germany's involvement in rocket technology, as reinforced by the Paris Treaties of May 1955. These agreements specifically prohibited the construction of guided missiles with a range exceeding 70 km. In the post-war period, the United Kingdom and France, in their efforts to reconstruct their nations and settle accumulated debts, initiated the development of their own launchers. Similar to other narratives in the space domain, Europe's journey began with a series of setbacks. Although the first modern missile was primarily constructed and launched in Europe, the role of Europe during that period was rather limited. However, success would be achieved in the following years.[145]

[144] John Krige and Arturo Russo, "A History of the European Space Agency, 1958-1987", *Vol. 1 The story of ESRO and ELDO, 1958-1973* (Noordwijk: ESA Publication, 2000) p.9.

[145] Cenan Al-Ekabi and Panos Mastorakis, "The Evolution of Europe's Launcher and Flagship Space Initiatives", *European Autonomy in Space*, (Switzerland: Springer International Publishing, 2015), p.3.

Between 1946 and 1947, France formed its initial rocket teams by welcoming approximately 40 German rocket specialists who migrated to France during that period. In 1949, the French government founded the Laboratoire de Recherches Ballistiques et Aérodynamiques with the specific objective of advancing ballistic missile technology. Within this laboratory, the Véronique sounding rocket was developed, drawing inspiration from the German V-2 rocket. Its first operational flight occurred in 1954, originating from a French military base situated within the Algerian desert. The rise to power of General Charles de Gaulle in France in 1958 resulted in an acceleration of the country's rocket and missile development efforts, with a particular focus on establishing an independent nuclear capability. On November 26, 1965, the Diamant rocket successfully placed the first French satellite, Astérix, into orbit, establishing France as the third space power and affirming its independent role in the strategic domain.[146]

Throughout the 1950s, there was a growing demand for establishing a national space program in West Germany, leading to the revival of several space societies and the establishment of a space research institute, which involved the participation of distinguished scientists and technicians from the Peenemünde project, while also engaging in collaborations with major industries. However, their efforts took a while to reach the goal due to the negative impact on the public's perception of space caused by the V-2 weapon, and the imposition of restrictions by the Allied powers, resulting in a decade-long prohibition on any activities in rocket technology, and even though the Paris Treaties of May 1955 eased these constraints slightly, the construction of guided missiles with a range exceeding 70 km remained prohibited.[147]

The UK had a strong and well-organized space science community in its early period, with a distinguished history in astronomy and ionospheric research. In 1946, the Controlled Weapons Department was established at the Royal Aircraft Establishment (RAE) in the United Kingdom. The Skylark sounding rocket was developed and tested in 1957. The availability of the Skylark and participation in the

[146] John Krige, "A History of the European Space Agency", p.10.

[147] Ibid p.11.

International Geophysical Year, along with close contacts with American colleagues, helped boost British space science. In 1958, the British National Committee for Space Research was established, which led to a cooperative program with NASA to launch three satellites with UK instruments on board at yearly intervals. The first satellite, Ariel 1, launched in 1962 and carried out experiments to investigate the Van Allen particle belt, solar radiation, and cosmic rays. The second Ariel satellite launched in 1964 and the third was built in the UK and launched in 1967. In 1955, the United Kingdom partnered with the United States to create their own Intermediate-Range Ballistic Missile (IRBM) named Blue Streak to serve two purposes: to maintain a separate British defense system and to complement American Intercontinental Ballistic Missiles (ICBMs) with medium-range missiles in Europe.[148] However, in 1960, the British government opted to terminate the military program. Blue Streak was a missile designed for first-strike capability, but its immobility made it easy to be targeted by the enemy. In times of crisis, Britain would have had to choose between risking disarmament by being cautious or risking a nuclear war by reacting immediately. Additionally, cost was a significant factor.[149] British government decided to use the cancelled ballistic missile as a satellite launcher due to the fact that they had already spent a significant amount of money. To divide the expenses of this initiative, the United Kingdom chose to ask other European nations to participate in a collective program aimed at creating a satellite launcher utilizing the "Blue Streak" missile. Additionally, there were political reasons behind this invitation. The signing of the Treaty of Rome on March 25th, 1957 marked a significant increase in the speed of the drive for collaboration, cooperation, and integration of European countries in the economic domain, resulting in the formation of the European Economic Community.[150] The British government regretted not initially participating in the successful European Economic Community after 1957.[151] They saw offering leadership in European space cooperation as a way

[148] John Krige and Arturo Russo. "A History of the European Space Agency 1958-1987" p.9.

[149]Ibid.

[150]Michael Sheehan, *The International Politics of Space*, (New York: Routledge, 2007) p. 72.

[151] Ibid. p.78.

to prove their European identity and strengthen their linkages with the continent. West Germany welcomed the British proposal for a European launcher organization as a way to further this integration and possibly lead to an enlargement of the EEC.[152] The joint program for developing rockets in collaboration offered Germany an opportunity to participate in a field from which it had been left out since the end of World War II. German interest groups saw the collaborative European space program launched in 1959 as an opportunity to legitimize Germany's re-entry into space research and launch an independent national program. Minister of Defense Franz Josef Strauss supported this initiative, seeing modern technologies, including missiles, as crucial to Germany's place in the western alliance.[153]

On the other hand, France, which objected to the influence of the US and NATO in Europe during the Cold War, accepted the idea of developing autonomous European technology in the space field. In order to decrease France's dependence on NATO and create its own nuclear deterrent capability, French President de Gaulle committed the country to developing its own space launch capability and sought to access British and American technology. He also aimed to make Europe an alternative to the US-dominated political landscape, with a focus on achieving military, economic, and technological independence. His positive attitude towards the European space program encouraged the UK on the EEC membership, but he later vetoed the UK's application for EEC membership, believing it would lead to greater American influence in Europe.[154]

In 1961, the establishment of Eurospace marked the formation of a non-profit transnational association with the primary objective of fostering and advancing aerospace activities across Western Europe. This association was created with the purpose of promoting and supporting the development of the aerospace industry in the region.[155] It supported the development of a European launcher based on the

[152]Ibid.

[153] Ibid.

[154] Ibid.

[155] Cenan Al-Ekabi, “European Autonomy in Space” p.5.

Blue Streak rocket to ensure Europe's independence in space technology. In 1962, six European countries and Australia signed the Convention for the Establishment of the European Launcher Development Organisation (ELDO), with the aim of constructing a heavy spacecraft launcher using the UK's Blue Streak as its first stage, France's "Coralie" as its second stage, and Germany's "Astrid" as its third stage, while Italy, Belgium, and the Netherlands would provide other necessary components for the program.[156]

Space launch vehicles, the models up to Ariane 1 and Ariane 4 successfully launched over 50% of the world's commercial satellites. This accomplishment played a crucial role in rebuilding trust and bolstering collaborative space efforts, while also establishing the European Space Agency (ESA) as a prominent player in the global space industry. Since 1996, despite growing competition from both established and emerging players in the space arena, Ariane 5 has maintained its dominance in the civil launch market under the management of "Arianespace".[157] Despite the later success of Ariane, ESA was unable to achieve a level of accomplishment comparable to the two superpowers during the Cold War years.

2.7. Indian Space Program during the Cold War

India's space program has a long-standing history and is comparable in age to the space programs of the United States, the Soviet Union, and China. However, what sets India apart is its distinct approach. Unlike these superpowers, India's early focus in space was not primarily driven by national security and defence concerns. Instead, it embraced a visionary perspective that sought to utilize the potential of space technology to uplift the country from poverty and reduce reliance on technologically advanced nations. Indian leaders recognized space as an invaluable tool for tackling the complex socio-economic issues faced by a large and developing nation.[158]

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[156] Ibid p.6.

[157] Ibid p.13.

[158] Marco Aliberti, "India's Path in Space: A Brief History of an Evolving Endeavour", *India in Space: Between Utility and Geopolitics*, (Springer International Publishing AG 2018) p.9.

India's journey into space has evolved through four distinct stages of development over the past fifty years. The initial stage, spanning from the establishment of INCOSPAR in 1962 to the institutionalization of the Space Commission and Department of Space in 1972, was characterized by the identification of reasons for establishing a national program and the determination of its objectives. During this period, the foundation was laid for future space application programs, and significant resources and human capital were mobilized for following efforts. As expected, India's non-aligned, post-colonial, and developing status played a significant role in shaping its vision for space exploration and the pace of its advancement. While challenges such as poverty levels and limited technological infrastructure posed obstacles to progress in space activities, India's active involvement in the non-aligned movement allowed it to arrange international collaborations with major spacefaring nations.[159]

After the first ten years, India's space program transitioned into a phase of consolidation and experimentation, displaying the practical functionality of space systems for users. This stage, which continued until the mid-1980s, saw significant milestones such as the successful creation of India's initial satellites, thorough examination of space technology's societal applications, and the establishment of the necessary groundwork for an operational launch vehicle program. During the early 1990s, as the program's three key components underwent successful testing, it advanced into the operational phase. Throughout this period, substantial investments were made in developing space infrastructure in two core areas: the versatile Indian National Satellite (INSAT) System, which addressed communication, broadcasting, and meteorology requirements, and the Indian Remote Sensing (IRS) satellite system, specifically designed for Earth observation purposes. During this time, notable progress was made in the development and utilization of the Polar Satellite Launch Vehicle (PSLV) to deploy the INSAT and IRS systems, alongside the development of the Geosynchronous Satellite Launch Vehicle (GSLV). However, unlike the experimental phase of the 1970s and early 1980s, this period experienced significant challenges in the international landscape, primarily driven by the United

[159] Ibid p.10.

States and other Western nations. These countries shifted their support from previous collaborative approaches, as they became cautious of encouraging the advancement of long-range ballistic missile technologies for nuclear weapons.[160]

In the early 21st century, as India experienced significant growth in political, economic, and military spheres and in response to the changing regional and global landscape, the country's space program underwent a remarkable period of growth and maturity. This expansion had a profound impact on the program's overall trajectory. Notably, there was a shift in focus from using space primarily for socio-economic development to exploring new frontiers, including space exploration and the utilization of space for military purposes.[161]

2.8. Conclusion

During the Cold War, space became a crucial competition arena where the United States and the Soviet Union strongly competed. Both countries sought to display the superiority of their space programs, highlighting their ideologies, political systems, technological advancements, and military strength. It is important to note that China, European countries, and India did not possess equivalent capabilities to the American and Soviet efforts. However, despite the intense tensions of the Cold War era, the use of space remained primarily peaceful and without weaponization. This was largely due to the establishment of international legal rules and principles developed during that time. In the next chapter, the advancements in the field of space law will be examined.

[160] Ibid p.10.

[161] Ibid p.10.

CHAPTER 3

THE MAKING OF INTERNATIONAL SPACE LAW

3.1. Introduction

The Soviet Union took the lead in space exploration by successfully launching the first satellite Sputnik-1 into orbit in 1957 and landing Luna IX on the moon in 1966. These achievements caused significant concern in the United States, as they were left behind. In response, the United States initiated treaties to restrict space activities to peaceful purposes and prohibit any state from claiming ownership.[162]

During the Cold War, when the United States and the Soviet Union dominated space exploration, there was significant opposition to the concept of property rights or sovereignty in space. This opposition originated from two main concerns. Firstly, nations without space capabilities feared that the dominant space powers would establish colonies throughout the solar system. Secondly, both the United States and the Soviet Union were apprehensive that the other would gain a decisive advantage in space.[163] Also, the military aspects of space exploration have raised numerous global concerns as well. The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) was established in 1959 to facilitate peaceful space exploration and serves as a central hub for various alliances. In this section, the international treaties related to outer space under the United Nations framework will be examined, and the ongoing debates regarding the status of space, militarization, and the rights of the private sector will be identified.

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[162] Carol R. Buxton, "Property in Outer Space: The Common Heritage of Mankind Principle vs. the First in Time, First in Right, Rule of Property", *J. Air L. & Com.*Vol 69, (2004) p.697.

[163] Glenn H. Reynolds, "International Space Law: Into the Twenty-First Century", *25 Vanderbilt Law Review,* Vol 225 (2021) p. 229.

3.2. History of International Space Law

The successful outcome of the aircraft experiments conducted by the Wright brothers in 1903 marked a significant milestone in the development of aviation law. The dual usability of airplanes for both military and commercial purposes played a crucial role in encouraging the growth of the aviation industry and establishing airspace as a domain of sovereignty.[164] Moreover, the development of aviation law has also sparked discussions on how to determine the boundary between space and air.[165]

The successful launch of Sputnik-1 by the Soviet Union in 1957 led to a focus on the legal issues that could arise from space exploration. The United States lagging behind in this field and concerns among emerging nations about the sharing of space between the two superpowers prompted discussions within the framework of the United Nations to address the legal aspects of space-related developments.[166] In 1958, the General Assembly took action by passing resolution 1348 (XIII) to create an *ad hoc* Committee on the Peaceful Uses of Outer Space (COPUOS). Its objectives were to examine whether space research was conducted peacefully, establish organizational structures under the framework of the United Nations to promote international collaboration in this field, and address legal challenges that might arise in space exploration activities. In 1959, the General Assembly made the decision to establish the COPUOS as a permanent entity.[167]

Edythe Weeks categorizes space law developments into three periods. The first period, including the time from the launch of Sputnik-1 in 1957 to the signing of the Moon Treaty in 1979, witnessed space law taking place under the framework of the United Nations. During the period from 1980 to 1991, states engaged in national-level regulations in the field of space law. The period from 1991 to the present has

[164] Brian F. Havel, Gabriel S. Sanchez, *The Principles and Practice of International Aviation Law*, (Cambridge: Cambridge University Press, 2014) p. 30.

[165] Ibid p. 41.

[166] Reynolds, "International Space Law: Into the Twenty-First Century"

[167] "COPUOS History" https://www.unoosa.org/oosa/en/ourwork/copuos/history.html (Accessed on 10.07.2023).

seen significant steps taken towards commercialization in the realm of space law. During the period from 1991 to the present, governments have been implementing regulations that support the steps taken towards commercialization.[168]

The treaties regarding space law, which were signed under the framework of the United Nations structure, began with the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies[169] in 1967 and continued with the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space[170] in 1968. Convention on International Liability for Damage Caused by Space Objects[171] took effect in 1972 and was followed by Convention on Registration of Objects Launched into Outer Space[172] in 1976. And finally, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies[173] was officially endorsed by the General Assembly in 1979, coming into effect in July 1984.[174] Although the first four treaties signed and ratified by almost all of the spacefaring countries, the Moon Agreement has not been signed and ratified by the US, Soviet Union and China. Among the countries with advanced space technologies, it has only been signed but not ratified by France and India.[175]

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[168] Edythe Weeks, Politics of Space Law in a Post-Cold War Era: Understanding Regime Change, (PhD thesis: Northern Arizona University, 2006).

[169] The term "The Outer Space Treaty" will be used to refer to this treaty in the following pages of this study.

[170] This treaty will be shortened as "The Rescue Agreement" in the following pages.

[171] This treaty will be shortened as "The Liability Convention" in the following pages.

[172] "The Registration Convention" will be used to refer to this treaty in the following pages.

[173] "The Moon Agreement" will be used to refer to this treaty in the following pages.

[174] Turkey has been a party to the Outer Space Treaty since 1968, the Rescue Agreement, the Liability Convention, and the Registration Convention since 2006. Turkey has been a party to the Moon Agreement since 2011. For more detailed information: Merve Erdem, Uzaya ilişkin Birleşmiş Milletler Antlaşmaları ile Öngörülen Rejimin Uluslararası Hukuk Açısından Değerlendirilmesi (Master Thesis: Ankara University, 2011).

[175] "Agreement governing the Activities of States on the Moon and Other Celestial Bodies", United Nations Treaty Collections https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXIV-2&chapter=24&clang=_en (Accessed on 31.08.2023)

In addition to these five treaties, various issues related to challenges arising from the use of outer space have been discussed in the General Assembly, leading to the establishment of certain principles and the adoption of resolutions concerning the utilization of space domains. These include the principles regarding satellite broadcasting through artificial satellites, accepted under Resolution 37/92 in 1982[176]; the principles regulating remote sensing, addressed by Resolution 41/65 in 1986[177]; the principles governing the utilization of nuclear power sources in space, established in accordance with Resolution 47/68 in 1992[178]; and the principles supporting international cooperation in the utilization of outer space for the benefit and interests of all humanity, with special consideration for the needs of developing countries, as set forth in Resolution 51/122 in 1996[179].

The foundation of the five international treaties signed under the framework of the United Nations is based on the resolutions adopted by the UN General Assembly in the 1960s. The fundamental principles concerning space law were primarily established in these resolutions. Resolution 1721 (XVI) titled "International Co-operation in the Peaceful Uses of Outer Space" adopted by COPUOS in 1961 is a milestone in space law as it is the first document to mention the internationally agreed-upon principles in relation to space law.[180] In accordance with the principles explained in this resolution, which acts as a guiding instrument for space-related activities, the exploration and utilization of outer space should exclusively contribute

[176] "Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting" UN. General Assembly (37th session 1982-1983) https://digitallibrary.un.org/record/41084?ln=en (Accessed on 10.07.2023).

[177] "Principles relating to Remote Sensing of the Earth from Outer Space: resolution / adopted by the General Assembly", UN. General Assembly (41st session 1986-1987) https://digitallibrary.un.org/record/126423?ln=en (Accessed on 10.07.2023).

[178] "Principles relevant to the Use of Nuclear Power Sources in Outer Space: resolution / adopted by the General Assembly", UN. General Assembly (47th session 1992-1993) https://digitallibrary.un.org/record/159141?ln=en (Accessed on 10.07.2023).

[179] "Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries : resolution / adopted by the General Assembly", UN. General Assembly (51st session 1996-1997) https://digitallibrary.un.org/record/231739?ln=en (Accessed on 10.07.2023).

[180] Ayten Selin Doğan, Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi, (Master Thesis: Hacettepe University, 2022) p. 14.

to the progress of mankind and promote the welfare of all nations. Furthermore, outer space and celestial bodies are accessible for exploration and utilization by all nations in conformity with international law, and they cannot be subjected to the act of national appropriation.[181] The Resolution titled "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space", adopted in 1963 and numbered 1962 (XVIII), confirmed and further elaborated the principles agreed upon in Resolution 1721 (XVI).[182]

The establishment of regulations for international space law sparked extensive diplomatic discussion within the United Nations. The Soviet Union and the United States held opposing views on how these regulations should be developed. The Soviet Union advocated for the creation of contractual rules to establish a comprehensive framework of international law governing space activities. In contrast, the United States proposed that international law should mainly address specific issues such as rescuing astronauts or determining liability for space object damages through resolutions passed by the UN General Assembly.

Another issue that the US and the USSR could not achieve a common posture is that the USSR planned and promoted complete disarmament throughout the Cold War. It was unable to find support of the West.[183] As M.I Lazarev, an expert Soviet jurist in the field of space law explained about the main Soviet approach towards the rulemaking process in space law and "peaceful coexistence" policy, which "the most important goal in the development of space law will be the prevention of imperialist expansion and militarism in space".[184]

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[181] "Resolution Adopted by the General: 1721 (XVI). International co-operation in the peaceful uses of outer space" https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/resolutions/res_16_1721.html#:~:text=(b)%20Outer%20space%20and%20celestial,2. (Accessed on 10.07.2023).

[182] "Resolution Adopted by the General Assembly 1962 (XVIII). Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space" https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/legal-principles.html (Accessed on 10.07.2023).

[183] Buse Yılmaz, "The Making, Working and Ending of the INF Treaty", (Master Thesis; Middle East Technical University, Ankara: 2021) p.114.

[184] M. I. Lazarev, as cited by Robert D. Crane, "Basic Principles in Soviet Space Law: Peaceful Coexistence, Peaceful Cooperation, and Disarmament", *Law and Contemporary Problems*, Vol. 29, No. 4, 1964 p.949.

These differing approaches were evident in the discussions concerning the principles that govern the behaviour of nations in outer space. The Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space was approved by the UN General Assembly in 1963. While the United States believed that this declaration was satisfactory, the Soviet Union argued that further measures were necessary, leading to the negotiation of an appropriate international treaty. The Soviet position gained support from other countries, resulting in the signing of the Space Treaty in 1967.[185] As a result, the principles established by the UN General Assembly resolutions gained binding effect and shaped the content of the following treaties.[186] The treaties adopted in the domain of outer space will be evaluated within the scope limited to this thesis.

3.3. International Space Law Treaties

3.3.1. The Outer Space Treaty

The Outer Space Treaty was made available for signature in the United States, the United Kingdom, and the Soviet Union on 27 January 1967, and came into effect on 10 October 1967. The treaty has been ratified by 113 nations, while an additional 23 nations have signed the treaty but have yet to complete the ratification process. The Outer Space Treaty establishes the fundamental framework for international space law.[187]

The treaty commences by acknowledging the shared interests of humanity in the peaceful exploration and utilization of space, emphasizing that its benefits should extend to all individuals, regardless of their level of economic or scientific advancement. The Outer Space Treaty firmly establishes the conviction that

[185] Gennady Zhukov and Yuri Kolosov, *International Space Law*, (Translated by. Boris Belizky), stereotyped 2nd edition, (Statut Publishing House, 2014), https://mgimo.ru/upload/2016/05/KOLOSOV_space_law_eng.pdf p.19-20 (Accessed on 10.07.2023).

[186] Ayten Selin Doğan, "Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi." p. 14.

[187] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.4

collaboration in space endeavours will foster mutual comprehension and strengthen amicable relations between nations and peoples. However, it is important to note that a precise definition of "peaceful purpose" has yet to be defined.

Article I of the Outer Space Treaty outlines the principles of benefiting all countries, non-discriminatory access to outer space, and the freedom of scientific investigation, encouraging international collaboration in these endeavours. It states that the exploration and utilization of outer space, including the moon and other celestial bodies, should be pursued for the collective benefit and interests of all nations, regardless of their level of economic or scientific progress. Furthermore, it emphasizes that outer space, along with the moon and other celestial bodies, should be open for exploration and use by all states without any form of discrimination. This access should be granted on the basis of equality, in accordance with international law, and unrestricted to all areas of celestial bodies. Moreover, the treaty emphasizes the freedom of scientific investigation in outer space, including the moon and other celestial bodies. It further urges states to facilitate and promote international cooperation in scientific research conducted in outer space.[188]

These principles are complex to understand and apply. Their meanings have been influenced by what countries are capable of and how they have been put into practice.[189] One ongoing debate concerns the interpretation of the "Common Interest" Principle, discussing whether it means a fair sharing of benefits or simply equal opportunities to access space. Previously, this concept mainly affected countries with space capabilities, but as technology advances, it now has implications for a wider range of nations.[190]

Article 2 provides that “(o)uter space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or

[188] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.4

[189] Daniel A Porras, "The Common Heritage of Outer Space: Equal Benefits For Most of Mankind," *California Western International Law Journal*: Vol. 37: No. 1, Article 5. (2006) p. 154.

[190] Ibid.

occupation, or by any other means."[191] This provision, which prohibits sovereignty in outer space and celestial bodies, has left a gap regarding the prohibition of property rights, thus giving rise to numerous ongoing debates in the present day. Due to the increasing impact of privatization in the 1980s, the role of the private sector in the space domain has expanded, leading to heightened debates on the interpretation of the non-appropriation principle. Encouraging the involvement of the private sector and establishing the necessary profit relationship within the emerging free market economy necessitates granting property rights to the private sector over the Moon and celestial bodies.

The Outer Space Treaty achieved significant compromises between Western and Eastern powers regarding the military's role in space. The Moon and other celestial bodies are designated exclusively for peaceful activities, strictly prohibiting any form of military installations even though the presence of military personnel is allowed.[192] Furthermore, the treaty prohibits the placement of nuclear weapons and weapons of mass destruction in outer space, effectively establishing a demilitarized zone. However, it is worth noting that reconnaissance satellites and non-nuclear/non-mass destruction weapons (such as anti-satellite weapons) have been interpreted as permissible under international space law.[193] Hence, the definition of peaceful activity varies from country to country. While the Soviet Union advocated for a complete ban on military activities, the United States interpreted peaceful actions as non-aggressive actions, allowing for the presence of military equipment and personnel in space.[194]

3.3.2. The Rescue Agreement

The Rescue Agreement came into force in 1968. The significance of this treaty lies in its establishment of the concept of "launching authority" and the assignment of

[191] The Outer Space Treaty, 1967.

[192] Eligar Sadeh, *Space Politics and Policy: An Evolutionary Perspective*, (SPRL, 2002) p.167.

[193] Ibid.

[194] Stacey L. Lowder, "Comment, A State's International Legal Role: From the Earth to the Moon, *7 TULSAJ. COMP. & INT'L L.* (1999) p.276

various responsibilities to the contracting states within this framework. The signatories undertake to aid in the secure return of astronauts or space objects to their respective home countries in case of an emergency landing. The primary objective of this agreement is to promote international cooperation and prevent potential international conflicts. Most provisions in the Rescue Agreement assign responsibilities to the "contracting parties" concerning lost astronauts within their jurisdictions.

According to the Article 2, in the event that spacecraft personnel experience an accident, distress, emergency, or unintended landing within the territory governed by a Contracting Party, immediate action must be taken to ensure their rescue and provide necessary assistance. The Contracting Party is obligated to inform both the launching authority and the Secretary-General of the United Nations about the measures being undertaken and their progress. If the involvement of the launching authority can contribute significantly to expediting the rescue or enhancing the effectiveness of search and rescue operations, the launching authority is expected to collaborate with the Contracting Party in order to facilitate the efficient execution of such operations. However, the direction and control of these operations rest with the Contracting Party, which will maintain close and continuous consultation with the launching authority.[195]

In general, the Rescue Agreement is widely regarded as a restatement of the principles already established in the Outer Space Treaty, elaborating on Article V of the Outer Space Treaty and provides further clarification on the responsibilities towards astronauts in distress and governments involved in the retrieval of misplaced technology.[196]

[195] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.10

[196] Daniel A. Porras, "The "Common Heritage" of Outer Space: Equal Benefits For Most of Mankind" *California Western International Law Journ*al: Vol. 37: No. 1, Article 5. (2006) Available at: https://scholarlycommons.law.cwsl.edu/cwilj/vol37/iss1/5 p. 158 (Accessed on 10.07.2023).

3.3.3. The Liability Convention

The International Liability for Damage Caused by Space Objects, also known as the Liability Convention, came into force in 1972. This treaty defined the necessary frameworks and instructions to address the issue of liability relating to damage caused by space objects.

The Convention begins by defining the concepts of “damage”, “launching”, “launching state”, and “space object”. The definition of these concepts is significant because the Outer Space Treaty and subsequent agreements do not establish a clear definition and boundaries of outer space. Therefore, it can be argued that this convention aims to shed light on the ambiguous aspects of outer space in international law. However, although this treaty assigns responsibility to countries for objects that cause damage, it does not address the issue of space debris.[197]

The Liability Convention clearly demonstrates a significant tendency against private enterprises while favouring state interests, which is characteristic of the initial phase of space law.[198] According to Article 2, a launching State is fully responsible for compensating any damage caused by its space object on the Earth's surface or to aircraft during flight.[199] However, according to Article 3, if damage occurs elsewhere to a space object or to individuals or property on board that space object, caused by a space object from another launching State, the latter will be liable only if the damage is a result of its own fault or the fault of those for whom it is responsible. If such damage caused to a space object or to individuals or property on board affects a third State, the first two States will be jointly and severally liable to the third State. The liability will vary depending on the location and circumstances of the damage.[200] The crucial point to be emphasized here is the absence of a defined definition for "fault"

[197]Timothy Justin Trapp, “Taking Up Space by Any Other Means: Coming to Terms with the Nonappropriation Article of the Outer Space Treaty”, *U. Ill. L. Rev*, Jun 30, (2013). p. 1692.

[198] Eligar Sadeh, “Space Politics and Policy” p. 168.

[199] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.14

[200] Ibid.

and the lack of a specified standard for the conduct of space activities.[201] Due to the challenging nature to determine the owner of a specific debris piece, The Liability Convention focuses on matters concerning the tangible destruction caused by a specific fragment of space debris, rather than the initial generation of debris.[202]

3.3.4. The Registration Convention

In 1976, the Convention on Registration of Objects Launched into Outer Space (Registration Convention) entered into force, requiring countries to register their launches in a national database and the United Nations Space Objects Registry.

Article 4 states that each State that registers a space object must provide specific information to the Secretary-General of the United Nations. This information includes the name of the State or States responsible for the launch, a suitable identifier for the space object or its registration number, date of launch and the territory or location from which it occurred, and fundamental orbital characteristics and general purpose or function of the space object.[203]

3.3.5. The Moon Agreement

The limited number of states with the capability to benefit from outer space and celestial bodies has led to concerns about the accessibility of these resources for less developed countries. To address this issue, two proposed treaties were presented to COPUOS, one by Argentina with the backing of the United States, and another by the Soviet Union.[204] These proposals sparked controversy regarding the desire of less developed nations to preserve their interests in an industry they were not yet able to access. Eventually, the Soviet Union's version was adopted as the initial draft of the

[201] Robert P. Merges and Glenn H. Reynolds, "Rules of the Road for Space?: Satellite Collisions and the Inadequacy of Current Space Law", *Environmental Law Institute*, (2010)

[202] Timothy Justin Trapp, "Taking Up Space by Any Other Means"

[203] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.14

[204] Daniel A. Porras, "The "Common Heritage" p. 160.

United Nations' Moon Treaty, governing the activities of states on the Moon and other celestial bodies.[205]

The Moon Agreement was officially approved by the UN General Assembly in 1979. The Agreement reinforces and expands upon numerous provisions of the Outer Space Treaty, specifically addressing the utilization of the Moon and other celestial bodies. It emphasizes the exclusive use of these bodies for peaceful purposes, the preservation of their environments, and the obligation to notify the United Nations about the establishment and objectives of any stations located on them.[206] Nevertheless, due to the limited number of 18 States[207] that have been parties of the Treaty, none of which lead the space exploration, the Moon Agreement is widely acknowledged as having minimal to negligible significance within the realm of international law.[208]

The reason for the non-ratification of the Moon Treaty by the United States, Soviet Union, and China lies in its prohibition of asserting claims on space resources and its aim to establish an international regime for the utilization of such resources. The Moon Treaty elaborates on Article 2 of the Outer Space Treaty by stating that

> neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person.[209]

The concept of the "common heritage of mankind" is mentioned in Article 11 of the Moon Treaty, which declares that the moon and its natural resources belong to all of

[205] Ibid.

[206] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.30

[207] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.30

[208] Jonathan Sydney Koch, "Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining", *Astropolitics*, 16:1, (2018) p.1-27.

[209] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.30

humanity.[210] The Article further stipulates the eventual creation of an international regime to oversee the utilization of the moon's natural resources as their exploitation becomes practically viable. Article 11 states that, the primary objectives of the future international framework that will be established are ensuring the systematic and secure advancement of the moon's natural resources, promoting the responsible administration of these resources, enhancing possibilities for utilizing these resources and ensuring fair distribution of the benefits derived from these resources among all participating states, with special regard given to the interests and requirements of developing nations, as well as the contributions made by countries directly or indirectly involved in moon exploration.[211] However, as of now, such a framework does not exist.

3.4. Current Debates on International Space Law

3.4.1. The Uncertainty in Defining Outer Space: What is the Starting Point of Outer Space?

From the perspective of international law, the Outer Space Treaty, as legally binding, and the subsequent international agreements do not provide a specific definition for outer space. However, in the OST and other treaties, the term “the other celestial bodies” is consistently used in conjunction with the Moon. Goedhuis argues that international treaties should be interpreted to include the term “Moon and the other celestial bodies” in defining outer space.[212]

It is important to define the boundary between airspace and outer space due to the differing legal regimes that apply to each.[213] According to the principle known in

[210] The Moon Treaty, 1979.

[211] The Moon Treaty, 1979.

[212] D. Goedhuis, “An Evaluation of the Leading Principles of the Treaty on Outer Space of 27th January 1967”, *Netherlands International Law Review*, 15:1, (1968). p. 29.

[213] Ayten Selin Doğan, “Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi” p. 56.

international law as "*cuius est solum, eius est usque ad coelum et ad inferos*"[214], the airspace mass above a state's land and sea territory is considered to be part of its sovereign domain.[215] Due to the lack of technological developments enabling the exploration of outer space prior to Sputnik-1, there was no need to determine an air-space boundary.[216] As pointed out by the Latin maxim, it was presumed that state sovereignty extended throughout the infinity of space.[217] The distinction between airspace and outer space and the inclusion of airspace within a state's sovereign territory have sparked debates regarding the definition of the starting point of outer space. While some argue that drawing such a boundary is not necessary as no issues have arisen thus far[218], there is a possibility that developments in technology may give rise to problems between states in the future.[219]

The right to property is protected under state sovereignty.[220] Therefore, the importance of defining the boundary between airspace and outer space is also significant in terms of defining the limits of property rights. This topic will be further examined in detail in the following pages.

States have different practices regarding the definition of the limits of airspace, and there are various theories on this matter.

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[214] In Latin, it means "whoever owns land it is theirs up to the heavens and down to hell" https://www.oxfordreference.com/display/10.1093/acref/9780199664924.001.0001/acref-9780199664924-e-4660;jsessionid=304F781A67C0B783F5ADF97048BCF047 (Accessed on 10.07.2023).

[215]Ayten Selin Doğan, Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi p. 55.

[216] Christy Collis, "Territories beyond possession? Antarctica and Outer Space", *The Polar Journal*, 7:2, (2017) p.287-302.

[217] For an examination of the evolving interpretations of this Latin maxim throughout the ages and its impact on aviation laws, reference can be made to the following source: Yehuda Abramovitch, "The Maxim 'Cujus Est Solum Ejus Usque Ad Coelum'" *Aviation*, Vol 8 (McGill University Institute of Air and Space Law Publication, 1962)

[218] S. Neil Hosenball and Pierre M Hartman, "The Dilemmas of Outer Space Law", *American Bar Association Journal*, Vol 60: 3, (1974), p 302; I.H.Ph. Diederiks-Verschoor and V Kopal, *An Introduction to Space Law*, 3rd Revised Edition, (Netherlands:Wolters Kluwer, 2008) p. 15.

[219] Ayten Selin Doğan, "Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi" p. 56-57.

[220] Morris R. Cohen, "Property and Sovereignty", *Cornell Law Quarterly*, 13:1, (1927) p. 13

3.4.2. Bogota Declaration and the Inequality Problems

The lack of a clear demarcation between airspace and outer space has resulted in certain states making claims of sovereignty over space. In 1976, a group of eight Equator states, including Brazil, Indonesia, Ecuador, Zaire, Congo, Uganda, Colombia, and Kenya, gathered in Bogota and released a declaration asserting their rights to the specific portion of the geostationary orbit that passes over their territories. This declaration, known as the 1976 Bogota Declaration, argued that the geostationary orbit, which is influenced by Earth's gravitational forces, should be considered a natural resource belonging to the Earth rather than a part of outer space. These states maintained that the 1967 Outer Space Treaty does not include any provisions defining the lower boundary of space, and therefore claimed sovereignty over the Earth-centered orbit.[221]

The geostationary orbit, known as the geostationary belt or fixed orbit, is positioned at an altitude of approximately 36,000 kilometers above the equator. Objects in this orbit synchronize their rotation with the Earth's rotation, resulting in a satellite placed in this orbit maintaining a fixed position relative to a specific point on Earth. While the geostationary orbit offers significant technical advantages, its capacity to accommodate satellites is limited, making it a scarce natural resource.[222] The International Telecommunication Convention of 1973, particularly Article 33, addresses the rational utilization of the radio frequency spectrum and the geostationary satellite orbit. It regulates the geostationary orbit as a finite natural resource, emphasizing the importance of efficient and economical use by all nations. The convention also highlights the need for fair access to the geostationary orbit, considering the specific requirements and technical capabilities of each state, in accordance with the Radio Regulations. Drawing on Article 33, it can be concluded that the geostationary orbit is considered a *res communis*, a shared resource. Due to its limited availability and potential for use by all nations, the geostationary orbit has

[221] "Declaration of the First Meeting of Equatorial Countries (Adopted on December 3, 1976)" https://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html (Accessed on 10.07.2023).

[222] I.H.Ph. Diederiks-Verschoor and V Kopal, "An Introduction to Space Law", p.99.

become a subject of sovereignty claims.[223] According to the equatorial states, this limitation is a basis for sovereignty to exist. However, according to Goedhuis, the crucial factor is not whether the geostationary orbit is a natural resource, but whether it is part of space or not, as there is no inherent distinction between this orbit and any other orbit in space.[224]

During the drafting of the Outer Space Treaty, the equatorial states lacked sufficient scientific input and were unable to thoroughly assess the deficiencies, contradictions, and implications of the draft text.[225] Consequently, despite having signed the treaty in 1967, these states later issued a declaration asserting their sovereign rights over the geostationary orbit after a significant period of time had elapsed. According to the Bogota Declaration, the 1967 Outer Space Treaty did not provide a definition of space, and there is no valid or satisfactory definition available to support the argument that the geostationary orbit is considered part of space. The absence of a clear definition of space in the 1967 Treaty is considered a limitation, and Article II, which prohibits state sovereignty in space, should not be applied to the geostationary orbit. As a result, the equatorial states that have already ratified the 1967 Outer Space Treaty maintain their rights over the geostationary orbit without being constrained by the rule that prohibits state sovereignty in space.[226]

Despite the prohibition of de jure claims of sovereignty over the geostationary orbit in space law, the dominant spacefaring nations have utilized the orbit to a greater extent than developing nations. This has resulted in a situation where the satellites of these dominant nations occupy a significant portion of the orbit, effectively establishing their control over it. Consequently, it is unlikely that the Bogota

[223] Zeynep Seyitoğlu Danışman, Uzayda ve uzaydaki gök cisimleri üzerinde devlet egemenliği ve mülkiyet, (Master Thesis: Gazi University: Ankara, 2019) p.80.

[224]D. Goedhius., "Influence of the Conquest of Outer Space on National Sovereignty: Some Observations", *Journal of Space Law*, Vol 6:1 (1978), p.41.

[225] Stanley B Rosenfield, "Where Air Space Ends and Outer Space Begins", *Journal of Space Law*, Vol 7:2, (1979) p.141

[226]"Declaration of the First Meeting of Equatorial Countries (Adopted on December 3, 1976)" https://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html (Accessed on 10.07.2023).

Declaration, which asserts sovereignty rights over the geostationary orbit, would be acknowledged by other states involved in space activities.[227]

Throughout history, the space efforts of developed nations have often marginalized or posed threats to the interests of less developed nations. In the near future, countries like Brazil and Indonesia may enter the realm of space activities and seek to attain equitable benefits comparable to those enjoyed by contemporary spacefaring nations. However, the underlying challenge of ensuring that less developed countries have opportunities to benefit from space advancements through international regulations remains unresolved. Future revisions of international space law should carefully consider the concerns and interests of less developed countries in their pursuit of space activities.[228]

3.4.3. Debates over Property Rights in Outer Space

The principle commonly known as "non-appropriation", which declares that outer space, including celestial bodies such as the moon, cannot be subjected to national ownership, is one of the fundamental principles of space law. The Outer Space Treaty includes other articles that support and define the boundaries of this principle. For instance, the principle of conducting space activities in accordance with the interests of all humanity supports the non-appropriation principle. Additionally, provisions regulating the purposes of future space facilities and the jurisdiction and supervision rights of states in space are related to the implementation of the non-appropriation principle.[229]

However, despite the prohibition of asserting sovereignty in outer space "by claim of sovereignty, by means of use or occupation, or by any other means", there are still

[227] Zeynep Seyitoğlu Danışman, "Uzayda ve uzaydaki gök cisimleri üzerinde devlet egemenliği ve mülkiyet" p.83.

[228] Karl Leib, "State Sovereignty in Space: Current Models and Possible Futures". *Astropolitics*, Vol 13:1, (2015) p.11.

[229] Zeynep Seyitoğlu Danışman, "Uzayda ve uzaydaki gök cisimleri üzerinde devlet egemenliği ve mülkiyet", p.56.

some ambiguities regarding its exact meaning. The transformative impact of technological activities on the development of the space sector and the growing significance of the private actors within this industry have also increased debates on how to interpret these ambiguities. The next chapter of this thesis will examine the role of the private sector in the transformation of collaboration and competition within the space domain in the present day. Therefore, the legal debates in this field will be addressed under this title.

Territorial areas on Earth have been classified in various ways in international law. Apart from a state's sovereign territory, *terra nullius* and *res communis* are legal domains. In addition to these two terms, the 1979 Moon Agreement and the 1982 UN Convention on the Law of the Sea have included the "common heritage of mankind" regime into international law.[230]

Terra nullius territories, while not under the sovereignty of any state, can be acquired or claimed by states, and they can be appropriated later, potentially becoming subject to claims of sovereignty by multiple states. *Res communis*, on the other hand, indicates areas that are legally incapable of being owned or controlled. These areas do not belong to any state's sovereignty but are open for the use of all states with unlimited access rights. These areas cannot be legally controlled by any state or group of states without the permission of the international community.[231]

The utilization and exploration of outer space have been declared free for all humanity for peaceful purposes through the 1967 Outer Space Treaty, while the declaring of sovereignty in space is also prohibited. This situation indicates the confirmation of outer space as *res communis*.[232]

The principle of the free use of outer space contains the term "use," and the nature of this utilization remains a subject of debate. Legally, "utilization" includes the right to

[230] Ibid p.56.

[231] Ibid.

[232] Ibid.

benefit from owned objects. However, is it possible to obtain ownership rights over extracted materials when land ownership is not possible? Two perspectives stand out here: one viewpoint distinguishes the moon and other celestial bodies from the materials derived from them, while stating that property rights can only be claimed over the extracted materials, given that sovereignty is not claimed over the moon and other celestial bodies. The other viewpoint, on the other hand, completely rejects the notion of property rights in space without making such a distinction.[233] This debate is at the core of the domestic regulations implemented by the United States governments in order to incentivize the private sector in the space domain, as well as the establishment of the Artemis Accords. However, a consensus has yet to be reached on this matter. The domestic regulations implemented by the United States, namely the 1984 Commercial Space Launch Act, the 2004 Commercial Space Launch Amendments Act, and the 2015 Commercial Space Launch Competitiveness Act, will be further examined in the following chapter. In this chapter, it is sufficient to state that the common feature of these three acts is to encourage private sector participation in space activities and regulate the conditions of this participation. The first act in which the United States made regulations regarding the scope of the non-appropriation principle is the 2015 Commercial Space Launch Competitiveness Act. This act is the world's first national regulation that foresees the possibility of appropriating extracted materials. The fourth title of this act states as follows:

A U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell it according to applicable law, including U.S. international obligations.[234]

The key argument behind this regulation is that it does not violate the non-appropriation principle due to the fact that the US does not claim sovereignty over any celestial body.[235]

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[233]Ayten Selin Doğan, "Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi", p. 41.

[234] "H.R.2262 - U.S. Commercial Space Launch Competitiveness Act 114th Congress (2015-2016)" https://www.congress.gov/bill/114th-congress/house-bill/2262 (Accessed on 10.07.2023).

[235] Ibid.

There is also a debate regarding the parties subjected to the prohibition of claiming property rights in space. The Outer Space Treaty does not specifically mention private companies, leading to the existence of an argument claiming that private companies cannot be subjected to this prohibition. In contrast, the opposing viewpoint suggests that during the time the Outer Space Treaty was discussed, there were no private sector actor operating in space, and therefore, the treaty did not include provisions for private companies. Considering the circumstances of that time, it can be argued that this prohibition is valid for private companies, too.[236]

3.4.4. Common Heritage of Mankind and Establishing an International Regime over Space Resources

The Common Heritage of Mankind (CHM) doctrine, was stated in The Moon Treaty firstly, had become a contested arena for interpretation between developing and the Western developed countries. Both sides sought to interpret this doctrine in a manner that aligned with their respective interests. While representatives of developing countries put forward the CHM principle as an economic-corporative challenge to the hegemony of the Global North, Western developed states attempted to utilize this doctrine as a tool to transform international law in line with their own hegemonic agenda.[237]

The term "common heritage of mankind" is not present in the text of the Outer Space Treaty. According to Article 1 of the treaty, “The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.”[238] However, the treaty does not provide a definition for the term “the province of all mankind”, leading to ambiguity regarding the status of outer space.

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[236] Ayten Selin Doğan, “Uzay Hukukunda Milli İktisaba Konu Olmama İlkesinin Yeniden Değerlendirilmesi” p. 46.

[237] Greg Melchin, "You Can't Take the Sky from Me: A Gramscian Interpretation of the Common Heritage of Mankind Principle in Space Law", *24 Dal J Leg Stud*, (2015), p.146-147.

[238] International Space Law: United Nations Instruments, (New York: United Nations Publication, 2017) p.30

The concept of the "common heritage of mankind," put forth by Maltese Ambassador Arvid Pardo in his 1967 speech to the United Nations General Assembly, recognizes the seabed and ocean floor as the common heritage of humanity, to be utilized for peaceful purposes and for the benefit of all humanity. In supporting this claim, Pardo argued against considering the seabed as *res nullius*, as he believed it would lead to a scramble for the exploitation of seabed resources and result in "serious" global instability. Developing countries held the expectation of facilitating the redistribution and equitable sharing of the wealth and benefits derived from both the deep seabed and celestial resources, considering that these resources would be exploited by advanced nations in a short time.[239]

The Moon Treaty signifies the aspiration of developing countries to establish a global framework that would regulate the utilization of resources in outer space in accordance with the principle of common heritage of mankind, aiming to prevent spacefaring superpowers from creating a hegemony through international law.[240] From this perspective, the concept of "common heritage" has been interpreted by developing countries as an area that is collectively owned and accessed, approved by the international community.

3.5. Conclusion

The successful launch of Sputnik-1 by the Soviet Union in 1957 led to discussions within the United Nations regarding the legal issues that could arise from space exploration, resulting in the establishment of certain rules and principles. However, ambiguities in the treaties have led to debates or differences in interpreting certain principles. The Outer Space Treaty and following international agreements do not provide a specific definition for outer space. Additionally, there are variations in the application framework of the principle of “non-appropriation” among nations. These ambiguities stemmed from the different ideologies and different positions that the US and the USSR pursued. Unlike the Soviet Union, the United States did not support

[239] Greg Melchin, “You Can't Take the Sky from Me”, p.147

[240] Ibid p.149.

complete disarmament and because of this, in treaties regarding the outer space for instance, the term “peaceful purpose” has not been defined. This situation opened the way for different interpretations and implementations. The absence of the term “common heritage of mankind” in The Outer Space Treaty and the responsibilities associated with this principle have also been subjects of debate among countries. These differences in the interpretation of international law, combined with the increasing activities of private space companies, have led states to develop different practices. The impact of these variations in practices on international competition will be examined in the following chapter.

CHAPTER 4

INTERNATIONAL COOPERATION AND COMPETITION AT THE AGE OF COMMERCIALIZATION OF THE OUTER SPACE IN THE POST-COLD WAR YEARS

4.1. Introduction

After the Soviet Union disintegrated in 1991, the United States and its leadership in the liberal economic model asserted itself as the main actor in the international capitalist order. During the 1990s, the relative weakness in power of nations such as Russia and China permitted the United States to maintain its unipolar dominance in the global capitalist system. However, since the early 2000s, both China and Russia have been challenging this unipolar paradigm, leading to geopolitical tensions and competition with the US on various occasions. This geopolitical rivalry has also extended to the space domain, especially with the acceleration of commercialization in outer space.

This chapter is to examine the growth of commercialisation in outer space after the Cold War. It also covers the space initiatives of developing countries, along with major space players such as the United States, Russia, China, India, and the European Union. In addition, the chapter concentrates on NASA's Artemis Program, which was started in 2017. This chapter covers the Artemis Accords, which govern other governments' involvement in the Artemis Program. The analysis in this chapter seeks to explore the current state of space activities and explore potential directions for future international relations in the field of space.

4.2. Commercialization of the Outer Space

In the post-Cold War years, outer space has grown and become more eclectic among multiple industries owing to noteworthy technological innovations.

Investments from private companies and the widening of space usage by governments have also contributed significantly in the expansion process. The dismantling of the inter-systemic competition in the aftermath of the Cold War, and the transition to a new international order marked by geopolitical struggles among the capitalist countries, played a pivotal role broadening of the space industry, moving away from being only focused on military ventures. Given these developments, it is essential to explain the differences between certain concepts and provide information about the ongoing status of the aerospace industry before evaluating current space relations, as private companies are now also becoming actors in this field.

Both government agencies and independent space companies are actively pursuing space exploration initiatives. The difference among them is that whereas government agencies are set up by authorized government bodies and held by the states themselves, private space companies as the name clearly states, are privately owned. But the most crucial distinction between them is that government space agencies are responsible for a country's administration of space operations.[241] Another important aspect to highlight in this context related to this matter is the reality that business entities are not covered in the Outer Space Treaty. This implies, as stated by the treaty, only states have the authority and liable for tasks beyond Earth's atmosphere. Consequently, private companies are unable to operate independently and execute actions without the permission and involvement of the states.[242]

Categorizing private space companies is challenging as the space sector is directly or indirectly related to numerous other industries. Moreover, the services that can be offered vary depending on the orbits, and there are companies capable of providing diverse services under their own umbrella. For instance, the company SpaceX provides more than just a cargo transportation services to the International Space

[241]Darija Maraš and Miloš Dangubić, "Cooperation Between Government Agencies and Private Companies in Space", p.227.

[242] The Outer Space Treaty, 1967.

Station(ISS)[243] in low Earth orbit (LEO) but also offers commercial crewed flight services[244] as well. Apart from SpaceX, also other companies, namely Sierra Space and Blue Origin is planned to collaborate with NASA to achieve some missions for ISS.[245] Blue Origin has the capacity to provide suborbital orbital services for tourism purposes as well.[246] Therefore, it can be argued that classifying private space companies into a single category is often not possible.

The space sector is a domain that interacts with numerous industries, allowing for numerous classifications. The classification provided in the report released by Space Angels in 2019 will be used in this thesis. According to this research, in the space sector, the following categories are considered to be fundamental: "launch, satellites, industrials, logistics, biospheres, interplanetary, information & research, and finally media & education".[247] Regarding the commercialization of space, it should be emphasized that commercialization necessitates a change in the state's function, with less direct engagement in space activities and increasing commercial actors' independence in their space activities.[248] The US Commercial Space Act of 1998 provides a definition of "commercial provider" as:

[243] Josh Dinner, "SpaceX launches Dragon cargo capsule to space station, lands rocket at sea (video)", *Space*, June 05, 2023 https://www.space.com/spacex-crs-28-cargo-mission-june-2023 (Accessed on 22.07.2023).

[244] Michael Sheetz, "SpaceX launches Crew-6 mission for NASA, sending four more astronauts to the space station", CNBC, March 2, 2023 https://www.cnbc.com/2023/03/02/spacex-launches-nasa-crew-6-mission.html (Accessed on 22.07.2023); "Watch live as SpaceX launches four commercial astronauts to the space station", Youtube video, 4:24:38 https://www.youtube.com/watch?v=mmCU1wY8Es8 (Accessed on 22.07.2023).

[245] "Sierra Space and Blue Origin Successfully Complete Orbital Reef System Definition Review", *Sierra Space*, August 22, 2022 https://www.sierraspace.com/newsroom/press-releases/sierra-space-and-blue-origin-successfully-complete-orbital-reef-system-definition-review/ (Accessed on 22.07.2023).

[246] Michael Sheetz, "How SpaceX, Virgin Galactic, Blue Origin and others compete in the growing space tourism market", CNBC, September 26, 2020 https://www.cnbc.com/2020/09/26/space-tourism-how-spacex-virgin-galactic-blue-origin-axiom-compete.html (Accessed on 22.07.2023)

[247] According to the report, these industries are further divided into numerous subcategories. The specific headings can be accessed from the following link: Space Capital, "US Government Support of the Entrepreneurial Space Age", *Space Angels*, June 20, 2019 https://www.spacecapital.com/publications/us-government-support-of-entrepreneurial-space-age-nasa-jpl (Accessed on 22.07.2023).

[248] Irina V. Louts, Space Cooperation Under Anarchy: Commercialization of Outer Space and Space Security in the Post-Cold War Era, (PhD Thesis, Old Dominion University, 2004), (Accessed on 22.07.2023).

> (…) any person providing space transportation services or other space-related activities, primary control of which is held by persons other than Federal, State, local, and foreign governments[249]

Similarly, the Russian Federal Law on Commercial Space Activity defines "commercial space activity" as:

> (…) independent space activity performed in line with the existing legislation by legal entities and natural persons at their risk and aimed at gaining systematic profits and other benefits from sales of goods, performing work or rendering services in the field of exploration and use of space (…)[250]

The first thing to stress in the context of space commercialization is that commercialization and privatization are two different things. Privatization is not always necessary for commercialization. Ownership does not need to change in order to enable commercialization. Commercialization can take place within state-owned businesses as well. Therefore, while privatization can be identified as a goal of commercialization in a capitalist system, commercialization activities do not definitely have to be accompanied by privatization.[251] State-owned businesses dominate the market relationships in the examples of Russia and China's space sectors, and privatization has not yet taken hold there to a significant extent.[252]

During the 1960s, when research and development projects for space exploration first began, the potential for commercial satellites and other technologies to be used in both military and civilian sectors was recognized. The economic opportunities presented by outer space activities were recognized in advance, but governments, especially the United States, supported their development while ensuring careful oversight of the technology's current and future applications, considering its dual-use

[249] "Text - H.R.1702 - 105th Congress (1997-1998): Commercial Space Act of 1998." October 28, 1998. https://www.congress.gov/bill/105th-congress/house-bill/1702/text. (Accessed on 22.07.2023)

[250] Russian Federation, Federal Law on Commercial Space Activity, Chapter 1, April 1997 https://www.jaxa.jp/library/space_law/chapter_4/4-1-1-5/4-1-1-51_e.html (Accessed on 22.07.2023).

[251] Louts, "Space Cooperation Under Anarchy", p.127.

[252] Ibid.

nature.[253] Governments supported commercial space activities in areas they found useful and controllable. Initially, the focus was on technologies with direct military applications, particularly in the field of space launch, where the government already held dominance.[254] During this period, the development of launch and satellite technologies was costly and had uncertain economic returns. Consequently, the private sector, particularly big companies in the telecommunications and aerospace industries, took the lead in pursuing space technology development, often operating as defence contractors for the government.[255] The risk of private sector actors losing future contracts if they did not conform to government requirements also helped maintain the government's authority in the space sector.[256] Governments also provided significant funding for research and development of new technologies.[257]

Beginning from the 1980s and particularly with the end of the Cold War, a new political-economic approach that has influenced international space transactions is the rise of neoliberal economic policies. This has caused drastic changes for many states involved in global space assets trade. The state's involvement in the national economy has decreased, causing state-owned industries to be privatized with market forces determining prices for goods and services.[258] However, the fact that space activities serve multiple purposes and the dual-purpose nature of space activities, governments tend to safeguard their national space sectors considering the importance of national security. This pressure to safeguard space industries exists for less economically developed states compared to the United States and the leading space-faring countries.[259]

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[253] Roger Handberg, *International Space Commerce: Building from Scratch*, (Florida: University Press of Florida, 2006) p.10.

[254] Ibid p.11.

[255] Ibid.

[256] James R. Myers, "US Commercial Space Ventures", *Harvard International Review*, Vol7:5, (1985) p.39-43.

[257] Ibid.

[258] Roger Handberg, *International Space Commerce: Building from Scratch*, (Florida: University Press of Florida, 2006) p.13.

[259] Ibid.

While working towards making space a commercial enterprise, the United States set its priorities on directing and overseeing its progress to strengthen and protect its economic and technological superiority compared to other nations. The United States actively and persistently pursued these goals. Initially, some countries opposed these efforts, but the United States' dominance in space launches allowed it to maintain its objectives.[260]

Handberg examines the history of space exploration and divides it into three distinct periods. The first period, spanning from 1946 to 1966, is referred to as the developmental period. During this time, government agencies had complete control over space activities, and there were no commercial entities involved. The second period, from 1966 to 1986, is known as the quasi-commercial period. It was during this time that private actors started to participate in space activities, and there was a gradual separation between public and private efforts in outer space. The third period, which began in 1986 and continues to the present day, is characterized as the period of space commercialization. This period witnessed the emergence of independent private enterprises in outer space, operating separately from government influence and control.[261]

The most important point that should be emphasized regarding the private sector activities during the Cold War is that the Cold War was more than just a military or industrial competition. The ideological rivalry between the United States and the Soviet Union, which presented their separate camps as models for a world order during this stage, influenced the shape and the rules of space race. The role of capitalism was heavily discussed and completely rejected by the Soviet Union. This ideological rivalry was especially noticeable in the making of space law. The Outer Space Treaty, signed in 1967, holds nations responsible for all space activities, does not matter if performed by governments or non-governmental organizations. Private enterprises were not regarded as space actors in the treaties negotiated during this period of history due to ideological rivalry with the Soviet Union.

[260] Ibid. p.38.

[261] Irina V. Louts, “Space Cooperation under Anarchy” p.131.

4.3. Space Policies in the 21st Century and the Rise of the Space Industry

During much of the Cold War, from the launch of Sputnik onwards, exploration and utilization of outer space were primarily driven by military competition between the two superpowers of the era, the United States and the Soviet Union. However, following the end of the Cold War, a new era of space exploration emerged, characterized by an increasing emphasis on commercial competition.[262] Research indicates that the American space economy showed an increase of $31 billion since 2012, reaching a gross output of $211.6 billion in 2021 and provided approximately 360,000 employment opportunities within the private sector.[263] According to "The Space Report 2021 Q2", the global space economy reached $447 billion in 2020, with commercial space activities accounting for $357 billion, representing 80% of the total economy.[264] Government spending on space amounted to $90.2 billion in 2020, with the United States contributing 58% of this total.[265] In the 21st century, unlike the Cold War era, the commercialization of space coexists with military utilization of outer space.

In today's world, space technology and information technology have progressed in parallel, leading to the widespread integration of space utilization into everyday life. Satellites are utilized in various fields, ranging from telecommunications to television and radio broadcasting, as well as satellite-based weather forecasting and navigation systems. Banks and financial institutions worldwide now depend on satellites for conducting their global transactions. The advancements in information and space technologies have resulted in transformative changes in significant sectors

[262] Ibid. p.7-11.

[263] Tina Highfill and Chris Surfield, "New and Revised Statistics for the U.S. Space Economy, 2012–2021," *The Journal of the U.S. Bureau of Economic Analysis*, June 27, 2023, https://apps.bea.gov/scb/issues/2023/06-june/0623-space-economy.htm (Accessed on 23.07.2023).

[264] "Global Space Economy Rose to $447B in 2020, Continuing Five-Year Growth", Space Foundation, July 15, 2021 https://www.spacefoundation.org/2021/07/15/global-space-economy-rose-to-447b-in-2020-continuing-five-year-growth/ (Accessed on 23.07.2023).

[265] Ibid.

of the modern economy, consequently impacting society and the state, as well as the military.[266]

By engaging in Public-Private Partnerships (PPP), government agencies in the civil and defense sectors join forces with commercial organizations to jointly develop and offer space technologies to the wider public and commercial sector, reducing costs. Consequently, there has been an increase in the availability of space capabilities, the introduction of innovative technologies, a reduction in the cost of space access, and a significant growth in the space market.[267] The involvement of nations in space efforts and the global user base of space technologies have experienced significant growth at a rapid pace. As a result, there has been a transformation in the commercialization of various applications, services, and infrastructures in the space industry, effectively turning space technology into a valuable commodity that can be traded.[268] These developments in the space domain also have an impact on the dynamics of relationships among spacefaring nations, as referred to by Paikowsky as the "space club".[269]

4.3.1. The American Space Policy after the Cold War

The commercialization of space primarily influenced commercial space efforts pioneered by the United States during the Cold War era. European players joined the

[266] Irina V. Louts, "Space Cooperation under Anarchy", p. 2.

[267] An example of the use of space technologies can be seen during the Gulf War that took place between 1990 and 1991, where the utilization of Global Positioning System (GPS) technology played a significant role. The active deployment of this technology during the war even led to it being referred to as the "first space war". For more detailed information: Larry Greenemeier, "GPS and the World's First 'Space War'", Scientific American, February 8, 2016 https://www.scientificamerican.com/article/gps-and-the-world-s-first-space-war/ (Accessed on 23.07.2023); Sir Peter Anson Bt and Dennis Cummings, "The first space war: The contribution of satellites to the gulf war", *The RUSI Journal*, 136:4, (1991),; Sharon Watkins Lang, "SMDC History: 25 years since first 'Space War'", U.S Army, January 20, 2016 https://www.army.mil/article/161173/smdc_history_25_years_since_first_space_war (Accessed on 23.07.2023) ; Charles Pope, "30 years later, Desert Storm remains a powerful influence on Air, Space Forces", Air Force, February 23, 2021 https://www.af.mil/News/Article-Display/Article/2512938/30-years-later-desert-storm-remains-a-powerful-influence-on-air-space-forces/ (Accessed on 23.07.2023).

[268] Deganit Paikowsky, *The Power of the Space Club*, (Cambridge: Cambridge University Press, 2017) p.178-179.

[269] Ibid.

area of commercialization with support from the United States, aiming to achieve orbit, but their interaction remained strained due to competitive factors. In contrast, the Soviet Union strongly opposed any capitalistic exploitation of outer space.[270]

Private funds have played a significant role in the space activities of the United States from the beginning. In the United States, the first private investments in space were made in the 19th century to support large observatories through private funds.[271] For instance, Robert Goddard, a pioneering figure in the space field carried out his projects with the help of funds provided by the private organizations.[272]

However, as the Cold War began, particularly with the successful launch of Sputnik-1, the dominance in the field of space and rocketry shifted towards the public sector, and the US government took control of all research and development efforts related to space exploration during the space race. The United States adopted an aggressive space strategy in order to regain its national prestige and international reputation.[273]

During the early years of the space age, the space industry required significant investments that private enterprises could not support on their own without government assistance. Space exploration was a risky business, and the costs of research and development, as well as equipment and facility charges, were prohibitively expensive. Scientists, engineers, and employees participating in these projects were also needed to pay high prices. As a result, besides national security objectives, private enterprises also relied on government assistance to develop an effective industrial sector in space.[274]

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[270] Roger Handberg, *International Space Commerce: Building from Scratch*, (Florida: University Press of Florida, 2006) p.9-10.

[271] Bhavya Lal, "A Brief History of Government Policies to Promote Commercial Space", *Journal of the Washington Academy of Sciences*, Vol 99:3, (2013), p.20.

[272] Ibid.

[273] Shane Chaddha, "U.S. Commercial Space Sector: Matured and Successful", *Journal of Space Law*, 36:1 (2010) p.4 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1493720 (Accessed on 23.07.2023).

[274] Ibid.

In contrast to the Soviet Union, which received government funding, the private sector supported the advancement of space technology in the United States during the Cold War. These businesses not only served as sponsors for NASA's and the Department of Defense's initiatives but also made significant advancements in the commercial satellite domain. The Atlas rockets were created by Convair, the first private space enterprise, and were meant to compete with the Soviet Union in the early Space Race. The deployment of Atlas rockets allowed Americans to complete their first manned orbital trip in 1962 as part of America's first manned space program, Mercury.[275] On July 10, 1962, Telstar, the first privately funded communication satellite, was launched into space with help from the American government. Among the many services offered by this satellite were direct television broadcasts. Additionally, Hughes Space and Telecommunications Company worked together with NASA to develop the geosynchronous equatorial orbit (GEO) satellite, which was a huge success.[276]

In 1962, during the Kennedy Administration, the Communications Satellites Act was put into effect. The main objective of this act was to establish a more advanced global communication network that could meet the communication requirements of the United States and other countries by utilizing improved technology and providing better quality services. To achieve this, the US government granted legal ownership and operation of the international communication network to private companies, which encouraged the involvement of the private sector. With the help of this strategy, the United States was able to keep up its position as the industry leader in commercial telecommunications. This law led to the creation of the Communications Satellite Corporation (COMSAT), which operated as a partnership between the public and private sectors. COMSAT was given exclusive control over satellite communications, but it was also subject to government supervision and regulations.[277] This law resulted in the formation of the Communications Satellite

[275] Maraš and Dangubić, "Cooperation Between Government Agencies and Private Companies in Space" p.228-229.

[276] Chaddha, "U.S. Commercial Space Sector" p. 4.

[277] Lal, "A Brief History of Government Policies to Promote Commercial Space" p. 28.

Corporation (COMSAT), which functioned as a public-private partnership. Actually, COMSAT, which was a trade consortium, was a privately organized corporation comprised of numerous different companies such as Western Union, RCA Global, and AT&T. Although COMSAT was given sole power over satellite communications, it was nevertheless subject to government oversight and regulations. The most significant aspect of the act organized in 1962 was its legal reflection of American policy during the Cold War years: allowing private companies to participate in space activities, albeit in a limited scope, despite the Soviet Union's existence. Furthermore, in 1964, the International Telecommunications Satellite Organization (Intelsat) was established in response to the growing global need for satellite telecommunications. Intelsat gave each country control of its international satellite communications.[278]

During the 1980s, there was a refreshment of interest in the private sector's involvement in the space industry. Arianespace, a French company with majority ownership by the French government, emerged as the pioneer in providing commercial launch services worldwide. It quickly gained dominance in the launch sector, surpassing the United States, and maintained this leadership until the achievements of SpaceX[279], an American space company, in the 2010s.[280]

With Reagan coming to power in 1981, neoliberal economic policies gained momentum and had an impact on the space sector, making efforts to promote the increase in commercialization. The Commercial Space Launch Act was approved by the American Congress in 1984. Its main purpose was to stimulate economic growth and support entrepreneurial efforts by utilizing space environment. In addition, the act aimed to foster the involvement of the United States private sector in offering

[278] Louts, "Space Cooperation Under Anarchy", p.132-133.

[279] Pascale Davies, "Can Europe's satellite ventures like Arianespace take on Elon Musk's SpaceX?", Euronews, July 12, 2021 https://www.euronews.com/next/2021/07/12/can-europe-s-satellite-ventures-like-arianespace-take-on-elon-musk-s-spacex (Accessed on 10.07.2023).

[280] Lal, "A Brief History of Government Policies to Promote Commercial Space" p. 29.

outer space related services. Moreover, with the legislation, private companies were allowed to launch their vehicles as long as they obtained the necessary license.[281]

The impact of Reagan's neoliberal policies began to be observed in NASA structure as well. In 1985, an amendment was made to the National Aeronautics and Space Act of 1958, which established NASA, adding the provision that NASA should "seek and encourage, to the maximum extent possible, the fullest commercial use of space" in line with its objectives.[282] Additionally, according to the added part in the act, NASA is required to "encourage and provide for Federal Government use of commercially provided space services and hardware, consistent with the requirements of the Federal Government."[283] To summarize, the Reagan administration worked to lessen financial risks in order to attract private enterprises to participate in space exploration. They prioritized the Space Shuttle program, for example, in order to make space access inexpensive and technically viable, designating the Shuttle as a transportation vehicle for both military and civil missions. The Space Shuttle had been initiated in 1972 by then-President Nixon as a cost-cutting reusable transportation system. However, the Shuttle did not result in the anticipated cost savings; rather, it resulted in increasing expenses.[284]

The 1986 Challenger disaster and the following temporary suspension of Shuttle launches revealed a lack of satellite launching capabilities in the United States. This was because the U.S. government had decided that the Shuttle would be the only way of space transport.[285] However, the temporary suspension of the Shuttle and NASA's backing of commercial launch opportunities created the conditions for the development of a domestic industry in this area. The rise of the commercial launch

[281] Ibid p.30.

[282] "National Aeronautics and Space Act of 1958 as Amended" (Printed for the use of the National Aeronautics and Space Administration, 2008) https://history.nasa.gov/spaceact-legishistory.pdf (Accessed on 20.07.2023).

[283] Ibid.

[284] Lal, "A Brief History of Government Policies to Promote Commercial Space" p. 31.

[285] Ibid.

industry in Europe during the early 1980s and the competition felt by the United States might have also played a role in the decision to take these initial steps towards establishing a domestic commercial launch industry. During this time, commercial launch became a requirement due to the situation in the US space environment, opening the door for competing companies from other countries to enter the space launch industry and laying the groundwork for the future acceleration of commercial space activities.[286]

Following the dissolution of the Soviet Union, the 1990s saw enormous changes in the international arena. With the fall of the Soviet Union, which posed both a geopolitical and a systemic threat, the United States emerged, albeit momentarily, as the only superpower in the new international order. U.S. policies aimed to maintain the sustainability of this post-Cold War era. The influence of this transition in world order was visible in the rise of the private sector, notably in space. With the Soviet threat gone, the United States was able to take more bold steps to support commercialization. Government budgets allocated for space activities were rapidly reduced, while private investments in space increased simultaneously. Additionally, the ending of the Soviet threat enabled the relaxation of export controls on dual-use technologies.[287]

The Global Positioning System (GPS), which began its deployment in the 1970s and was completed in 1994, serves as an example of the distinction between the commercialization and privatization of space assets. Operated by the U.S. Department of Defense and currently managed by the U.S. Space Force, GPS offers services to the international market despite being under government control.[288]

In 1990, President George H. W. Bush signed the Launch Services Purchase Act, which mandated NASA to procure launch services for its primary payloads from

[286] Louts, "Space Cooperation Under Anarchy", p.137-138.

[287] Lal, "A Brief History of Government Policies to Promote Commercial Space" p. 31.

[288] "Satellite Navigation - Global Positioning System (GPS)", Federal Aviation Administration https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/gps (Accessed on 23.07.2023).

commercial entities. The Commercial Space Act in 1998 made a significant advancement by eliminating barriers for NASA to provide services with the help of private companies. The aim was to lower the costs in the space sector while also fostering the creation of new markets for private companies involved in space activities[289].

The U.S. governments persisted to emphasize the significance of private enterprise within the American space exploration domain during the 2000s. They offered legal guidance by various acts and government policy papers. Some of these included the Commercial Space Transportation Competitiveness Act of 2000, the US Commercial Remote Sensing Policy in 2003, The White House Space Policy in 2004, The White House Space Transportation Policy in 2006, and National Space Policy in 2010.[290]

Private sector entrepreneurship has grown in popularity since the early 2000s. Blue Origin (2000), SpaceX (2002), and Virgin Galactic (2004) were created by entrepreneurs Jeff Bezos, Elon Musk, and Richard Branson, respectively. These firms have increasingly received government assistance, allowing them to rapidly grow their commercial capacity and evolve into strong competitors in the worldwide market.[291]

In the 2010s, the space industry made a breakthrough with the successful applications of private space companies such as Spacex and Blue Origin. However, many policymakers argue that in order for American space companies to be successful in the free market, the ambiguity regarding the use of space resources in the Outer Space Treaty should be revised and the use of these resources should be made possible in order to gain profit at the end.[292]

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[289] Lal, "A Brief History of Government Policies to Promote Commercial Space" p. 31.

[290] Ibid.

[291] Maraš and Dangubić, "Cooperation Between Government Agencies and Private Companies in Space" p.229.

[292] Amanda M. Leon, "Mining For Meaning: An Examination of the Legality of Property Rights in Space Resources "*Virginia Law Review*, vol 104:3 (2018).

For these reasons, American congressman Bill Posey introduced a bill to US Congress called "American Space Technology for Exploring Resource Opportunities In Deep Space Act", simply known as "ASTEROIDS Act" in 2014. This bill was offering that:

> (…) resources obtained in outer space from an asteroid are the property of the entity that obtained such resources, which shall be entitled to all property rights thereto, consistent with applicable provisions of Federal law.

Posey, who was the sponsor of this act, emphasized the significance of asteroids for their potential to hold rare minerals, counting them as "platinum group metals such as platinum, osmium, iridium, ruthenium, rhodium, and palladium in addition to nickel, iron and cobalt".[293]

The provisions in this bill were expanded and introduced to Congress as a new bill in 2015 by Republican Congressman Kevin McCarthy under the title "Spurring Private Aerospace Competitiveness and Entrepreneurship Act of 2015". This bill successfully passed both the Senate and Congress and was signed into law by then President Barack Obama (from January 2009 to January 2017), becoming the "U.S. Commercial Space Launch Competitiveness Act" or simply known as the SPACE Act of 2015. Act states that

> (…) a U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell it according to applicable law, including U.S. international obligations.[294]

Two years later, Donald Trump administration issued "the Executive Order on Encouraging International Support for the Recovery and Use of Space Resources" on April 6, 2020. Although the Executive Order is similar to the Commercial Space Launch Competitiveness Act of 2015, it also rejects the status of the outer space as

[293] "Bipartisan Legislation Promotes Commercial Space Ventures", U.S. Congressman Bill Posey official website, July 10, 2014 https://posey.house.gov/news/documentprint.aspx?DocumentID=387391 (Accessed on 10.07.2023).

[294] U.S. Commercial Space Launch Competitiveness Act, 2015.

global commons. It takes position against the Moon Treaty and highlights that Treaty does not create international customary law and should not guide the states arranging space resources utilization activities. [295]

The Artemis Program, however, was the most significant advancement linked to space activity during Trump's presidency. During Trump's presidency, NASA launched the Artemis Program, with the goal of sending humans to the Moon by 2024. Along with NASA, the European Space Agency (ESA), Japan Aerospace Exploration Agency (JAXA), and Canadian Space Agency (CSA) participated in the effort. The program includes the development of the Orion spacecraft, the Space Launch System rocket, the Exploration Ground Systems, the Gateway project, the Human Landing System, and, eventually, the Artemis Base Camp. Government space agencies and commercial space corporations have participated with the initiative, and countries who have signed the "Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes" have joined the program.[296]

SpaceX is now an important contractor for the United States government. It has received $15.3 billion in government funding since 2003. For several years following the cease of the Space Shuttle program in 2011, the United States relied on Russian Soyuz rockets for astronaut transportation. However, the Commercial Crew Program was launched in 2014 to allow astronaut access to the International Space Station (ISS), and SpaceX was contracted to do so. SpaceX has been offering human launch services to NASA since 2020.[297] Furthermore, in 2023, SpaceX agreed with the US Department of Defense to provide Starlink satellite services to the Ukrainian army, which has been at war with Russia since February 2022.

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[295] "Executive Order on Encouraging International Support for the Recovery and Use of Space Resources", Trump White House Website, 2020 https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-encouraging-international-support-recovery-use-space-resources/ (Accessed on 23.07.2023).

[296] "NASA Artemis Program", National Aeronautics and Space Administration https://www.nasa.gov/specials/artemis/ (Accessed on 23.07.2023).

[297] Tim Fernholz, "Elon Musk's SpaceX and Tesla get far more government money than NPR", Quartz, April 13, 2023 https://qz.com/elon-musks-spacex-and-tesla-get-far-more-government-mon-1850332884 (Accessed on 23.07.2023).

4.3.2. The Russian Space Policy after the Cold War

From the beginning of the era of space exploration, Soviet Union strategically controlled and precisely monitored its space program, similar to what it did in other areas. The Soviet space program was entirely backed with government funds. However, with the conclusion of the détente period and the rapid increase of the commercialization of space within the United States in accordance with Reagan administration policies, Soviet Union aimed to generate revenue and began offering commercial services. For example, during the year 1988, they conducted a business launch using Soviet rockets to install India's domestic remote sensing satellite, IRS-1A, into space. In addition, various initiatives were carried out in order to profit from space operations. Individuals from many countries, for example, were given the option to go to the Mir space station by the Soyuz spacecraft in exchange for payment. As part of the perestroika reforms which was initiated to ease the role of central planning in the economy, Mikhail Gorbachev, the Secretary General of the Communist Party of the Soviet Union from 1985 to 1991, established the Glavkosmos agency. The organization had the task of managing and marketing Russian space operations. The organization's main objective was to employ USSR space technology to conduct financially beneficial tasks. In this way, the Soviet Union joined the trend of commercialization of space.[298]

Following the dissolution of the Soviet Union, the Russian Space Agency (RKA) was founded in 1992 to oversee space activities in Russia and contribute to the execution of economic space operations. Beginning in 1992, government backing for space programs declined considerably, and Russia began cancelling planned projects. Because the country's economy had drastically worsened and there were few resources available for space activities, cutting the space budget was an unavoidable action. As a result, commercialization of space operations became considered as the only option to sustain the Russian space program, and these attempts were supported through joint initiatives. There was a lack of regulations regarding the space operations throughout the Soviet era. To continue the Russian space program,

[298] Irina V. Louts, “Space Cooperation Under Anarchy”, p. 152.

commercialization initiatives were essential, but this required building the suitable legislative framework to support such activity at first. And with this aim, Russia established "Law of the Russian Federation on Space Activity" in 1993. This law included provisions that would provide assurance for both domestic and foreign investments in Russia during the commercialization phase, thereby promoting commercialization.[299]

Russia needed to undertake strategic actions and enhance bilateral ties with the United States in order to continue its space program via commercialization, as worldwide launch market required close coordination. The United States' severe export regulations on space-related technologies were a key underlying obstacle. Russia intended to provide launch services, mostly for commercial satellites, however the vehicles in issue were generally manufactured in the United States or used American technology. As a result, they were subject to strict US export regulations, limiting Russia's access to the worldwide launch market. Between 1992 and 1993, Russia concentrated on strengthening bilateral ties with the United States in order to overcome this challenge and achieve entry into the global space market. The United States required Russia to join the "Missile Technology Control Regime" (MTCR), an export control system aimed at controlling products exported if they contain nuclear warheads[300], as a prerequisite for Russia's entry into markets including firms involved in space operations. Russia formally announced its acceptance of the MTCR regulations in 1993, and the US and Russia then established a bilateral agreement. As agreed in the deal, Russia was allowed to launch a limited number of satellites built or containing American components.[301]

Another example of collaboration between Russia and the US in the 1990s was the US offer to Russia to participate in the construction and operation of the International Space Station (ISS). Construction of the International Space Station began in 1998, and it was built through international partnership by "the space agencies of the

[299] Ibid p.152-153.

[300] "The Missile Technology Control Regime", Arms Control Association https://www.armscontrol.org/2021-10/missile-technology-control-regime (Accessed on 10.07.2023).

[301] Irina V. Louts, "Space Cooperation Under Anarchy", p. 160.

United States, Russia, Europe, Japan, and Canada" with the aim of conducting scientific research.[302]

The significance of this collaboration for Russia lies in its potential to deepen connections with the international space market and create a favourable climate for business collaborations. The United States' post-Cold War strategy toward Russia during the first decade following the Cold War reflects the attempts of the United States, as the sole superpower at that moment, to maintain its position of strength and shape the international political landscape according to its interests. By including Russia into this new order, the United States hoped to prevent Russia from taking a stance against itself and instead encouraged cooperation with the aim of facilitating Russia's integration into the global system.[303]

The Soviet Union also left Russia with a successful photoreconnaissance program. In order to commercialize this technology, Russia attempted to establish collaborative partnerships with Western companies. Aside from the photoreconnaissance program, attempts to commercialize satellite technology and form collaborations with Western space businesses boosted the Russian space sector. This was critical since the United States dominated the worldwide satellite business. INTERSPUTNIK emerged as an organization that provided benefits to Russia in this context. INTERSPUTNIK was founded during the Soviet Union era to provide satellite communication services to the socialist bloc. Following the dissolution of the Soviet Union, INTERSPUTNIK extended its activities, using foreign technology and expanding its market links. As a result, communication satellites became a profitable business for Russia in the post-Cold War years.[304]

GLONASS was developed in the early 1980s as a system similar to the Global Positioning System (GPS) to provide satellite navigation services globally. It began

[302] "International Space Station - International Cooperation", National Aeronautics and Space Administration, April 12, 2023.https://www.nasa.gov/mission_pages/station/cooperation/index.html (Accessed on 21.07.2023).

[303] Irina V. Louts, "Space Cooperation Under Anarchy", p.172.

[304] Ibid p.168-169.

as a military technology, but following the dissolution of the Soviet Union, it attracted the interest of international investors and was transformed into a dual-use system for commercial purposes. Moving from the Defense Ministry to the Russian Space Agency, in the 2000s, its budget was increased by the President Vladimir Putin[305].

Significant difference is evident when comparing the commercialization efforts of space programs in Russia and the United States. Even throughout the Cold War, the American private sector actively participated in space projects. A market economy was well established, particularly in the commercial satellite market. In contrast, with the dissolution of the Soviet Union, Russia witnessed a transition from a socialist to a market economy, which necessitated significant political and legislative changes. Because the Soviet Union's space technology were essentially military in nature, commercialization required addressing to civilian clients. As a result, several space sectors had to be created from the beginning.[306] Thus, the commercialization of space activities in Russia occurred in parallel with its fundamental transformation: integration into the global economy. Mizin claims that thanks to the dual-use nature of space technologies, the space industry in Russia is one of the best survivors among those which remained from the militarized sectors in Soviet Union.[307]

Under Putin's leadership in the early 2000s, Russia evaluated the strategic importance of outer space and began to place a larger priority on space programs. Putin raised the funding for space and made efforts to ensure the effective functioning of GLONASS, which had declined during the 1990s. As a result of the Space Shuttle's unexpectedly high costs, and particularly the impact of the Columbia tragedy in 2003, the United States opted to end the Space Shuttle program when the International Space Station was completed, which happened in 2011. This presented Russia with a tremendous opportunity since it became the sole provider of human

[305] "Russia's Glonass system to get full state support - deputy PM", Sputnik News, May 12, 2009 https://sputnikglobe.com/20090512/121546208.html (Accessed on 20.07.2023).

[306] Ibid p.172.

[307] Victor Mizin, "New Russia in space: more than a 'celestial travel agency'?" *Astropolitics*, Vol 1:3, (2003) p.80-94.

spaceflights to the ISS. As a result, all US launches to the ISS began utilizing Russian Soyuz rockets launched from Baikonur Cosmodrome, which stayed in Kazakhstan after the dissolution of Soviet Union. Following the 2008 war with Georgia, Russia identified deficiencies in intelligence and reconnaissance technologies based in space and prioritized their development and modernization.

During the 2010s, Russia prioritized reducing its reliance on foreign space infrastructure and increasing national control over its space program. A fresh reform was undertaken in 2015, that the Federal Space Agency Roscosmos became united with the United Rocket and Space Corporation, which was concluded in the formation of the Roscosmos State Corporation. In addition to the Baikonur Cosmodrome, the construction of the Vostochny Cosmodrome was initiated in 2011 and has been utilized for space launches since 2016. The Vostochny Cosmodrome is being built in accordance with Russia's goal of strengthening its space capabilities and gaining more autonomy in space operations.[308]

Russia's invasion of Ukraine in February 2022 led in economic sanctions imposed on Russia by the United States and other European Union nations. As a result, Russia faced restrictions in acquiring specific materials required in its space technology development, potentially delaying production. These restrictions have had an impact on the Russian launch industry as well. For example, the launch of 36 commercial satellites belonging to the British-backed business OneWeb, which was scheduled to use Soyuz rockets, was cancelled due to the imposed embargoes and disagreements with Roscosmos. Instead, it was agreed that the launch operations would be carried out from India, utilizing SpaceX rockets. The satellites belonging to OneWeb, which were initially scheduled for launch, are still in the hands of Roscosmos at Baikonur as of the writing of this thesis.[309]

[308] Nils Holger Schreiber, "Man, State, and War in Space: Neorealism and Russia's Counterbalancing Strategy Against the United States in Outer Space Security Politics", *Astropolitics*, Vol 20:2-3, (2022) p.164.

[309] Joey Roulette, "OneWeb 'moves on' from Soyuz-stranded satellites as its network nears completion", *Reuters*, March 15, 2023 https://www.reuters.com/lifestyle/science/oneweb-moves-on-soyuz-stranded-satellites-its-network-nears-completion-2023-03-15/ (Accessed on 20.07.2023).

According to Schreiber, Russia's allocated funding for its space program is around 12% of NASA's budget. Furthermore, Russia's budget for space defense is 1.6 billion dollars, but the US Space Force's proposed budget for 2023 is 24.5 billion dollars. This situation results in a large gap in military capability between the US and Russia.[310]

Russia has begun to challenge the concept of the United States leading the international order on its own since the early 2000s. To get support for its objection, Russia has formed a "strategic partnership" with China to build a "multipolar world". Russia has strengthened trade connections with China and supplied military equipment to the country, building upon the relations established with China since the 1990s. Although Russia contributed to the development of China's space program, it maintained a cautious stance on this matter until the 2010s. Anatoly Perminov, the former head of Russia's federal space agency, raised worries about China being a "rival in a future space race" in 2006. As a result, Russia continued to "maintain restrictions on sharing technology" with China.[311]

However, American relations with Russia and China deteriorated throughout the 2010s, collaboration between these two countries in the realm of space has expanded gradually. Beginning in 2014, efforts were made to harmonize the GLONASS satellite system with China's Beidou navigation system, allowing them to operate in together.[312] In 2022, they agreed to enhance these two systems so that they could compete with American GPS, demonstrating their commitment to increasing their capabilities in the space realm.[313] China and Russia are the two most powerful

[310] Nils Holger Schreiber, "Man, State, and War in Space", p.164-165.

[311] "Space pact with China has limits, Russia says", CBC, December 27, 2006 https://www.cbc.ca/news/science/space-pact-with-china-has-limits-russia-says-1.611434 (Accessed on 20.07.2023).

[312] "China's Beidou and Russia's GLONASS to harmonize standards", East-West Digital News, September 22, 2014 https://www.ewdn.com/2014/09/22/chinas-beidou-and-russias-glonass-to-harmonize-standards/ (Accessed on 20.07.2023).

[313] Liu Zhen, "China's BeiDou and Russian GLONASS sign new deal to rival America's GPS satellite navigation", South China Morning Post, February 5, 2022

countries in the space domain after the United States. Their decision not to participate in the US-led Artemis Program and therefore the Artemis Accords, which interpret space law to best serve the American private space industry, represents a concrete example of their objections to the US's goal of maintaining a unipolar order. In March 2021, Russian Roscosmos and China National Space Administration (CSNA) announced an agreement to create the International Lunar Research Station together as an alternative to the US-led Artemis Program.[314] In addition to its efforts with Russia, China seeks cooperation with other countries in the building of this space station. For the development of this station, China has reached agreements with members of the Asia-Pacific Space Cooperation Organization, as well as Pakistan and the United Arab Emirates[315]. Discussions with other nations, according to Chinese sources, are still underway, as of the writing of this thesis.

4.3.3. Chinese Space Policy after the Cold War

The Space Shuttle's problems in the late 1980s prompted the US to want to utilise Chinese technology in launch operations, paving the way for China's entry into the space launch business. Concerned about technology transfer, US officials reached an agreement in 1993 with China in a document titled "Memorandum of Agreement on Satellite Technology Safeguards Between the Governments of the United States and the People's Republic of China"[316] and Chinese launch systems were used to access space in the 1990s, however in limited numbers.[317]

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https://www.scmp.com/news/china/diplomacy/article/3165924/chinas-beidou-and-russian-glonass-sign-new-deal-rival-americas (Accessed on 20.07.2023).

[314] Natalia Azarova, "In the New Space Race, Will Russia and China Triumph Over America?", Carnegie Endowment for International Peace, December 28, 2021 https://carnegiemoscow.org/commentary/86094 (Accessed on 20.07.2023).

[315] Andrew Jones, "China attracts moon base partners, outlines project timelines", Space News, June 19, 2023 https://spacenews.com/china-attracts-moon-base-partners-outlines-project-timelines/ (Accessed on 20.07.2023).

[316] The Aerospace Corporation, "Memorandum of Agreement on Satellite Technology Safeguards Between the USA and China", 1993 https://aerospace.org/sites/default/files/policy_archives/Tech%20Safeguards%20Agreement%20-%20China%20Feb93.pdf (Accessed on 28.07.2023).

[317] Louts, "Space Cooperation Under Anarchy", p.178.

China intended to commercialize the space sector and began on a new reorganization process to do so. In 1988, they initiated the "Torch Program", which attempted to bring technology and industry together under a market system in order to build new high-tech sectors in the nation. Torch has achieved remarkable results by improving the environment for innovation, distributing science and technology resources, encouraging technological advancements and changes, fostering the link between the economy and science and technology, adapting the industrial setup, and reinforcing the ability for innovation in various regions.[318] The Chinese National Space Agency was founded in 1993 to simplify China's space programs. China created "the China Great Wall Industry Corporation" and "the China Aerospace Great Wall Group" to promote its technical achievements, as well as institutions to facilitate international collaboration.[319]

Due to political disagreements, China and the Soviet Union had ended their partnership in 1960. Following the dissolution of the Soviet Union, China and Russia reestablished bilateral ties and entered into business deals. Chinese astronauts were trained in Russian training facilities. Russia provided China with the required equipment for crewed flights. China, like Russia, underwent substantial structural transformations toward commercialization in the 1990s, transitioning from a closed and strongly regulated space sector to a competitive commercial actor on the world arena. After the Cold War ended, China, which was technologically far behind the United States and Russia, carefully formed bilateral partnerships with these two nations in order to benefit and develop its own technology, eventually achieving similar levels of space progress as these two countries.

During the Cold War, China's approach to space was primarily motivated by security considerations. China saw the two countries' arms race as a threat to its own security and, as a result, resisted it. China saw the United States' Strategic Defense Initiative (SDI) in the 1980s as a potential danger to the continuation of the international

[318] "Torch High Technology Industry Development Center Ministry of Science and Technology", Torch High Technology Industry Development Center http://www.chinatorch.gov.cn/english/ (Accessed on 19.07.2023).

[319] Louts, "Space Cooperation Under Anarchy", p.180.

system. China felt that this effort was intended to achieve not just space superiority over the Soviet Union, but also to establish dominance over third-world countries.[320] China vehemently opposed the United States' National Missile Defense (NMD) and Theater Missile Defense (TMD) projects in the 1990s. At the time, China urged for strict adherence to the Anti-Ballistic Missile (ABM) Treaty and a full prohibition on the possession, use, and testing of weapons in space. In the framework of the idea of mutual destruction, the ABM Treaty signed 1972 by the US and the USSR sought to restrict missile defence systems. In the second part of the 1990s, in reaction to the United States' plans to withdraw from the ABM Treaty, China emphasized military technology modernisation, putting national security first. Various US security reports dating back to the early 2000s has begun to identify China as a possible danger to US space security. [321]

The United States formally left the ABM Treaty in 2002. President George W. Bush, who served from 2001 to 2009, announced plans to build a new defence system known as "layered national missile defense" which aimed to protect the US from possible attacks from rogue nations rather than China and Russia, as Bush administration explained.[322] A draft treaty which was prepared for the space disarmament was drafted by Russia and China in the same year. By prohibiting the placement and use of not only weapons of mass destruction but also all types of space-based weapons, this proposed document went beyond the terms of the Outer Space Treaty. The U.S. administration considered the Outer Space Treaty to be sufficient and did not pursue a new treaty.[323] A non-operational weather satellite was used as the target of a successful anti-satellite (ASAT) test that China carried out in

[320] Ibid p.266.

[321] Ibid 275.

[322] Peter Van Ness, "The Time Has Come For a Treaty to Ban Weapons in Space", *Asian Perspective*, Vol. 34:3 (2010), https://www.jstor.org/stable/42704727 (Accessed on 20.07.2023).

[323] The Acronym Institute, "Russia and China Introduce Draft Treaty on Space Weapons", Issue No. 66, September 2002 http://www.acronym.org.uk/old/archive/dd/dd66/66nr07.htm (Accessed on 20.07.2023).

2007. This test brought attention to China's achievements in space technology on a worldwide scale.[324]

Since the aftermath of the 9/11 attacks in 2001 and the following invasions of Afghanistan in 2001 and Iraq in 2003 by the United States, China has increased its emphasize for the multipolar cooperation. China has been persistent in supporting this policy of multipolar structure in the space domain as well. In addition to its bilateral relations with Russia, China established Asia-Pacific Space Cooperation Organization (APSCO) in 2008. Also, "the Belt and Road Initiative" (BRI), a large-scale infrastructure project which was launched in 2013 and still in progress in Asia, was expanded in 2016 to include the space sector, and a project to create a "space information corridor" under the BRI umbrella was developed. Additionally, remote sensing satellites were also incorporated into the BRI.[325]

The "Woolf Amendment" which was introduced by Frank Wolf, who is now former Republican Party member and former U.S. House of Representative, was approved in 2011, prohibiting bilateral collaboration in the space domain between NASA and other American government institutions with the Chinese government or Chinese corporations. The fundamental rationale for this bill is the United States' national security concerns, as well as the anticipated risk of China acquiring American technologies secretly. As of the writing of this thesis, this bill remains in effect, and it puts back the possibility of US-China space collaboration.[326]

In 2019, China initiated the International Lunar Research Station (ILRS) project, entering into multilateral cooperation in the space domain for the first time, as emphasized by Wu. Wu claims that China intentionally emerged as a competitor to the United States' Artemis program with its ILRS program. However, unlike the

[324] Carin Zissis, "China's Anti-Satellite Test", Council on Foreign Relations, February 22, 2007 https://www.cfr.org/backgrounder/chinas-anti-satellite-test (Accessed on 20.07.2023).

[325] Xiaodan Wu, "The International Lunar Research Station: China's New Era of Space Cooperation and Its New Role in the Space Legal Order", *Space Policy*, 2023 p.2-9.

[326] Leonard David, "Can the U.S. and China Cooperate in Space?", Scientific American, August 2, 2021 https://www.scientificamerican.com/article/can-the-u-s-and-china-cooperate-in-space/ (Accessed on 22.07.2023).

Artemis Program, as of the writing of this thesis, there has been no specific legal regulation for the ILRS, and there is yet to be a clear agenda for the projects planned to be carried out.[327]

4.3.4. Emerging Actors in the Space Sector

During the Cold War, India's space program was launched with the goal of assisting the country's economic development. In the twenty-first century, India enlarged its space program agenda, exceeding its economic growth goals, and established new aims to produce projects that contribute to humanity's scientific research in space. The Indian Space Research Organisation (ISRO) sent Chandrayaan-1 into lunar orbit in 2008, making it India's first successful project that made it to the Moon. The goal of this initiative was to improve India's technology and knowledge in order for it to profit from the Moon in the future. The lunar surface was surveyed using remote sensing technologies, and its mineral and resource content was identified. In addition, in 2019, Chandrayaan-2 was sent into the Moon's orbit to further explore lunar geography. Furthermore, "the Mars Orbiter Mission" was started, and a spacecraft was sent to Mars in 2013. Finally, India is developing plans to launch crewed flights into Earth orbit by 2024. In addition, India provides business services. The Antrix Corporation, a state-owned firm, promotes worldwide alliances in order to deliver global services in the field of space launches.[328] On August 23, 2023, the Indian Space Research Organisation achieved a remarkable milestone by successfully landing an unmanned mission, Chandrayaan-3, on the challenging lunar south pole's rocky surface. This achievement makes India the first country to accomplish such a landing.[329] This accomplishment comes after Russia's recent attempt to beat India to this achievement failed when their Luna-25 probe, crash-landed at the same week. India became the fourth country to land a spacecraft on the

[327] Wu, "The International Lunar Research Station" p. 2-9.

[328] Ram S. Jakhu , Joseph N. Pelton , Yaw Otu Mankata Nyampong, *Space Mining and Its Regulation*, (Switzerland: Springer International Publishing,2017) p.110.

[329] Ragini Saxena, "India first to land near moon south pole after Russia fails", Phys.org, August 26, 2023 https://phys.org/news/2023-08-india-moon-south-pole-russia.html (Accessed on 31.08.2023)

moon's surface, following the United States, the Soviet Union, and China. What makes this landing even more significant is that India achieved this landing at the particularly challenging South Pole, which is filled with treacherous terrain and craters, and where Scientists hold the belief that there may be water. The U.S. space agency, with its Artemis III mission, plans to send humans to explore this region near the lunar South Pole in 2025. China also aims to establish a research station in this area and send astronauts to the moon by 2030. Additionally, Japan has an unmanned mission scheduled for launch on August 26th, 2023.[330] India's successful lunar landing at the South Pole in August 2023 represents a notable departure from the historically bipolar dynamics of the space race that characterized the Cold War era. It signifies the dawn of a new era where a multitude of emerging nations have risen to prominence through their achievements in this field.

The European Space Agency (ESA) is an intergovernmental agency to coordinate and simplify collaborative planning of European space operations, which was founded in 1975. Because it is not a part of the European Union, non-EU nations such as the United Kingdom, Norway, and Canada are eligible to join in ESA. ESA's mission is to help its member countries succeed in the highly competitive space domain. The European space sector is complicated, with several layers. National space agencies exist in addition to the European Union and ESA. ESA is active in a wide range of space-related research projects. Some notable examples include Herschel Space Observatory, Mars Express, Venus Express, Mercury Mission, Jupiter Exploratory Mission, and Deep Space missions. Also, ESA has built a global navigation network with the Galileo project, giving a commercial alternative to GPS and GLONASS.[331]

Canada makes intensive research, with a special focus on Mars. The Canadian Space Agency (CSA) collaborates with NASA and conducts studies aimed at creating

[330] Joshua Posaner, Sanya Khetani-Shah and Matt Berg, "India beats Putin in race to moon's south pole", Politico, August 23, 2023 https://www.politico.eu/article/india-modi-beats-putin-race-moon-south-pole-chandrayaan-mission/ (Accessed on 31.08.2023)

[331] Louis Brennan and Alessandra Vecchi, *The Business of Space: The Next Frontier of International Competition*, (London: Palgrave Macmillan, 2011) p. 91-94.

habitable environments on Mars and other planets. Additionally, Canada shows strong interest in space mining and actively engages in multidisciplinary research, involving universities and science institutions in the country.[332]

South Korea began developing its space sector in the 1990s. The country's space operations are carried out in state-run facilities with the long-term goal of building a self-sufficient and autonomous space industry. By incorporating foreign corporations in space initiatives, Korea hopes to raise its space sector to the level of space-capable states by leveraging international collaboration. The budget for space is steadily growing year after year. Korea's space efforts have a security component, as it invests in satellite technology to monitor military operations on the Korean Peninsula.[333]

Brazil, Saudi Arabia, Israel, Japan, Pakistan are among the countries that have given importance to the development of their national space programs. For a long time, Israel was the only Middle Eastern country capable of launching domestically built satellites into orbit. Israel also has a sophisticated photo reconnaissance system. Pakistan, on the other hand, used a Chinese rocket to launch its first domestically built satellite into orbit in 1990. In terms of space activity, Japan now ranks among the top ten most advanced countries in the world regarding space activities. Japan has a competent rocket industry and successfully launched a lunar probe in 2007, gathering valuable information about the moon's dark side. Japan's national space agency, JAXA, has a close bilateral cooperation with NASA and has sent Japanese astronauts to the International Space Station (ISS) on Space Shuttle missions.[334]
Parallel to the United States approving the Space Act in 2015, which allows American citizens to "extract" celestial resources acquired from celestial bodies,

[332] Ram S. Jakhu , Joseph N. Pelton , Yaw Otu Mankata Nyampong, *Space Mining and Its Regulation*, (Switzerland: Springer International Publishing, 2017) p.85-97.

[333] Park Si-soo, "South Korea sets record space budget to bolster industry, develop new rocket", Space News, March 31, 2023 https://spacenews.com/south-korea-sets-record-space-budget-to-bolster-industry-develop-new-rocket/#:~:text=South%20Korea%20plans%20to%20launch,(%241.09%20billion)%20through%202030. (Accessed on 22.07.2023).

[334] Brennan and Vecchi, "The Business of Space", p.74-124.

Luxembourg and the United Arab Emirates issued legal legislation in 2017 allowing for the use of space resources with the same way the US implemented.[335]

4.4. Artemis Program and the International Cooperation

4.4.1. What is the Artemis Program?

In 2017, then-President of the United States, Donald Trump, signed his administration's first space policy directive on December 11, directing NASA to prioritize the return of humans to the Moon and later, focus on sending them to Mars and beyond.[336] In 2019, the name of the project was announced as "Artemis" by NASA's administrator, Jim Bridenstine, also confirming the collaboration with private companies.[337] Following President Trump's term, current US President Joe Biden, who assumed office in 2021, decided to continue the project.[338]

NASA's objective with the Artemis missions is to make history by landing the first woman and the first person of colour on the Moon. NASA aims to collaborate with commercial and international partners to build a long-lasting and sustainable presence on the Moon. The mission to the Moon is planned to act as a crucial step in journey towards the ultimate objective of sending astronauts to Mars. NASA aims to return to the Moon for the purpose of scientific discovery, attaining economic benefits, and inspiring a new generation of explorers known as the "Artemis

[335] Ram S. Jakhu , Joseph N. Pelton , Yaw Otu Mankata Nyampong, "Space Mining and Its Regulation", p.85-97.

[336] Jen Rae Wang, "New Space Policy Directive Calls for Human Expansion Across Solar System", National Aeronautics and Space Administration, December 12, 2017 https://www.nasa.gov/press-release/new-space-policy-directive-calls-for-human-expansion-across-solar-system (Accessed on 22.07.2023).

[337] Kenneth Chang, "For Artemis Mission to Moon, NASA Seeks to Add Billions to Budget", The New York Times, May 13, 2019 https://www.nytimes.com/2019/05/13/science/trump-nasa-moon-mars.html (Accessed on 22.07.2023).

[338] Joey Roulette, "Trump's Moon program survived a transfer of power, so what's next?", The Verge, March 12, 2021 https://www.theverge.com/2021/3/12/22323621/trump-moon-program-artemis-biden-nasa-timeline (Accessed on 22.07.2023).

Generation". The primary objective is to maintain American leadership in the field of exploration while achieving these goals.[339]

The Artemis Program comprises several distinct projects. NASA's Space Launch System[340] (SLS), working together with NASA's spacecraft named Orion, the Gateway in lunar orbit, and the human landing system, has a mission to take people to the Moon and even farther destinations in space. The SLS is NASA's strongest rocket ever constructed.[341] Due to its extraordinary capabilities, the SLS stands out as a rocket capable of directly transporting the Orion spacecraft, along with a team of four astronauts and a huge amount of cargo, all in one mission, to reach the Moon.[342] Orion will function as the exploration vehicle tasked with transporting the crew to space.[343] The Gateway[344] has been designed as the first manned space station in lunar orbit to support NASA's space exploration project[345]. As part of the Artemis Program, a cabin along with a rover and a mobile home are planned to be constructed in an area called "Artemis Base Camp" on the Moon to provide astronauts with the

[339] "NASA Artemis Program", National Aeronautics and Space Administration https://www.nasa.gov/specials/artemis/ (Accessed on 22.07.2023).

[340] National Aeronautics and Space Administration, "NASA's Space Launch System Rocket Ready for Moon Launch on Artemis I", Youtube video, 3:36, August 26, 2022 https://www.youtube.com/watch?v=PwgDpGSm_n4 (Accessed on 22.07.2023).

[341] "NASA Space Launch System (SLS) Rocket", National Aeronautics and Space Administration, August 13, 2014 https://www.nasa.gov/sls/multimedia/gallery/sls-infographic3.html (Accessed on 22.07.2023).

[342] "Space Launch System" National Aeronautics and Space Administration https://www.nasa.gov/exploration/systems/sls/fs/sls.html (Accessed on 22.07.2023).

[343] "Orion Overview", National Aeronautics and Space Administration https://www.nasa.gov/exploration/systems/orion/about/index.html (Accessed on 22.07.2023).

[344] "Gateway", National Aeronautics and Space Administration https://www.nasa.gov/gateway/overview (Accessed on 22.07.2023).

[345] NASA releases informative videos about the Artemis Program. These videos utilize visual animations to illustrate how the project will be conducted, outlining various stages and providing information about international and private actors involved. Additionally, comparisons are made with the previous Apollo program. Here are some examples: National Aeronautics and Space Administration, "How We Are Going to the Moon - 4K", Youtube video, 5:31, December 19, 2019 https://www.youtube.com/watch?v=_T8cn2J13-4 (Accessed on 22.07.2023); National Aeronautics and Space Administration, "Artemis I Path to the Pad: Launch and Recovery", Youtube video, 14:40, March 31, 2023 https://www.youtube.com/watch?v=yae96AxH7V0 (Accessed on 22.07.2023).

ability to reside there for short durations. Initially designed for short stays, this base is intended to be utilized for longer stays if the program proves successful.[346]

The Artemis Program is comprised of three distinct phases. The initial phase, known as Artemis 1, aimed to examine the safety of the SLS rocket and the capabilities of the Orion capsule to achieve lunar arrival, lunar orbital operations, and execute a controlled splashdown in the Earth's ocean upon return. It was carried out unmanned from the Kennedy Space Centre on November 16, 2022. On December 11, the Orion capsule successfully landed in the Pacific Ocean, thus concluding NASA's Artemis 1 mission.[347] The second stage of the program, Artemis 2, is planned to commence in November 2024. Its main objective is to utilize the SLS mega rocket and Orion spacecraft to conduct a lunar flyby mission, and collect data on the performance of both Orion and the crew, in order to evaluate the readiness of the Artemis program to send humans to the lunar surface. Artemis 2 will serve as manned test of the SLS and Orion spacecraft systems for the first time.[348] The third and final stage of the program, Artemis 3, is planned to take place in 2025. NASA aims to achieve the milestone of landing the first woman in history and the first human in over 50 years on the lunar surface with this project.[349] NASA plans to utilize the SLS rocket and the Orion spacecraft to reach the Moon. For the final stage of the journey, the landing on the lunar surface and the return to orbit, NASA will rely on the Starship vehicle provided by SpaceX.[350] The realization of the program depends on the evaluation of

[346] "Lunar Living: NASA's Artemis Base Camp Concept", National Aeronautics and Space Administration, October 28, 2020 https://blogs.nasa.gov/artemis/2020/10/28/lunar-living-nasas-artemis-base-camp-concept/ (Accessed on 22.07.2023).

[347] Adam Mann and Ailsa Harvey, "NASA's Artemis program: Everything you need to know", Space, last updated December 12, 2022 https://www.space.com/artemis-program.html (Accessed on 22.07.2023).

[348] Elizabeth Howell and Daisy Dobrijevic, "NASA's Artemis 2 mission: Everything you need to know", Space, last updated June 23, 2023 https://www.space.com/artemis-2-humans-moon-orbit (Accessed on 22.07.2023).

[349] "Artemis III: NASA's First Human Mission to the Lunar South Pole", National Aeronautics and Space Administration, January 13, 2023 https://www.nasa.gov/feature/artemis-iii (Accessed on 22.07.2023).

[350] "As Artemis Moves Forward, NASA Picks SpaceX to Land Next Americans on Moon", National Aeronautics and Space Administration, April 16, 2021 https://www.nasa.gov/press-release/as-artemis-moves-forward-nasa-picks-spacex-to-land-next-americans-on-moon (Accessed on 22.07.2023).

data obtained from Artemis 1 and Artemis 2, which will determine the approval for Artemis 3. Additionally, the readiness timeline of the Starship vehicle and the spacesuits to be worn by the astronauts also impact the project's implementation date.[351] NASA has assigned the task of producing the spacesuits to two private companies, Axiom Space and Collins Aerospace.[352]

Although the Artemis Program is led by the United States, it has been designed to allow international collaboration. In order to establish the terms of participation and the fundamental principles to be followed in this US-led project, the Artemis Accords were developed in 2020.[353] While these accords have garnered some international support, they have also sparked numerous political and legal debates.

4.4.2. What is the Artemis Accords?

The Artemis Accords, a set of bilateral agreements established by NASA to which all international partners wishing to participate in the Artemis programme, which aims to send new crews to the Moon and beyond, must adhere. NASA states that individuals who do not agree to the Accords are ineligible to take part in the program.[354] So far, 27 countries participated in the Accords.[355]

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[351] Elizabeth Howell, "NASA's Artemis 3 mission: Landing humans on the moon", Space, last updated November 16, 2022 https://www.space.com/artemis-3-moon-landing-mission (Accessed on 22.07.2023).

[352] Elizabeth Howell, "NASA just picked these 2 companies to build next-gen spacesuits for the moon, space station", Space, June 01, 2022 https://www.space.com/nasa-selects-companies-build-spacesuits-moon-space-station (Accessed on 22.07.2023).

[353] "NASA, International Partners Advance Cooperation with First Signings of Artemis Accords", National Aeronautics and Space Administration, October 13, 2020 https://www.nasa.gov/press-release/nasa-international-partners-advance-cooperation-with-first-signings-of-artemis-accords (Accessed on 22.07.2023).

[354] Alexander Stirn, "Do NASA's Lunar Exploration Rules Violate Space Law?", Scientific American, November 12, 2020 https://www.scientificamerican.com/article/do-nasas-lunar-exploration-rules-violate-space-law/ (Accessed on 22.07.2023).

[355] According to the US Department of State, "Artemis Accords signatories as of June 24, 2023: Australia, Bahrain, Brazil, Canada, Colombia, Czech Republic, Ecuador, France, India, Israel, Italy, Japan, Luxembourg, Mexico, New Zealand, Nigeria, Poland, the Republic of Korea, Romania, Rwanda, Saudi Arabia, Singapore, Spain, Ukraine, the United Arab Emirates, the United Kingdom,

The first point that needs to be addressed regarding the Artemis Accords is that, as stated in Number 2 of Section 13 of the Accords, it is not eligible for registration under Article 102 of the United Nations Charter, which means that the agreement does not have legal binding.[356] Therefore, Frans von der Dunk believes that this agreement presents more of a political challenge rather than a legal one. According to him, when states sign this agreement, it shows that they agree with how the United States understands and interprets the Outer Space Treaty in terms of using the Moon. Moreover, von der Dunk suggests that the growing number of countries participating in the agreement indicates the formation of an international consensus on this matter.[357]

The primary purpose behind the development and signing of the Artemis Accords, as expressed in Section 1, is as follows:

> (…) to establish a common vision via a practical set of principles, guidelines, and best practices to enhance the governance of the civil exploration and use of outer space with the intention of advancing the Artemis Program. Adherence to a practical set of principles, guidelines, and best practices in carrying out activities in outer space is intended to increase the safety of operations, reduce uncertainty, and promote the sustainable and beneficial use of space for all humankind.[358]

The principles outlined are aimed to govern civil space activities carried out by the civil space agencies of each Signatory. The Accords have also specified the locations where they will be applicable, as follows:

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and the United States" Artemis Accords, the US Department of State, https://www.state.gov/artemis-accords/ (Accessed on 22.07.2023).

[356] Section 13, The Artemis Accords, National Aeronautics and Space Administration, October 13, 2020 https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf (Accessed on 22.07.2023).

[357] Quoted in Alexander Stirn, "Do NASA's Lunar Exploration Rules Violate Space Law?", Scientific American, November 12, 2020 https://www.scientificamerican.com/article/do-nasas-lunar-exploration-rules-violate-space-law/ (Accessed on 22.07.2023).

[358] Section 1, The Artemis Accords, National Aeronautics and Space Administration, October 13, 2020 https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf (Accessed on 22.07.2023).

> These activities may take place on the Moon, Mars, comets, and asteroids, including their surfaces and subsurfaces, as well as in orbit of the Moon or Mars, in the Lagrangian points for the Earth-Moon system, and in transit between these celestial bodies and locations.[359]

Most of the provisions stated in the Artemis Accords are consistent with the Outer Space Treaty and other related agreements, which means that these provisions are not likely to cause disagreements or debates.[360] According to the Section 3, the countries that have signed the Artemis Accords agree that all collaborative activities mentioned in the Accords should only serve peaceful purposes and be in line with applicable international laws.[361] This provision is consistent with Article 3 of the Outer Space Treaty.[362] The Section 4 of the Artemis Accords aligns with the principles outlined in Article 11 of the Outer Space Treaty. According to the provision, countries involved in the Accords have the intention to openly share the scientific knowledge that comes from their actions with the general public and the worldwide scientific community, while maintaining good faith.[363] Also, Section 6 of the Artemis Accords is consistent with the Article 5 of the Outer Space Treaty, which states that signatory countries to make every reasonable effort to provide necessary assistance to individuals in outer space who find themselves in difficult situations.[364]

To sum up, the Accords align with the fundamental principles of the Outer Space Treaty, which include utilizing outer space for peaceful purposes, registering space objects, ensuring transparency in space operations, and taking responsibility for any damages that may occur.[365]

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[359] Section 1, "The Artemis Accords"

[360] Rossana Deplano, "The Artemis Accords: Evolution or Revolution in International Law?", *International & Comparative Law Quarterly* , Volume 70 :3 , (July 2021)

[361] Section 3, "The Artemis Accords"

[362] Article 3, "the Outer Space Treaty"

[363] Section 3, "The Artemis Accords"

[364] Section 6, "The Artemis Accords"

[365] Athar ud Din, "The Artemis Accords: The End of Multilateralism in the Management of Outer Space?", *Astropolitics*, 20:2-3, (2022) p.143-144.

However, Section 10 of the Artemis Accords, titled "Space Resource" contains one of the most controversial provisions of the Accords. First paragraph of the section seems to comply with the Outer Space Treaty by stating that "the utilization of space resources can benefit humankind by providing critical support for safe and sustainable operations". But, according to paragraph 2 of this section:

> The Signatories emphasize that the extraction and utilization of space resources, including any recovery from the surface or subsurface of the Moon, Mars, comets, or asteroids, should be executed in a manner that complies with the Outer Space Treaty and in support of safe and sustainable space activities. The Signatories affirm that the extraction of space resource does not inherently constitute national appropriation under Article II of the Outer Space Treaty, and that contracts and other legal instruments relating to space resources should be consistent with that Treaty.[366]

Stating that the extraction of space resources does not contradict the "non-appropriation" principle outlined in Article II of the Outer Space Treaty implies choosing a side in one of the debates concerning the "non-appropriation" principle. As discussed in the previous pages of this thesis, the United States, Luxembourg, and the United Arab Emirates have made domestic regulations regarding the utilization of space resources. These regulations generally distinguish between celestial bodies themselves and the resources they contain.[367] However, this interpretation represents just one of the many different interpretations of the "non-appropriation" principle. These interpretations were examined in the previous chapter of this thesis. Therefore, it can be said that the Accords explicitly impose the United States' interpretation of the Outer Space Treaty on the participating states in the Artemis Accords.

Another aspect of the Artemis Accords that introduces innovation to the current structure of space law is the introduction of "safety zones" as foreseen in Section 11. The concept of "safety zones" has been introduced to prevent "harmful interference" particularly in activities related to the extraction and utilization of space resources while states carry out their space operations.[368]

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[366] Section 10, "The Artemis Accords"

[367] Din, "The Artemis Accords: The End of Multilateralism" p.145.

[368] Section 11, "The Artemis Accords"

4.4.3. The International Reaction to the Artemis Accords

The Artemis Program and the following Artemis Accords, which have been established to support and define the conditions of participation to the program, present one of the most significant developments in space exploration in the 21st century. The innovative provisions introduced by the Accords have sparked debates among both states and legal experts. This part aims to examine the international reactions to the Artemis Accords.

The Artemis Accords, announced as an international agreement by NASA on October 13, 2020, were signed by eight countries; Australia, Canada, Japan, Luxembourg, Italy, the United Kingdom, and the United Arab Emirates and the United States.[369] The various stages of the Artemis Program have been developed in collaboration with international partners. The European Space Agency (ESA)[370], the Japan Aerospace Exploration Agency (JAXA)[371], and the Canadian Space Agency (CSA)[372] have played various roles within the program and their countries have also signed the Accords as part of their participation.[373]

[369] Loren Grush, "US and seven other countries sign NASA's Artemis Accords to set rules for exploring the Moon", The Verge, October 13, 2020 https://www.theverge.com/2020/10/13/21507204/nasa-artemis-accords-8-countries-moon-outer-space-treaty (Accessed on 22.07.2023).

[370] "Artemis I", The European Space Agency, https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Orion/Artemis_I (Accessed on 22.07.2023); "Artemis II", The European Space Agency, https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Orion/Artemis_II (Accessed on 22.07.2023); "Artemis III", The European Space Agency, https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Orion/Artemis_III (Accessed on 22.07.2023).

[371] JAXA Research and Development Directorate, https://www.kenkai.jaxa.jp/eng/research/exploration/exploration.html (Accessed on 22.07.2023).

[372] "NASA Names Astronauts to Next Moon Mission, First Crew Under Artemis", National Aeronautics and Space Administration, April 3, 2023 https://www.nasa.gov/press-release/nasa-names-astronauts-to-next-moon-mission-first-crew-under-artemis (Accessed on 22.07.2023).

[373] Directors of the ESA and the NASA signed a Memorandum of Understanding to build the Lunar Gateway. On the other hand, not all European countries, who are members of ESA, have yet signed the Artemis Accords. "Gateway MoU and Artemis Accords – FAQs", The European Space Agency, https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Gateway_MoU_and_Artemis_Accords_FAQs (Accessed on 22.07.2023).

In addition to the United States, Luxembourg and the United Arab Emirates share a common characteristic. These three countries have implemented legal regulations at domestic level that allow their space industries to extract minerals from outer space.[374] In line with these regulations, the Artemis Accords indirectly facilitate the extraction of resources from celestial bodies, as it is acknowledged that such extraction and utilization do not constitute claims of sovereignty.[375]

Although France had concerns regarding the utilization of space resources, it eventually signed the agreement two years later on June 7, 2022.[376] Similarly, India also signed the agreement three years later in June 2023.[377] The space capabilities of both countries and their rich history of space research and development make the participation of France and India highly significant.

Among the states that have not yet become parties to the agreement, China, Russia, and Germany stand out. The fact that Germany has not yet joined the agreement indicates a lack of consensus within the European Union. However, this situation should not be interpreted as a stance against the agreement. It is noteworthy that Germany is the country that has made the most contributions to the European Space Agency as of 2022.[378] Therefore, it can be said that Germany approaches the collaborative framework established by the Artemis Accords cautiously, but also remains open to cooperation.

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[374] Ajey Lele and V. Gopalakrishnan, "Artemis Accords: Unilateralization In Space*", Society for the Study of Peace and Conflict*, October 24, 2020 https://sspconline.org/opinion-analysis/artemis-accords-unilateralization-space-sat-10242020 (Accessed on 22.07.2023).

[375] Section 11, "The Artemis Accords"

[376] Loren Grush, "Why France signing NASA's lunar exploration pact is the most important signature yet", The Verge, June 10, 2022.https://www.theverge.com/2022/6/10/23159558/nasa-artemis-accords-france-signing-moon-exploration-significance (Accessed on 22.07.2023).

[377] "India signs global Artemis accord with US, to share data resources over Moon mission", India Today, June 24, 2023 https://www.indiatoday.in/science/story/india-signs-artemis-accord-us-nasa-share-data-resources-moon-mission-2397380-2023-06-24 (Accessed on 22.07.2023).

[378] "Germany contributes four billion euros and remains key partner of European spaceflight", Deutsches Zentrum für Luft un Raumfahrt, November 23, 2022 https://www.dlr.de/en/latest/news/2022/04/esa-ministerial-council-meeting-in-paris (Accessed on 22.07.2023).

The countries that stand against the Artemis Accords are China and Russia. Although there have been no official protests from these two countries regarding the Artemis agreement, the way the agreement is being discussed and the statements made by officials provide an insight into the attitude of these two countries. Dmitry Rogozin, the former Director of the State Space Corporation "Roscosmos" in Russia, described the Artemis Program as a US-centric political project. According to him, the program is similar to NATO rather than being truly international in nature.[379]

Chinese media has interpreted the Artemis Accords as a move by the United States to privatize outer space for its own benefit. Song Zhongping, a military commentator, compared the Accords to the "Enclosure Movement" in 18th-century Great Britain, where land that was previously shared among the public was privatized to benefit the wealthy. Song argued that this trend could result in colonization and the claiming of sovereignty over the lunar surface.[380] Political science professor Ma Zhanyuan, on the other hand, recognizes the lack of clarity in the area of space law, especially when it comes to extracting space resources. He claims that the United States is taking steps to address these ambiguous areas in international law through its own legislation, allowing for the extraction of space resources according to its own interests. However, he has noted that this may harm the interests of other countries.[381] Dai Xin, a legal professor, claims that the Artemis Accords are not legally binding and can be interpreted as a bilateral or multilateral arrangement primarily helping the interests of the United States, as there is no consensus from China and Russia.[382]

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[379] Loren Grush, "Head of Russian space program calls for more international cooperation in NASA's Moon plans", The Verge, October 12, 2020 https://www.theverge.com/2020/10/12/21512712/nasa-roscosmos-russia-dmitry-rogozin-artemis-moon-interntational-cooperation (Accessed on 22.07.2023) ; For the original interview in Russian: Alexander Milkus, "'С 2021 года начинаем российскую программу': Дмитрий Рогозин - о том, когда и с кем мы полетим на Луну", Komsomolskaya Pravda, July 15, 2020 https://www.kp.ru/daily/27155/4252526/ (Accessed on 22.07.2023).

[380] Elliot Ji, Michael B. Cerny, and Raphael J. Piliero, "What Does China Think About NASA's Artemis Accords?", The Diplomat, September 17, 2020 https://thediplomat.com/2020/09/what-does-china-think-about-nasas-artemis-accords/ (Accessed on 22.07.2023).

[381] Ibid.

[382] Ibid.

In summary, although Russia and China have not officially opposed the Accords through official state channels, they have made their positions known to the international community. Their official opposition could have legal, political, and economic implications, potentially affecting their bilateral relations with other countries that have joined or plan to join the Artemis Accords, such as India.

In addition to the risks identified by the international community regarding resource extraction from celestial bodies, the Artemis Accords also carry a risk of undermining pluralism in the realm of outer space through the Artemis Accords. As Din highlights, the United Nations provides a platform for all countries, regardless of their space capabilities, to express their concerns and reach consensus on issues related to the exploration and utilization of outer space.[383] However, the Artemis Accords establish a framework in which the United States defines the methods and fundamental principles of space activities and encourages other states to accept them through bilateral agreements. Although there is no obligation to become a party to these accords, it can be argued that this structure does not provide a multilateral environment similar to the United Nations, particularly for countries without spacefaring capabilities. Considering that even during the height of the Cold War, the United Nations provided a platform where the two superpowers could find common ground and prevent a war, the unipolar structure presented by the Artemis Accords carries the risk of leading to dangerous consequences in today's international competitive environment.

4.5. Space as a Security Domain

In the early part of the 1990s, with the fall of the Soviet Union and the end of the Cold War, the United States and Russia began to restore bilateral ties and engage in cooperation. The demise of the Soviet Union left no alternative system capable of competing with the United States' market economy and liberal political order. The United States aimed to strengthen ties with the newly constituted and economically weak Russia aiming to bring it into alignment with the established order and achieve

[383] Athar ud Din, "The Artemis Accords: The End of Multilateralism" p.147.

political stability. The fact that Russia inherited advanced military and nuclear capabilities from the Soviet Union made it an important actor in the new international order where the United States played a dominant role. In the 1990s, the United States also pushed to strengthen bilateral ties with China, aiming to incorporate it into the system as an actor committed to liberal economic principles. The United States expanded this integration to the space sector in the 1990s through accords with China and Russia, allowing them access to commercial space markets.[384]

Since the second part of the 1990s, China and Russia have had similar concerns about the United States. Russia and China, both of which prefer a multipolar international order, see the United States' economic supremacy and rising military strength as threats, leading them to form a strategic cooperation. With NATO's expansion to east, the U.S. strengthened its posture against Russia and formed bilateral partnerships for anti-terrorism with states surrounding Russia and China, sending military forces in their neighbouring countries. They became also aware of the possible threat presented by the United States' military supremacy in space, which may have an impact on their national security and global stability. Both nations actively cooperated and opposed the United States' departure from the ABM Treaty in 2002 and the Intermediate-Range Nuclear Forces (INF) Treaty in 2019, as well as plans to install a National Missile Defense system.[385]

In the Department of the Air Force, the U.S. Space Force was created by the US Congress in December 2019 as a separate military organization and independent form from the US Air Force. The document "Spacepower", published by the US Space Force in 2020 provided information about the doctrines that the US Space Force aims to follow. By defining space as a domain for security, the US Space Force presents its guideline and explains it as "space domain is the area above the altitude where atmospheric effects on airborne objects becomes negligible".[386]

[384] Louts, "Space Cooperation Under Anarchy", p.327.

[385] Ibid.

[386] JW Raymond, "Spacepower", The US Space Force, August 2020 https://www.spaceforce.mil/Portals/1/Space%20Capstone%20Publication_10%20Aug%202020.pdf (Accessed on 15.07.2023).

Alongside the creation of the US Space Force, 2019 also saw the adoption by the Allies of the NATO Space Policy, which recognises space as a new operational domain alongside cyberspace, air, land and sea. This policy directs NATO's use of space and ensures that its operations and missions in fields like communications, intelligence and navigation receive the proper support. Satellites are defined to enable NATO and the Allies to respond to emergencies more quickly, effectively, and precisely.

NATO interpreted Russia's war on Ukraine as a threat to the "rules-based international order" in the Strategic Concept adopted at the Madrid Summit in June 2022, and identified Russia as the "most significant and direct threat to Allies' security and to peace and stability in the Euro-Atlantic area". The Concept also included China, claiming that China presents "systemic challenges" to the Euro-Atlantic region. Consistent with the 2019 strategy, the Concept acknowledges space as a security area and emphasizes that Russia and China's actions are against NATO's interests and values.[387]

In January 2023, the NATO and the European Union issued a joint declaration underlining similar points to the Strategic Concept, claiming that China and Russia have engaged in detrimental measures to security and stability in the Euro-Atlantic area.[388]

In July 2023, government of Germany presented their new China strategy document. This new strategy hold importance as China is the biggest partner of Germany's in trade. Claiming that China is pursuing "assertive politics", the document names China as country's "partner, competitor and systemic rival". German government emphasized

[387] "NATO 2022 Strategic Concept", North Atlantic Treaty Organization, March 03, 2023 https://www.nato.int/cps/en/natohq/topics_210907.htm#:~:text=The%202022%20Strategic%20Concept%20describes,and%20management%3B%20and%20cooperative%20security. (Accessed on 23.07.2023).

[388] "Joint Declaration on EU-NATO Cooperation", North Atlantic Treaty Organization, January 09, 2023 https://www.nato.int/cps/en/natohq/official_texts_210549.htm?selectedLocale=en_(Accessed on 23.07.2023).

that they are analysing Chinese capabilities in outer space and carefully calculating the impact of these capabilities to their security.[389]

4.6. Conclusion

Following the Soviet Union's dissolution, the United States became the sole superpower. However, this unipolar situation was short-lived as Russia and China challenged the US's vision of a world order dominated by a single power, starting in the 1990s. Both China and Russia pursued a multipolar international order, leading to frequent confrontations with the US. This competition extended to space, where space security emerged as a critical aspect of various security strategies. The US's unilateral approach in defining space principles through the Artemis Accords and seeking acceptance from other countries through bilateral agreements, alongside its ongoing geopolitical competition with China and Russia, demonstrates that space has become an arena where global politics significantly impact decisions.

[389] Strategy on China, Auswaertiges Amt, July 13, 2023 https://www.auswaertigesamt.de/blob/2608580/49d50fecc479304c3da2e2079c55e106/china-strategie-en-data.pdf (Accessed on 15.07.2023).

CHAPTER 5

CONCLUSION

The Space Age began in 1957 with the launch of Sputnik-1, mankind's first artificial satellite into space. The intense competition of the Cold War, which began after the Second World War, extended beyond the Earth's atmosphere with the advent of the Space Age. During the Cold War, space became the domain of the United States and the Soviet Union and developed into a competition for military, political, economic and psychological supremacy between these two states.

After the 1950s, both the United States and the Soviet Union emerged as prominent actors in space operations and made significant advances in the development of space technology. Each side sought to demonstrate its technological superiority and present victories in space exploration as a symbol of its dominance on the global stage. Competition between the superpowers grew as the United States pursued space development in the 1950s and 1960s while lagging behind the Soviet Union. The successful Apollo 11 mission in 1969 was the result of the US taking the initiative to send men to the moon in order to gain prestige. In the early years of the space race, the United States lagged behind the Soviet Union in space exploration. As a result, the competition between the two countries became increasingly fierce. The United States embarked on a mission to send men to the moon in order to establish its supremacy and prestige in the space race. This project reached a major milestone in 1969 when the Apollo 11 mission successfully landed astronauts on the lunar surface. The Moon landing was a major success for the United States, demonstrating its improved technological capabilities and enhancing its status in space exploration. During this period, efforts were made to define fundamental principles and norms for space activities within the framework of the United Nations. Developing countries participated enthusiastically in these efforts, helping to develop concepts such as the

peaceful use of outer space, the use of space for the benefit of all mankind, and the prohibition of weapons of mass destruction in space. They also sought to prevent the division of space between the United States and the Soviet Union by emphasising the need for international cooperation in the exploration and use of space. During the Cold War, the development of space law reflected the ongoing inter-systemic competition. There are certain ambiguities in space law. These ambiguities arose from the conflicting beliefs and positions of the United States and the Soviet Union. Unlike the Soviet Union, the United States did not advocate total disarmament, which resulted in a lack of precise meaning for the concept of "peaceful purpose" in space law. Also under the influence of the Soviet Union, the Outer Space Treaty only recognised states as having legal responsibility for space operations, which prevented the private sector from participating in the treaty.

During the Cold War, China, India and some European Union countries emerged as spacefaring nations, although they were far behind the United States and the Soviet Union in terms of technology and funding. They relied on the United States and the Soviet Union to carry out most of their space missions. However, with the dissolution of the Soviet Union, the landscape changed, and the space sector grew to include a variety of companies and commercial operations. The space industry has become more commercialised and involves several sectors. Private space companies, which have existed since the beginning of the space age, have increased their activities in the United States as a result of neo-liberal economic policies and government funding.

Many developing and underdeveloped countries have also turned their attention towards the field of space exploration. The interest of these countries in space technology is driven by a mix of civilian and military needs. Some of these countries have large land areas, so they need satellites for things like communication, broadcasting, and monitoring the environment. Even smaller countries can benefit from satellites. They use data from satellites to join the global economy, improve education, use natural resources better, and take care of their environment. Their missile programs can be used for both civilian and military purposes. Countries such

as India, Brazil, South Korea, Israel, Pakistan, Argentina and Turkey, with a primary focus on India, have made efforts to commercialize their space activities and produce technologies with dual-use capabilities. In this regard, India, in particular, has taken notable strides and achieved considerable success. India's successful landing at the South Pole of the Moon in August 2023 signifies a significant shift in the once bipolar structure of the space arena during the Cold War. It marks an era where numerous emerging states have come to the forefront with their successful activities in this domain. This development has led to diversification in commercial relationships and the opening of new avenues for both competition and cooperation in the process of space commercialization.

In 2017, the Artemis programme was launched by the United States to boost space research and commercial activities and maintain American leadership in space. As the programme aims to continue through international collaboration, the United States is attempting to gain the participation of international actors by having them accept the terms of the project through a series of bilateral agreements known as the Artemis Accords. However, the Artemis Accords have been criticised from a variety of perspectives within the space community actors. The Artemis Accords carry the risk of exploitation of space resources. In addition to concerns about the exploitation of resources from celestial worlds, the Artemis Accords run the risk of reducing plurality in space. Unlike the United Nations, which allows all nations to voice their concerns and reach consensus on space exploration, the Artemis Accords provide a framework in which the US sets the principles of space activity and urges other governments to adopt them through bilateral agreements. Although not required, this system lacks the international involvement of the United Nations, particularly for countries without space capabilities. The unipolar nature of the Artemis agreements may have serious implications in today's international competitive climate, where the United Nations provides a platform for cooperation. It can be argued that the collapse of the Soviet Union made these breakthroughs in space possible. With the collapse of the Soviet Union, a systemic rival that threatened the American capitalist system and its dominance in space disappeared, allowing the United States to launch far-reaching projects that could actively involve the private sector. With the dissolution

of the Soviet Union, the United States briefly remained the sole superpower. This unipolar condition did not last long, however, as Russia and China began to challenge the US vision of a unipolar international order in the 2000s. Both China and Russia sought a multipolar international order, leading to frequent confrontations with the US. This competition extended to space, where space security began to be recognised as a domain of different security strategies. The US approach of unilaterally defining the principles governing the space domain through the Artemis Accords and seeking acceptance by other states through bilateral agreements, coupled with its ongoing geopolitical competition with China and Russia, reflects how space has become a domain where international politics come into play. The United States' efforts to constrain Russia and China in geopolitics through bilateral and regional international cooperation, as well as its unilateral decision-making in space with the Artemis programme, limit the ability of countries to find common ground and act on shared principles, both in the Cold War and post-Cold War eras.

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APPENDICES

A. TURKISH SUMMARY / TÜRKÇE ÖZET

Sovyetler Birliği, 1957 yılında ilk yapay uydu olan Sputnik-1'i başarılı bir şekilde yörüngeye fırlatarak uzay çağının başlangıcını işaret etmiştir. Bu gelişme, insan faaliyetlerinin kara, deniz ve atmosfer sınırlarının ötesine geçerek uzayın derinliklerine doğru genişlemesini mümkün kılmıştır. Uzayın keşfi, insanlık medeniyeti için önemli bir başarı olmakla birlikte, kısa bir süre içerisinde dünyadaki jeopolitik ve askeri politikalar uzay alanına da uygulanmıştır.

Soğuk Savaş'ın II. Dünya Savaşı'nı takip eden döneminde yoğunlaşan rekabet, Uzay Çağı'nın başlamasıyla birlikte uzay alanını da içine alan bir boyut kazanmıştır. Uzay, Amerika Birleşik Devletleri ve Sovyetler Birliği arasında rekabetin odak noktası haline gelmiş, bu iki süper güç arasında askeri, siyasi, ekonomik ve psikolojik üstünlüğün sağlanması amacıyla bir yarışa dönüşmüştür. Uzay teknolojilerinin gelişimi, yeni askeri tehditlerin ortaya çıkmasına sebep olmuştur; bu tehditler arasında nükleer silahların uzaya taşınması da bulunmaktadır.

Soğuk Savaş döneminde, uzay askeri amaçlar için kullanılmasına rağmen, zaman içinde uzayın silahlanmasını kısıtlayan ve askeri gücün kullanımını düzenleyen uluslararası bir rejim yavaşça şekillenmiştir. Sovyetler Birliği'nin 1957'deki Sputnik-1 fırlatışının ardından, Birleşmiş Milletler çatısı altında uzayın hukuki konuları üzerine tartışmalar başlamış ve böylelikle belli kuralların ve prensiplerin oluşturulması gerekliliği vurgulanmıştır. Bu bağlamda, Dış Uzay Antlaşması da dahil olmak üzere uzay hukukunun temelini oluşturan beş uluslararası antlaşma imzalanmıştır. Ancak iki süper gücün sistemsel farklılıkları anlaşmalarda belirsiz bırakılan noktaların olmasına yol açmış ve bu durum bazı prensiplerin yorumlanmasında tartışmalara veya farklılıklara neden olmuştur.

Sovyetler Birliği'nin 1991'de dağılmasının akabinde, Amerika Birleşik Devletleri tek başına süper güç pozisyonuna yükselmiştir. Ancak, bu tek kutuplu konjonktür kısa bir dönemle sınırlı kalmış, 1990'lı yılların sonlarından itibaren Rusya ve Çin, ABD'nin hegemonik dünya düzeni vizyonuna karşı çıkmaya başarmıştır. Hem Çin hem de Rusya, çok kutuplu bir uluslararası düzeni benimsemiş ve bu durum jeopolitik düzlemde sık sık ABD ile karşı karşıya gelmelerine neden olmuştur. Bu jeopolitik rekabet uzaya da genişlemiş, uzay güvenliği devletlerin güvenlik stratejilerinin önemli bir yönü olarak yeniden önem kazanmıştır. Sovyetler Birliği'nin dağılması ile birlikte uzay endüstrisindeki manzara da değişmiş, uzay alanındaki ticarileşme faaliyetleri hız kazanmıştır. Uzay sektörü çeşitli şirketler ve ticari operasyonları içerecek şekilde genişlemiştir. Çin, Hindistan ve Avrupa Birliği ülkeleri gibi uzay teknolojilerini geliştirmeye Soğuk Savaş yıllarında başlamış ülkelerin yanı sıra Brezilya, Güney Kore, Japonya gibi yeni ülkeler de uzay alanına Soğuk Savaş sonrasında dahil olmaya başlamıştır. Uzay çağının başlangıcından bu yana ABD'de var olan özel uzay şirketleri, 1980'ler sonrasında neo-liberal ekonomi politikalarının etkisi ve artan hükümet finansmanları sonucunda faaliyetlerini artırmışlardır.

2017 yılında Amerika Birleşik Devletleri tarafından Artemis programı başlatılmıştır. Bu program, uzay araştırmalarını ve uzay endüstrisindeki ticari faaliyetleri artırmayı amaçlayarak Amerika'nın uzaydaki liderliğini sürdürmeyi hedeflemektedir. Programın uluslararası işbirliği yoluyla devam etmesini amaçlayan Amerika Birleşik Devletleri, Artemis Antlaşmaları adını verdiği ikili sözleşmeler yoluyla uluslararası aktörlerin programa katılımının şartlarını belirlemiştir. ABD'nin uzay aktivitelerinin yürütülmesinde rehber alınacak prensipleri Artemis Anlaşmaları aracılığıyla tek taraflı olarak programa katılmak isteyen devletlere ön şart olarak kabul ettirmesi, uzay alanında Birleşmiş Milletler tarafından yaratılmış çok taraflı yapının bozulmasına ve uluslararası siyasetin rekabet ilişkilerinin uzay alanına yayılmasına yol açma riskini taşımaktadır.

Bu tez, Soğuk Savaş sonrası dönemde uluslararası siyasetin uzayın kullanımı bağlamında nasıl geliştiğini incelemektedir. Önde gelen aktörlerin uzay politikaları detaylı olarak ele alınmıştır. Soğuk Savaş yıllarının aksine günümüzde uzay farklı

özelliklere sahip geniş bir aktör yelpazesi tarafından kullanılmaktadır. Devletlerin yanı sıra özel şirketler de uzayın kullanımına katılmışlardır. Bu durum ülkeler arasında uzayın kullanımı açısından farklı ilişki dinamiklerinin gelişmesine neden olmuştur. Bu tez Artemis Antlaşmaları'nın üstünde durmaktadır; bu anlaşmalar, bağlayıcı olmasa da uzay aktivitelerini dönüştürme potansiyeline sahip olup, Amerika Birleşik Devletleri liderliğinde başlatılmıştır. Uzayın bir işbirliği ve rekabet alanı olarak nasıl evrildiği, uluslararası siyasetin etkisi altında nasıl şekillendiği ve ülkelerin uzay politikalarında kutuplaşmanın varlığı bu tezin ana araştırma sorularını oluşturmaktadır.

Bu tezde hem nitel hem de nicel araştırma yöntemleri kullanılmıştır. Birleşmiş Milletler altında imzalanan uzay hukuku antlaşmaları ve devletlerin uzay araştırmalarına yönelik olarak iç hukuklarında yaptığı düzenlemeler incelenmiştir. Ayrıca, bu tez için büyük önem taşıyan bağlayıcılığı olmayan Artemis Antlaşmaları da kullanılan kaynaklar arasındadır. Birincil kaynakların yanı sıra, tezin kapsamına giren makaleler, kitaplar, raporlar, anılar ve resmi konuşmalar gibi ikincil kaynaklar olarak kullanılmıştır. Özel sektörün gelişimini incelemek için istatistiksel verilerden yararlanılmıştır.

Bu tezin ikinci bölümünde, Soğuk Savaş döneminde devletlerin uzay araştırmalarına yönelmelerini tetikleyen temel motivasyon kaynakları ele alınmıştır. 2. Dünya Savaşı'nın ardından iki kutuplu bir dünya düzeni ortaya çıkmıştır ve ortaya çıkan yeni jeopolitik düzen, SSCB ve ABD etrafında şekillenmiştir. Her iki sistemin sürdürülebilirliği, ülkelerinin içinde ve uluslararası toplumla etkileşimlerinde karşıt bir sistemin varlığı ve yayılmasının etkisiyle tehlikeye düşmüştür. Bu iki sistem arasında ortaya çıkan rekabet kısa bir süre içinde uzay alanına da yayılmıştır.

Uzay teknolojilerine yönelik çalışmalar, 19. yüzyılda başlamış ve 2. Dünya Savaşı sonrasında ivme kazanmıştır. 2. Dünya Savaşı sırasında Alman mühendislerinin geliştirdiği V-2 roketi, balistik füzelerin dünya çapında gelişimine öncülük etmiş, ABD ve Sovyetler Birliği'nin 2. Dünya Savaşı'nın ardından girdikleri silahlanma yarışı bu alandaki hızlı ilerlemelere kapı aralamıştır. Sovyetler Birliği ilk yapay uydu olan Sputnik-1'i 1957 yılında başarılı bir şekilde uzaya göndermiştir. Sovyetler

Birliği uzay alanında pek çok ilki başarmıştır. Luna-1 1959 yılında aya inen ilk insan yapımı araç olmuş, Yuri Gagarin de 1961 yılında uzaya çıkan ilk insan olmayı başarmıştır. Sovyetler Birliği'nin bu başarıları ABD tarafından geriden takip edilmiştir. Sputnik-1'in başarılı bir şekilde fırlatılması ve Sovyetler Birliği'nin arka arkaya gelen başarıları ABD tarafından Soğuk Savaş rekabeti nedeniyle nükleer silah tehdidi endişesiyle değerlendirilmiştir. 1958 yılında ABD Başkanı Eisenhower liderliğinde Ulusal Havacılık ve Uzay Dairesi (NASA) kurularak, havacılık ve uzay alanlarındaki faaliyetlerin barışçıl ve bilimsel amaçlarla kullanımının potansiyel faydaları, imkânları ve karşılaşılacak zorlukları uzun vadeli olarak ele alınarak, ABD'nin havacılık ve uzay bilimi ile teknolojisinde lider rolü üstlenmesi öngörülmüştür.

Soğuk Savaş sırasında gelişen uzay çalışmaları Soğuk Savaş'ın sonuna değin büyük oranda askeri açıdan değerlendirilmiştir. Bu dönemde uzaya yönelik askeri tartışmalar iki eksende gelişmiştir. İlk eksen uzayın askerileşmesi ve silahlandırılması temelinde kurulmuştur. Uzayın askerileştirilmesi ve silahlandırılması, birbiriyle ilişkili fakat aynı zamanda farklı kavramlardır. Askerileştirme, dünya üzerindeki askeri operasyonlara destek sağlamak amacıyla uzay teknolojisinin kullanılmasını içerir; bu, iletişim, izleme ve istihbarat toplama gibi faaliyetleri kapsar, ayrıca askeri hedefler için uydu gibi uzay tabanlı varlıkların geliştirilmesini de içerir. Uzayın askerileştirilmesi, yalnızca askeri amaçlara değil, aynı zamanda sivil amaçlara da katkıda bulunabilir. Silahlandırma ise Dünya veya uzaydaki nesneleri yok edebilme yeteneğine sahip cihazların kullanılmasını ifade eder. Bu tür cihazların uzayda konuşlandırılmasını içerir. Ancak, uzay silahları ve uzayın silahlandırılması için uluslararası olarak kabul edilen bir tanım bulunmamaktadır. Dahası, uzayın silahlandırılıp silahlandırılmadığı sorusu, alandaki en çok tartışılan konulardan biridir. Çoğunluk, uzayın henüz silahlandırılmadığı konusunda anlaşsa da, bu fikre karşı çıkan uzmanlar da bulunmaktadır. Uzay ile hava sahası arasında net sınırların olmaması, uzay teknolojilerinin çift kullanımlı doğası ve uydu gibi teknolojilerin varlığı uzayın silahlandırılmasıyla ilgili tartışmanın temelini oluşturur. Soğuk Savaş döneminde, uzay silahlarının güvenlik boyutuyla ilgili iki temel tartışma meydana gelmiştir. İlk tartışma, nükleer silahlar taşıyan bombardıman uydularının geliştirilmesinin gelişen teknolojiyle mümkün hale

gelmesidir. İkinci tartışma konusu ise ABD Başkanı Reagan tarafından 1983'te ilan edilen Stratejik Savunma Girişimi (SDI) ile başlayan nükleer füzelere karşı uzaya bütünleşmiş savunma sistemi projeleriydi.

Uzaya yönelik askeri tartışmaların ikinci ekseni ise nükleer doktrinler üzerine olmuştur. Nükleer silahlara ilişkin olarak dört temel doktrin bulunmaktadır. Koruma alanı doktrini uzayın silahlandırılmasına karşı çıkmaktadır. Bu doktrin silahlanmayı sınırlama anlaşmalarının kabul edilmesinin uzay teknolojileri olmadan mümkün olmayacağını iddia etmektedir. Uzay teknolojileri, kullanımlarıyla ülkelerin sınırlarının içini görebilmeyi mümkün kılmaları nedeniyle iki süper güç arasındaki ilişkilerde önemli bir istikrar sağlamıştır. Sağkalabilirlik doktrini uzay teknolojilerinin diğer askeri unsurlara oranla daha savunmasız olduklarını vurgulayarak bu sorunun çözümünü sistemlerin sağkalabilirliğini artırmakta bulmuştur. Üstün konum doktrinine göre uzay bir savaşın sonucunu belirlemede kritik bir rol oynayabilir ve uzay kuvvetleri kara kuvvetlerine karşı üstünlük kazanabilir. Bu okul, Başkan Reagan'ın Stratejik Savunma Girişimi (SDI) projesinden etkilenmiştir. Uzay kontrolü doktrini ise uzay ile hava ve deniz alanları arasında benzerlik kurar. Amaç uzay ortamını saldırı ve savunma operasyonları aracılığıyla kontrol altına almaktır. Bu okul, keşif, güç artırma ve güç uygulama gibi askeri görevlerin yanı sıra uzay keşfi ve ticari kullanım gibi askeri olmayan konularla da ilişkilidir.

ABD 2. Dünya Savaşı'nın bittiği ve Soğuk Savaş'ın başladığı ilk yıllarda askeri bütçede küçülmeye gidilmesi nedeniyle uzay alanına yoğunlaşmamıştı. Ancak bu durum Eisenhower'ın başkanlık koltuğuna oturmasıyla değişti. Eisenhower'ın uzay politikası, ABD'nin uzayın keşfine yaklaşımını yönlendiren üç temel hedefi içeriyordu. İlk hedef, uzay teknolojisini kullanarak kapalı bir devlet yapılanmasına sahip olan Sovyetler Birliği'nin sınırlarının içini gözetlemek ve hakkında istihbarat toplamaktı. Bunun için keşif uyduları kullanılması gerekiyordu. İkinci hedef ise ilk hedefle bağlantılı olarak, keşif görevleri de dahil olmak üzere uyduların "barışçıl amaçlarla" ülkelerin üzerinden serbest geçişini meşrulaştıracak yeni bir uluslararası hukuki çerçeve oluşturmak için politikalar geliştirmeyi içeriyordu. Üçüncü hedef ise uzay hakkında bilgi ve anlayışı genişletmeye yönelik bilimsel çabalara

odaklanıyordu. Bu dönemdeki önemli bir aşama, ABD'nin uzaydan kıtalararası mesafelere uydu veya savaş başlıkları fırlatabilecek güçlü roket iticileri geliştirmesi gerekliliğiydi, çünkü bu teknoloji üç hedefi de gerçekleştirmenin temelini oluşturuyordu. Sputnik-1'in fırlatılması ikinci hedefin başarıyla gerçekleşmesinin yolunu açmıştı çünkü uydunun devletlerin hava sahalarının üstünde uçmasına uluslararası toplumdan itiraz gelmemişti. Sputnik-1 ayrıca uzayın güç mücadelelerinin görüleceği bir alan olarak ortaya çıkmasına da yol açmıştır. Bunun yanı sıra Sputnik-1 ABD ordusuna uydu imha silahları (ASAT) geliştirebilmeleri için yeterli meşruiyeti de sağlamıştır.

Amerikan Uzay Programı'nın dönüşümü ve gelişiminde ABD Başkanı John F. Kennedy önemli bir rol oynamıştır. İki kutuplu bir sistemde uzay yarışında önde olmanın getirdiği psikolojik üstünlük ve saygınlığın farkında olan Kennedy, uzay faaliyetlerine ayrılan bütçeyi önemli ölçüde artırmış ve bir dizi araştırma tesisi projesi başlatmıştır. Uzay yarışında kazanılacak zaferlerin İkinci Dünya Savaşı sonrasında ortaya çıkmış veya yükselişe geçmiş yeni devletlerin üzerinde bir etki alanı oluşturacağı ve sistemin iki kutbundan biri olarak liderliğini güçlendireceği öngörülerek Apollo olarak bilinen Aya insan gönderme ve geri getirme projesi başlatılmıştır. Bu proje, 1969'da Apollo 11 ekibinin Ay'a ayak basmasıyla başarılı bir sonuç elde etmiştir. Apollo görevlerinin başarısının ardından, Amerika Birleşik Devletleri kendisini Uzay Yarışı'nın "kazananı" olarak görmesine rağmen, Apollo'nun ardından gelen dönem, Amerikan uzay programını daha ileri başarılar için çaba sarf etmeye teşvik etmemiştir. Bunun yerine, NASA çoğunlukla yetersiz bütçe ve azalan kamu ilgisi gibi zorluklarla karşı karşıya kalmıştır.

1960'lı yıllarda başlayan ve 1970'li yıllar boyunca süren Soğuk Savaş'ın yumuşama dönemi Stratejik Silahların Sınırlandırılması Görüşmeleri'nin ardından imzalanan SALT-1 ve SALT-2 Antlaşmaları ve 1972'de imzalanarak nükleer silah taşıyan balistik füzelerin sınırlandırılmasını sağlayan Anti-Balistik Füze Antlaşması ile neticelenmiştir. SALT II Antlaşmasının Amerikan Senatosu tarafından hiçbir zaman onaylanmaması ve 1979'da Sovyetler Birliği'nin Afganistan'ı işgali ile yumuşama dönemi sona erdi. 1981 yılında göreve başlayan Başkan Reagan'ın yönetimi ABD uzay politikasının temel amaçlarını yeniden belirlemiştir. Reagan yönetimi uzayda

karşılaşılabilecek tehditlere karşı Amerikan uzay sistemlerinin caydırıcılığını artırarak ASAT yeteneğini geliştirmeye odaklanmıştır. Ayrıca, ABD'nin uzay araç ve teçhizatına yönelik tehditleri tespit edebilen ve böyle tehditler gerçekleşirse olağanüstü durum planları sunabilen bir programın kurulması gerekliliğine karar verilmiştir. Bu amaçla 1983'te Stratejik Savunma Girişimi tanıtılmış, uzayın stratejik savunma amaçları için kullanıma ilişkin araştırma ve geliştirme programının başlatılacağına işaret edilmiştir. Ocak 1986'da Challenger felaketinin gerçekleşmesinin de etkisiyle ABD uzay politikası yeniden gözden geçirildi. Revize edilen politika özet olarak ABD'nin ulusal güvenliğini sağlama ve uzay tabanlı yeteneklerini koruma ihtiyacını yansıtmıştır.

Eisenhower'dan başlayarak tüm Amerikan Başkanları uzay araştırmalarında Amerikan liderliğini sürdürmeyi temel amaç olarak belirlemişlerdir ve bu amaç günümüzde de devam etmektedir. Ancak Reagan kendinden önceki başkanlardan farklı olarak federal harcamalarda azalmaya gitmiş ve özelleştirmeyi amaçlayan yasal düzenlemelerin uygulanmasına başlamıştır. Bu tez Amerikan uzay sektöründeki neoliberal politikaların etkisiyle gerçekleşen ticarileşme faaliyetlerini incelemiş ve hükümetlerin özel sektörü teşvik etmek amacıyla yapmış olduğu yasal düzenlemeler değerlendirilmiştir.

Sovyetler Birliği'nin uzay çalışmaları 19. yüzyıla dayanmaktadır. ABD'nin 2. Dünya Savaşı'nın son döneminde nükleer silah elde etmesi, Stalin liderliğindeki Sovyetler Birliği yönetimini askeri teknolojileri hızla geliştirmeye yönelmesine neden olmuştur. Sovyet roket teknolojisi 1957 yılında ilk yapay uydu olan Sputnik-1'in başarılı bir şekilde yörüngeye yerleştirilmesi ile kendisini ispatlamıştır.

Sovyet programı esas olarak askeri amaçlıdır ve balistik füze gelişimine odaklanmıştır. Süper güçler, uzay keşfi konusunda farklı yaklaşımlara sahiptir. Amerika Birleşik Devletleri'nin aksine, Sovyetler Birliği, askeri ile paralel ilerleyen sivil bir uzay programı kurmamıştır. Sovyetler Birliği çoğunlukla koruma alanı doktrinini uygulamıştır. Keşif uyduları ve okyanus gözetleme uyduları kullanarak silahlanmanın kontrol altında tutulması hedeflenmiştir. Sovyetler Birliği Soğuk Savaş döneminde stratejik silahları kısıtlayan uluslararası anlaşmaları güçlendirmeyi

ve uzayın silahsız bir ortam haline gelmesini teşvik etmeyi amaçlamıştır. Bu tez ABD ve Sovyetler Birliği'nin uzaydaki karşılıklı konumlarını analiz ederek uzay politikalarının yıllar içindeki değişimlerini incelemektedir.

Soğuk Savaş döneminde Çin, Hindistan ve Avrupa Birliği uzay alanında araştırma yapan diğer ülkelerdir. Bu devletlerin uzaya yönelmelerindeki temel motivasyon kaynakları bu tezin incelediği konulardan biridir. Özet olarak bu devletlerin ekonomik fayda elde etmek ve güvenlik endişeleri nedeniyle uzay araştırmaları yapmaya yöneldikleri tespit edilmiştir. Ancak bu devletlerin ABD ve Sovyetler Birliği ile rekabet edebilecek düzeye gelemedikleri ve uzay teknolojilerini büyük oranda bu iki devletin mali ve teknik yardımları ile geliştirebildikleri söylenebilir.

Amerika Birleşik Devletleri ve Sovyetler Birliği'nin uzay keşfinde hâkimiyet kurduğu Soğuk Savaş döneminde uzayın kullanımına ilişkin çeşitli endişeler mevcuttu. Uzay teknolojisi olmayan ülkeler, iki süper gücün güneş sistemi boyunca koloniler kuracağından endişe etmişlerdir. Ayrıca hem ABD hem de Sovyetler Birliği, rakibinin uzayda kesin bir üstünlük kurmasından endişe etmiştir. ABD'nin uzay araştırmalarında Sovyetler Birliği'ni geriden takip ediyor olması duyduğu endişeyi artırmıştır. Bu nedenlerle ülkeler Birleşmiş Milletler çatısı altında toplanarak uzay araştırmalarında takip edilecek temel prensipleri belirlemişlerdir. Tüm ülkelerin, gelişmişlik durumlarından bağımsız olarak, uzayın araştırılması ve kullanımı konusunda özgür olduğu kabul edilmiştir. Kitle imha silahlarının uzaya yerleştirilmesi ve egemenlik anlamına gelebilecek her türlü eylem yasaklanmıştır.

ABD ve Sovyetler Birliği uzay hukuku alanında uluslararası düzenlemelerinin oluşturulması süresince birbirlerinden farklı pozisyonlar almışlardır. Sovyetler Birliği, uzay faaliyetlerini düzenleyen kapsamlı bir uluslararası hukuk çerçevesi oluşturmak için antlaşmalar imzalanmasını savunurken ABD çeşitli konuları düzenleyen BM kararlarının yeterli olacağı görüşünü savunmuştur. 3. Dünya ülkelerinin bu konuda Sovyetler Birliği'ne destek vermesi Dış Uzay Antlaşması başta olmak üzere 5 uluslararası antlaşma ile neticelenmiştir. Ancak Sovyetler Birliği'nin uzayda tam silahsızlanma planı başarılı olamamış, uzayın askeri amaçlarla kullanımı mümkün kılınmıştır. Özel sektörün uzaydaki konumu, “egemenlik” kavramının

niteliği, uzayın sınırı gibi pek çok konu ABD ve Sovyetler Birliği'nin karşıt konumları nedeniyle belirsiz kalmıştır. ABD bu belirsiz konuları kendi iç yasalarıyla düzenlemiş ve milli menfaatlerine uygun bir şekilde yorumlamıştır. Tezin 3. bölümü uzay hukuku alanında kabul edilen temel prensipleri incelemekte ve bu alandaki farklı yorumları değerlendirmektedir.

1991 yılında Sovyetler Birliği'nin dağılması, Soğuk Savaş döneminin sonunu işaret etmiş ve dünya siyasi ve ekonomik sahnesinde önemli değişikliklere yol açmıştır. Sovyetler Birliği'nin dağılışıyla birlikte, güç dengeleri değişmiştir. ABD'nin karşısında rakip bir süper güç kalmamıştır ve ABD, uluslararası ilişkilerde tek başına belirleyici bir konum kazanmıştır. Liberal ekonomi modelinin yayılması ve diğer ülkelerin sisteme eklemlenerek benzer bir yaklaşım benimsemesiyle ABD uluslararası kapitalist düzenin öncü ve belirleyici aktörü haline gelmiştir. 1990'ların ortasında, Rusya ve Çin gibi ülkelerin zayıflığı, ABD'nin küresel kapitalist sistemde tek kutuplu üstünlüğünü sürdürmesine olanak tanımıştır. Ancak 2000'lerin başından itibaren hem Çin hem de Rusya, bu tek kutuplu paradigmayı sorgulayarak, ABD ile çeşitli durumlarda jeopolitik anlamda karşı karşıya gelmiştir.

Soğuk Savaş sonrası dönemde kendisine sistemsel açıdan meydan okuyan rakibinin etkisiz kalmasıyla ABD, uzayın ticarileştirilmesi ve özelleştirilmesi çalışmalarına hız vermiş ve yasal düzenlemelerle özel uzay şirketlerini teşvik eden adımlar atmıştır. Milyarder girişimcilerin uzay alanına yönelmesiyle SpaceX, Blue Origin, Virgin Galactic gibi uzay alanında faaliyet gösteren özel şirketler kurulmuş ve bu şirketler Amerikan hükümetleri tarafından geliştirecekleri projeler için yüksek meblağdaki fonlarla desteklenmişlerdir. ABD'nin yanı sıra Çin, diğer alanlarda olduğu gibi uzay alanında da önemli bir rakip olarak ortaya çıkmıştır. Avrupa Birliği ülkeleri, Hindistan, Japonya, Brezilya, Güney Kore gibi pek çok ülke uzay alanındaki yatırımlarını artırmış ve bu alanda başarılı sonuçlar almaya başlamışlardır. ABD 2017 yılında Ay'a insanlı yolculukların tekrar başlamasını da içeren yeni bir uzay politikası belirlemiştir. Artemis Programı adı verilen bu proje kapsamında uluslararasıı işbirliğine izin verecek aşamalar belirlenmiştir. ABD, programa katılmak isteyen ülkelere Artemis Antlaşmaları'nın imzalanmasını katılımlarına ön şart olarak sunmuştur. Bu tezin 4. bölümü Soğuk Savaş sonrası uzay çalışmalarına

odaklanmakta ve uluslararası siyasetin uzay politikalarını nasıl şekillendirdiğini anlamaya çalışmaktadır. Artemis Antlaşmaları'nın uluslararası işbirliği ve rekabet açısından ne anlama geldiği analiz edilip Çin ve Rusya'nın bu antlaşmalara olan yaklaşımı değerlendirilerek antlaşmanın uluslarararası ilişkiler açısından önemi vurgulanmaktadır.

Bu bölümde öncelikle uzayın ticarileşmesi tarihsel olarak incelenmektedir. Özel uzay şirketleri Soğuk Savaş'ın her döneminde mevcutsa da uzayın ticarileşmesi 1980'li yıllarda neoliberal politikaların etkisi ile gerçekleşmiştir. Soğuk Savaş'ın büyük çoğunluğunda özel şirketler ABD'nin belirlediği sınırlar içinde hareket edebilmiş ve askeri kuvvetlerin ihtiyaçlarına yönelik üretim yapabilmişlerdir. Sovyetler Birliği ve sosyalist blokun bir tehdit olmaktan çıkması ile birlikte ABD özel sektörünü teşvik eden adımlar atmış ve uzayda özelleştirme çalışmalarına girişmiştir. Uzay çalışmaları ileri teknoloji gerektirmektedir ve bu da yüksek maliyet demektir. Uzay çalışmalarının yüksek maliyetli oluşu devlet desteğini mecbur bırakmıştır. Bunun yanı sıra uzay madenciliği çok yüksek miktarda kar vaat etmektedir. Ancak uzay madenciliği henüz somut olarak gerçekleşebilmiş değildir. Gerçekleşebiliyor olsa da mevcut uluslararası hukuk kuralları uzayda egemenlik iddiasında bulunmayı açık bir şekilde yasaklamaktadır. Uluslararası hukuk kuralları oluşturulurken özellikle ABD bazı konuların belirsiz bırakılmasını sağlamıştır. Bu konulardan biri de özel şirketlerin rolüdür. Dış Uzay Antlaşması özel şirketlere yer vermemiş ve uzay çalışmalarında tüm yetki ve sorumluluk devletlere verilmiştir. Ancak özel şirketlerin eylemleri yasaklanmamıştır. Dolayısıyla özel şirketlerin uzay çalışmalarındaki konumu yoruma açıktır ve ABD bu alanda yasal düzenlemeler yapmıştır. 2015 yılında yasalaşan ABD Ticari Uzay Fırlatma Rekabet Edebilirlik Yasası bu düzenlemelerin başında gelmektedir. Bu yasa ile ABD vatandaşlarına bir asteroit kaynağı elde edildiğinde, elde edilen uzay kaynağına sahip olma, bunu yasalara uygun olarak sahiplenme, mülkiyetini elde etme, taşıma, kullanma ve satma hakkı verilmiştir. Her ne kadar Dış Uzay Antlaşması'nda egemenlik iddiası yasaklanmış olsa da bu yasa uzay hukuku bağlamında gök cismi üzerinde hak iddia edilmediği, sadece kaynak üzerinde sahiplik ilişkisi kurulduğu yorumuna sahiptir.

Artemis Antlaşmaları bu açıdan büyük önem taşımaktadır. ABD özel şirketler ve uzay kaynaklarının sahipliği bağlamında kabul etmiş olduğu uzay hukuku yorumunu antlaşma metnine de yansıtmıştır. Dolayısıyla ABD milli çıkarları doğrultusunda oluşturduğu uzay hukuku yorumuna uluslararası bir nitelik kazandırmış ve uzay programına katılımın ön şartı olarak bu yorumu pek çok devlete kabul ettirmiştir. Çin ve Rusya tarafından kabul edilmeyen bu antlaşmanın uluslararası bağlayıcılığı bulunmasa da Birleşmiş Milletler'in çok taraflı doğasına paralel bir yapı oluşturma riskini beraberinde getirmiştir. Birleşmiş Milletler, özellikle uzay teknolojisine sahip olmayan devletlere uzaydaki çıkarlarını savunabilecekleri bir platform olanağı sağlamaktadır. ABD'nin kendi çıkarlarına uyan prensiplerini tek taraflı olarak kararlaştırdığı ve devletlerle ikili antlaşmalar yaparak Artemis Antlaşmaları adı altında bir araya getirdiği unutulmamalıdır. Antlaşmaya ilişkin bir başka önemli nokta ise uzay kaynaklarının kullanımı uygulamasının nasıl yapılacağının belirlenmemiş olmasıdır. Bu durum uzay kaynaklarının gelişmiş devletler tarafından sınırsızca sömürülmesine yol açma riskini meydana getirmektedir. Bu durum gelişmiş devletlerle gelişmekte olan ve gelişmemiş devletler arasındaki uçurumun açılmasına ve ülkeler arasındaki eşitsizliğin daha da çok artmasına yol açacaktır. Uzay son yıllarda NATO ve Avrupa Birliği tarafından yayınlanan bildirilerde deniz, kara, havanın yanı sıra rekabet edilecek ve güvenlikleştirilecek yeni bir mücadele alanı olarak tanımlanmaktadır. Bu bildirilerde aynı zamanda Çin ve Rusya'nın Atlantik güvenliğine yönelik bir tehdit olarak değerlendirildiği görülmektedir. Tüm bu gelişmeler beraber değerlendirildiğinde uzay alanında rekabetin gelecekte çok daha artacağı tespit edilmiştir.

B. TREATY ON PRINCIPLES GOVERNING THE ACTIVITIES OF STATES IN THE EXPLORATION AND USE OF OUTER SPACE, INCLUDING THE MOON AND OTHER CELESTIAL BODIES[390]

The States Parties to this Treaty,

Inspired by the great prospects opening up before mankind as a result of man's entry into outer space,

Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes,

Believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development,

Desiring to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes,

Believing that such cooperation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples,

Recalling resolution 1962 (XVIII), entitled "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space", which was adopted unanimously by the United Nations General Assembly on 13 December 1963,

[390] United Nations, *Treaty Series*, vol. 610, No. 8843.

Recalling resolution 1884 (XVIII), calling upon States to refrain from placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction or from installing such weapons on celestial bodies, which was adopted unanimously by the United Nations General Assembly on 17 October 1963,

Taking account of United Nations General Assembly resolution 110 (II) of 3 November 1947, which condemned propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression, and considering that the aforementioned resolution is applicable toouter space,

Convinced that a Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, will further the purposes and principles of the Charter of theUnited Nations,

Have agreed on the following:

Article I

The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

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

There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.

Article II

Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

Article III

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

Article IV

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

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

Article V

States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle.

In carrying on activities in outer space and on celestial bodies, the astronauts of one State Party shall render all possible assistance to the astronauts ofother States Parties.

States Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts.

Article VI

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non- governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the inter- national organization and by the States Parties to the Treaty participating in such organization.

Article VII

Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, andeach State Party from whose territory or facility an object is launched, is inter- nationally liable for damage to another State Party to the Treaty or to its naturalor juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.

Article VIII

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Owner- ship of objects launched

into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data priorto their return.

Article IX

In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle ofcooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the Moon and othercelestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shalladopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment.

Article X

In order to promote international cooperation in the exploration and use of outer space, including the Moon and other celestial bodies, in conformity with the purposes of this Treaty, the States Parties to the Treaty shall consider on a basis of

equality any requests by other States Parties to the Treaty to be afforded an opportunity to observe the flight of space objects launched by those States.

The nature of such an opportunity for observation and the conditions under which it could be afforded shall be determined by agreement between the States concerned.

Article XI

In order to promote international cooperation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the Moon and other celestial bodies, agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities. On receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.

Article XII

All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other States Parties tothe Treaty on a basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations maybe held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

Article XIII

The provisions of this Treaty shall apply to the activities of States Parties to the Treaty in the exploration and use of outer space, including the Moon and other celestial bodies, whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international intergovernmental organizations.

Any practical questions arising in connection with activities carried on by international intergovernmental organizations in the exploration and use of outer

space, including the Moon and other celestial bodies, shall be resolved by the States Parties to the Treaty either with the appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty.

Article XIV

1. This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force upon the deposit of instruments of ratification by five Governments including the Governments designated as Depositary Governments under this Treaty.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Treaty, the date of its entry into force and other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article XV

Any State Party to the Treaty may propose amendments to this Treaty. Amendments shall enter into force for each State Party to the Treaty accepting the amendments upon their acceptance by a majority of the States Parties to the Treaty and thereafter for each remaining State Party to the Treaty on the date of acceptance by it.

Article XVI

Any State Party to the Treaty may give notice of its withdrawal from the Treaty one year after its entry into force by written notification to the Depositary Governments. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article XVII

This Treaty, of which the Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signedthis Treaty.

DONE in triplicate, at the cities of London, Moscow and Washington, D.C.,the twenty-seventh day of January, one thousand nine hundred and sixty-seven.

C. AGREEMENT ON THE RESCUE OF ASTRONAUTS, THE RETURN OF ASTRONAUTS AND RETURN OF OBJECTS LAUNCHED INTO OUTER SPACE

The Contracting Parties,

Noting the great importance 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,1 which calls for the rendering of all possible assistance to astronauts in the event of accident, distress or emergency landing, the prompt and safe return of astronauts, and the return of objects launched into outer space,

Desiring to develop and give further concrete expression to these duties,

Wishing to promote international cooperation in the peaceful exploration and use of outer space,

Prompted by sentiments of humanity,

Have agreed on the following:

Article 1

Each Contracting Party which receives information or discovers that the personnel of a spacecraft have suffered accident or are experiencing conditions of distress or have made an emergency or unintended landing in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State shall immediately:

(a) Notify the launching authority or, if it cannot identify and immediately communicate with the launching authority, immediately make a public announcement by all appropriate means of communication at its disposal;

(b) Notify the Secretary-General of the United Nations, who should disseminate the information without delay by all appropriate means of communication at his disposal.

Article 2

If, owing to accident, distress, emergency or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of a Contracting Party, it shall immediately take all possible steps to rescue them and render them all necessary assistance. It shall inform the launching authority and also the Secretary-General of the United Nations of the steps it is taking and of their progress. If assistance by the launching authority would help to effect a prompt rescue or would contribute substantially to the effectiveness of search and rescue operations, the launching authority shall cooperate with the Contracting Party with a view to the effective conduct of search and rescue operations. Such operations shall be subject to the direction and control of theContracting Party, which shall act in close and continuing consultation with the launching authority.

Article 3

If information is received or it is discovered that the personnel of a space-craft have alighted on the high seas or in any other place not under the jurisdiction of any State, those Contracting Parties which are in a position to do so shall, if necessary, extend assistance in search and rescue operations for such personnel to assure their speedy rescue. They shall inform the launching authority and the Secretary-General of the United Nations of the steps they are taking and of their progress.

Article 4

If, owing to accident, distress, emergency or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of a Contracting Party or have been found on the high seas or in any other place not underthe jurisdiction of any State, they shall be safely and promptly returned to representatives of the launching authority.

Article 5

1. Each Contracting Party which receives information or discovers that a space object or its component parts has returned to Earth in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State, shall notify the launching authority and the Secretary-General of the United Nations.

2. Each Contracting Party having jurisdiction over the territory on which a space object or its component parts has been discovered shall, upon the request of the launching authority and with assistance from that authority if requested, take such steps as it finds practicable to recover the object or component parts.

3. Upon request of the launching authority, objects launched into outer space or their component parts found beyond the territorial limits of the launching authority shall be returned to or held at the disposal of representatives of the launching authority, which shall, upon request, furnish identifying data prior to their return.

4. Notwithstanding paragraphs 2 and 3 of this article, a Contracting Party which has reason to believe that a space object or its component parts discovered in territory under its jurisdiction, or recovered by it elsewhere, is of a hazardous or deleterious nature may so notify the launching authority, which shall immediately take effective steps, under the direction and control of the said Contracting Party, to eliminate possible danger of harm.

5. Expenses incurred in fulfilling obligations to recover and return a space object or its component parts under paragraphs 2 and 3 of this article shall be borne by the launching authority.

Article 6

For the purposes of this Agreement, the term "launching authority" shall refer to the State responsible for launching, or, where an international inter- governmental organization is responsible for launching, that organization, pro- vided that that organization declares its acceptance of the rights and obligations provided for in this Agreement and a majority of the States members of that organization are Contracting Parties to this Agreement and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article 7

1. This Agreement shall be open to all States for signature. Any State which does not sign this Agreement before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Agreement shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, which are hereby designated the Depositary Governments.

3. This Agreement shall enter into force upon the deposit of instruments of ratification by five Governments including the Governments designated as Depositary Governments under this Agreement.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Agreement, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Agreement, the date of its entry into force and other notices.

6. This Agreement shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article 8

Any State Party to the Agreement may propose amendments to this Agreement. Amendments shall enter into force for each State Party to the Agreement accepting the amendments upon their acceptance by a majority of the States Parties to the Agreement and thereafter for each remaining State Party to the Agreement on the date of acceptance by it.

Article 9

Any State Party to the Agreement may give notice of its withdrawal from the Agreement one year after its entry into force by written notification to the Depositary

Governments. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article 10

This Agreement, of which the Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Agreement shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Agreement.

DONE in triplicate, at the cities of London, Moscow and Washington, D.C., the twenty-second day of April, one thousand nine hundred and sixty-eight.

D. CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS

The State Parties to this Convention,

Recognizing the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes,

Recalling the Treaty on Principles Governing the Activities of States in theExploration and Use of Outer Space, including the Moon and Other Celestial Bodies,

Taking into consideration that, notwithstanding the precautionary measures to be taken by States and international intergovernmental organizations involved in the launching of space objects, damage may on occasion be caused by suchobjects,

Recognizing the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment under the terms of this Convention of a full and equitable measure of compensation to victims of such damage,

Believing that the establishment of such rules and procedures will contribute to the strengthening of international cooperation in the field of the exploration and use of outer space for peaceful purposes,

Have agreed on the following:

Article I
For the purposes of this Convention:

(c) The term "damage" means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations;

(d) The term "launching" includes attempted launching;

(e) The term "launching State" means:

(i) A State which launches or procures the launching of a space object;

(ii) A state from whose territory or facility a space object is launched;

(f) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof.

Article II

A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight.

Article III

In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

Article IV

1. In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, and of damage thereby being caused to a third State or to its natural or juridical persons, the first two States shall be jointly and severally liable to the third State, to the extent indicated by the following:

(a) If the damage has been caused to the third State on the surface of the Earth or to aircraft in flight, their liability to the third State shall be absolute;

(b) If the damage has been caused to a space object of the third State or to persons or property on board that space object elsewhere than on the surface of the

Earth, their liability to the third State shall be based on the fault of either of the first two States or on the fault of persons for whom either is responsible.

2. In all cases of joint and several liability referred to in paragraph 1 of this article, the burden of compensation for the damage shall be apportioned between the first two States in accordance with the extent to which they were at fault; if the extent of the fault of each of these States cannot be established, the burden of compensation shall be apportioned equally between them. Such apportionment shall be without prejudice to the right of the third State to seek the entire compensation due under this Convention from any or all of the launching States which are jointly and severally liable.

Article V

1. Whenever two or more States jointly launch a space object, they shall be jointly and severally liable for any damage caused.

2. A launching State which has paid compensation for damage shall have the right to present a claim for indemnification to other participants in the joint launching. The participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a State sustaining damage to seek the entire compensation due under this Convention from any or all of the launching States which are jointly and severally liable.

3. A State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching.

Article VI

1. Subject to the provisions of paragraph 2 of this article, exoneration from absolute liability shall be granted to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents.

2. No exoneration whatever shall be granted in cases where the damage has resulted from activities conducted by a launching State which are not in con- formity

with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of Statesin the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article VII

The provisions of this Convention shall not apply to damage caused by a space object of a launching State to:

(a) Nationals of that launching State;

(b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State.

Article VIII

1. A State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage.

2. If the State of nationality has not presented a claim, another State may, in respect of damage sustained in its territory by any natural or juridical person, present a claim to a launching State.

3. If neither the State of nationality nor the State in whose territory the damage was sustained has presented a claim or notified its intention of present- ing a claim, another State may, in respect of damage sustained by its permanent residents, present a claim to a launching State.

Article IX

A claim for compensation for damage shall be presented to a launching State through diplomatic channels. If a State does not maintain diplomatic relations with the launching State concerned, it may request another State to present its claim to that launching State or otherwise represent its interests under this Convention. It may also present its claim through the Secretary- General of the United Nations, provided the claimant State and the launchingState are both Members of the United Nations.

Article X

1. A claim for compensation for damage may be presented to a launching State not later than one year following the date of the occurrence of the damage or the identification of the launching State which is liable.

2. If, however, a State does not know of the occurrence of the damage or has not been able to identify the launching State which is liable, it may present a claim within one year following the date on which it learned of the aforementioned facts; however, this period shall in no event exceed one year following the date on which the State could reasonably be expected to have learned of the facts through the exercise of due diligence.

3. The time limits specified in paragraphs 1 and 2 of this article shall apply even if the full extent of the damage may not be known. In this event, however, the claimant State shall be entitled to revise the claim and submit additional documentation after the expiration of such time limits until one year after the full extent of the damage is known.

Article XI

1. Presentation of a claim to a launching State for compensation for damage under this Convention shall not require the prior exhaustion of any local remedies which may be available to a claimant State or to natural or juridical persons it represents.

2. Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State. A State shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching State or under another international agreement which is binding on the States concerned.

Article XII

The compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with inter- national law and the principles of justice and equity, in order to provide such reparation in respect of the

damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred.

Article XIII

Unless the claimant State and the State from which compensation is due under this Convention agree on another form of compensation, the compensation shall be paid in the currency of the claimant State or, if that State so requests, in the currency of the State from which compensation is due.

Article XIV

If no settlement of a claim is arrived at through diplomatic negotiations as provided for in article IX, within one year from the date on which the claimant State notifies the launching State that it has submitted the documentation of its claim, the parties concerned shall establish a Claims Commission at the request of either party.

Article XV

1. The Claims Commission shall be composed of three members: one appointed by the claimant State, one appointed by the launching State and the third member, the Chairman, to be chosen by both parties jointly. Each party shall make its appointment within two months of the request for the establishment of the Claims Commission.

2. If no agreement is reached on the choice of the Chairman within four months of the request for the establishment of the Commission, either party may request the Secretary-General of the United Nations to appoint the Chairman within a further period of two months.

Article XVI

1. If one of the parties does not make its appointment within the stipulated period, the Chairman shall, at the request of the other party, constitute a single-member Claims Commission.

2. Any vacancy which may arise in the Commission for whatever reason shall be filled by the same procedure adopted for the original appointment.

3. The Commission shall determine its own procedure.

4. The Commission shall determine the place or places where it shall sit and all other administrative matters.

5. Except in the case of decisions and awards by a single-member Commission, all decisions and awards of the Commission shall be by majority vote.

Article XVII

No increase in the membership of the Claims Commission shall take place by reason of two or more claimant States or launching States being joined in any one proceeding before the Commission. The claimant States so joined shall collectively appoint one member of the Commission in the same manner and subject to the same conditions as would be the case for a single claimant State. When two or more launching States are so joined, they shall collectively appoint one member of the Commission in the same way. If the claimant States or the launching States do not make the appointment within the stipulated period, the Chairman shall constitute a single-member Commission.

Article XVIII

The Claims Commission shall decide the merits of the claim for compensation and determine the amount of compensation payable, if any.

Article XIX

1. The Claims Commission shall act in accordance with the provisions of article XII.

2. The decision of the Commission shall be final and binding if the parties have so agreed; otherwise the Commission shall render a final and recommendatory award, which the parties shall consider in good faith. The Commission shall state the reasons for its decision or award.

3. The Commission shall give its decision or award as promptly as possible and no later than one year from the date of its establishment, unless an extension of this period is found necessary by the Commission.

4. The Commission shall make its decision or award public. It shall deliver a certified copy of its decision or award to each of the parties and to the Secretary

General of the United Nations.

Article XX

The expenses in regard to the Claims Commission shall be borne equally by the parties, unless otherwise decided by the Commission.

Article XXI

If the damage caused by a space object presents a large-scale danger to human life or seriously interferes with the living conditions of the population or the functioning of vital centres, the States Parties, and in particular the launching State, shall examine the possibility of rendering appropriate and rapid assistance to the State which has suffered the damage, when it so requests.

However, nothing in this article shall affect the rights or obligations of the States Parties under this Convention.

Article XXII

1. In this Convention, with the exception of articles XXIV to XXVII, references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention and if a majority of the States members of the organization are States Parties to this Convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

2. States members of any such organization which are States Parties to this Convention shall take all appropriate steps to ensure that the organization makes a declaration in accordance with the preceding paragraph.

3. If an international intergovernmental organization is liable for damage by virtue of the provisions of this Convention, that organization and those of its members which are States Parties to this Convention shall be jointly and severally liable; provided, however, that:

(a) Any claim for compensation in respect of such damage shall be first

presented to the organization;

(b) Only where the organization has not paid, within a period of six months, any sum agreed or determined to be due as compensation for such damage, may the claimant State invoke the liability of the members which are States Parties to this Convention for the payment of that sum.

4. Any claim, pursuant to the provisions of this Convention, for compensation in respect of damage caused to an organization which has made a declaration in accordance with paragraph 1 of this article shall be presented by a State member of the organization which is a State Party to this Convention.

Article XXIII

1. The provisions of this Convention shall not affect other international agreements in force insofar as relations between the States Parties to such agreements are concerned.

2. No provision of this Convention shall prevent States from concluding international agreements reaffirming, supplementing or extending its provisions.

Article XXIV

1. This Convention shall be open to all States for signature. Any State which does not sign this Convention before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Convention shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, which are hereby designated the Depositary Governments.

3. This Convention shall enter into force on the deposit of the fifth instrument of ratification.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of

ratification of and accession to this Convention, the date of its entry into force and other notices.

6. This Convention shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article XXV

Any State Party to this Convention may propose amendments to this Convention. Amendments shall enter into force for each State Party to the Convention accepting the amendments upon their acceptance by a majority of the States Parties to the Convention and thereafter for each remaining State Party to the Convention on the date of acceptance by it.

Article XXVI

Ten years after the entry into force of this Convention, the question ofthe review of this Convention shall be included in the provisional agenda of the United Nations General Assembly in order to consider, in the light of past application of the Convention, whether it requires revision. However, at any time after the Convention has been in force for five years, and at the request of one third of the States Parties to the Convention, and with the concurrence of the majority of the States Parties, a conference of the States Parties shall beconvened to review this Convention.

Article XXVII

Any State Party to this Convention may give notice of its withdrawal from the Convention one year after its entry into force by written notification to the Depositary Governments. Such withdrawal shall take effect one year fromthe date of receipt of this notification.

Article XXVIII

This Convention, of which the Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Convention shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized thereto, havesigned this Convention.

DONE in triplicate, at the cities of London, Moscow and Washington, D.C., this twenty-ninth day of March, one thousand nine hundred and seventy-two.

E. CONVENTION ON REGISTRATION OF OBJECTS LAUNCHED INTO OUTER SPACE[391]

The State Parties to this Convention,

Recognizing the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes,

Recalling that the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, of 27 January 1967 affirms that States shall bear international responsibility for their national activities in outer space and refers to the State on whose registry an object launched into outer space is carried,

Recalling also that the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space2 of 22 April 1968 provides that a launching authority shall, upon request, furnish identifying data prior to the return of an object it has launched into outer space found beyond the territorial limits of the launching authority,

Recalling further that the Convention on International Liability for Damage Caused by Space Objects3 of 29 March 1972 establishes international rules and procedures concerning the liability of launching States for damage caused by their space objects,

Desiring, in the light 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, to make provision for the national registration by launching States of space objects launched into outer space,

[391] United Nations, *Treaty Series*, vol. 1023, No. 15020.

Desiring further that a central register of objects launched into outer space be established and maintained, on a mandatory basis, by the Secretary-General of the United Nations,

Desiring also to provide for States Parties additional means and proceduresto assist in the identification of space objects,

Believing that a mandatory system of registering objects launched into outer space would, in particular, assist in their identification and would contribute to the application and development of international law governing the exploration and use of outer space,

Have agreed on the following:

Article I

For the purposes of this Convention:

(g) The term "launching State" means:

(i) A State which launches or procures the launching of a space object;

(ii) A State from whose territory or facility a space object is launched;

(h) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof;

(i) The term "State of registry" means a launching State on whose registrya space object is carried in accordance with article II.

Article II

1. When a space object is launched into Earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary- General of the United Nations of the establishment of such a registry.

2. Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object in accordance with paragraph 1 of this article, bearing in mind the provisions of article

VIII 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, and without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof.

3. The contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned.

Article III

1. The Secretary-General of the United Nations shall maintain a Register in which the information furnished in accordance with article IV shall be recorded.

2. There shall be full and open access to the information in this Register.

Article IV

1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:

(a) Name of launching State or States;

(b) An appropriate designator of the space object or its registration number;

(c) Date and territory or location of launch;

(d) Basic orbital parameters, including:

(e) Nodal period;

(f) Inclination;

(g) Apogee;

(h) Perigee;

2. General function of the space object.

3. Each State of registry may, from time to time, provide the Secretary-General of the United Nations with additional information concerning a space object carried on its registry.

4. Each State of registry shall notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of space objects

concerning which it has previously transmitted information, and which have been but no longer are in Earth orbit.

5. Article V

Whenever a space object launched into Earth orbit or beyond is marked with the designator or registration number referred to in article IV, para- graph 1 (*b),* or both, the State of registry shall notify the Secretary-General of this fact when submitting the information regarding the space object in accordance with article IV. In such case, the Secretary-General of the United Nations shall record this notification in the Register.

Article VI

Where the application of the provisions of this Convention has not enabled a State Party to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which may be of a hazardous or deleterious nature, other States Parties, including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party, or transmitted through the Secretary- General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object. A State Party making such a request shall, to the greatest extent feasible, submit information as to the time, nature and circumstances of the events giving rise to the request. Arrangements under which such assistance shall be rendered shall be the subject of agreement between the parties concerned.

Article VII

1. In this Convention, with the exception of articles VIII to XII inclusive, references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention and if a majority of the States members of the organization are States Parties to this Convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

2. States members of any such organization which are States Parties to this Convention shall take all appropriate steps to ensure that the organization makes a declaration in accordance with paragraph 1 of this article.

Article VIII

1. This Convention shall be open for signature by all States at United Nations Headquarters in New York. Any State which does not sign this Convention before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Convention shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Secretary-General of the United Nations.

3. This Convention shall enter into force among the States which have deposited instruments of ratification on the deposit of the fifth such instrument with the Secretary-General of the United Nations.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Secretary-General shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Convention, the date of its entry into force and other notices.

Article IX

Any State Party to this Convention may propose amendments to the Convention. Amendments shall enter into force for each State Party to the Convention accepting the amendments upon their acceptance by a majority of the States Parties to the Convention and thereafter for each remaining State Party to the Convention on the date of acceptance by it.

Article X

Ten years after the entry into force of this Convention, the question of the review of the Convention shall be included in the provisional agenda of the United Nations General Assembly in order to consider, in the light of past application of the Convention, whether it requires revision. However, at any time after the Convention has been in force for five years, at the request of one third of the States Parties to the Convention and with the concurrence of the majority of the States Parties, a

conference of the States Parties shall be convened to review this Convention. Such review shall take into account in particular any relevant technological developments, including those relating tothe identification of space objects.

Article XI

Any State Party to this Convention may give notice of its withdrawal from the Convention one year after its entry into force by written notification to the Secretary-General of the United Nations. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article XII

The original of this Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to all signatory and acceding States.

IN WITNESS WHEREOF the undersigned, being duly authorized thereto by their respective Governments, have signed this Convention, opened for signature at New York on the fourteenth day of January, one thousand nine hundred and seventy-five.

F. AGREEMENT GOVERNING THE ACTIVITIES OF STATES ON THE MOON AND OTHER CELESTIAL BODIES[392]

The States Parties to this Agreement,

Noting the achievements of States in the exploration and use of the Moon and other celestial bodies,

Recognizing that the Moon, as a natural satellite of the Earth, has an important role to play in the exploration of outer space,

Determined to promote on the basis of equality the further development of cooperation among States in the exploration and use of the Moon and other celestial bodies,

Desiring to prevent the Moon from becoming an area of international conflict,

Bearing in mind the benefits which may be derived from the exploitation of the natural resources of the Moon and other celestial bodies,

Recalling the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space,2 the Convention on International Liability for Damage Caused by Space Objects,[3] and the Convention on Registration of Objects Launched into Outer Space,4

Taking into account the need to define and develop the provisions of these international instruments in relation to the Moon and other celestial bodies, having

[392] United Nations, *Treaty Series*, vol. 1363, No. 23002.

regard to further progress in the exploration and use of outer space,

Have agreed on the following:

Article 1

1. The provisions of this Agreement relating to the Moon shall also apply to other celestial bodies within the solar system, other than the Earth, except insofar as specific legal norms enter into force with respect to any of these celestial bodies.

2. For the purposes of this Agreement reference to the Moon shall include orbits around or other trajectories to or around it.

3. This Agreement does not apply to extraterrestrial materials which reach the surface of the Earth by natural means.

Article 2

All activities on the Moon, including its exploration and use, shall be carried out in accordance with international law, in particular the Charter of the United Nations, and taking into account the Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations,[393] adopted by the General Assembly on 24 October 1970, in the interest of maintaining international peace and security and promoting international cooperation and mutual understanding, and with due regard to the corresponding interests of all other States Parties.

Article 3

1. The Moon shall be used by all States Parties exclusively for peaceful purposes.

2. Any threat or use of force or any other hostile act or threat of hostile act on the Moon is prohibited. It is likewise prohibited to use the Moon in order to commit any such act or to engage in any such threat in relation to the Earth, the Moon, spacecraft, the personnel of spacecraft or manmade space objects.

[393] Resolution 2625 (XXV), annex.

3. States Parties shall not place in orbit around or other trajectory to or around the Moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the Moon.

4. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the Moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the Moon shall also not be prohibited.

Article 4

1. The exploration and use of the Moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Due regardshall be paid to the interests of present and future generations as well as to theneed to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.

2. States Parties shall be guided by the principle of cooperation and mutual assistance in all their activities concerning the exploration and use of the Moon. International cooperation in pursuance of this Agreement should be as wide as possible and may take place on a multilateral basis, on a bilateral basis or through international intergovernmental organizations.

Article 5

1. States Parties shall inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of their activities concerned with the exploration and use of the Moon. Information on the time, purposes, locations, orbital parameters and duration shall be given in respect of each mission to the Moon as soon as possible after launching, while information on the results of each mission, including scientific results, shall be furnished upon completion of the mission. In the case of a mission lasting more than sixty days, information on conduct of the mission, including any scientific results, shall be given periodically, at thirty-day intervals. For missions lasting more than six months, only significant additions to such information need be

reported thereafter.

2. If a State Party becomes aware that another State Party plans to operate simultaneously in the same area of or in the same orbit around or trajectory to or around the Moon, it shall promptly inform the other State of the timing of and plans for its own operations.

3. In carrying out activities under this Agreement, States Parties shall promptly inform the Secretary-General, as well as the public and the international scientific community, of any phenomena they discover in outer space, including the Moon, which could endanger human life or health, as well as of any indication of organic life.

Article 6

1. There shall be freedom of scientific investigation on the Moon by all States Parties without discrimination of any kind, on the basis of equality and in accordance with international law.

2. In carrying out scientific investigations and in furtherance of the provisions of this Agreement, the States Parties shall have the right to collect on and remove from the Moon samples of its mineral and other substances. Such samples shall remain at the disposal of those States Parties which caused them to be collected and may be used by them for scientific purposes. States Partiesshall have regard to the desirability of making a portion of such samples avail-able to other interested States Parties and the international scientific community for scientific investigation. States Parties may in the course of scientific investigations also use mineral and other substances of the Moon in quantities appropriate for the support of their missions.

3. States Parties agree on the desirability of exchanging scientific and other personnel on expeditions to or installations on the Moon to the greatest extentfeasible and practicable.

Article 7

1. In exploring and using the Moon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise. States Parties

shall also take measures to avoid harmfully affecting the environment of the Earth through the introduction of extraterrestrial matter or otherwise.

2. States Parties shall inform the Secretary-General of the United Nations of the measures being adopted by them in accordance with paragraph 1 of this article and shall also, to the maximum extent feasible, notify him in advance of all placements by them of radioactive materials on the Moon and of the purposes of such placements.

3. States Parties shall report to other States Parties and to the Secretary-General concerning areas of the Moon having special scientific interest in order that, without prejudice to the rights of other States Parties, consideration may be given to the designation of such areas as international scientific preserves for which special protective arrangements are to be agreed upon in consultation with the competent bodies of the United Nations.

Article 8

1. States Parties may pursue their activities in the exploration and use of the Moon anywhere on or below its surface, subject to the provisions of this Agreement.

2. For these purposes States Parties may, in particular:

(a) Land their space objects on the Moon and launch them from the Moon;

(b) Place their personnel, space vehicles, equipment, facilities, stations and installations anywhere on or below the surface of the Moon.

Personnel, space vehicles, equipment, facilities, stations and installations may move or be moved freely over or below the surface of the Moon.

3. Activities of States Parties in accordance with paragraphs 1 and 2 of this article shall not interfere with the activities of other States Parties on the Moon. Where such interference may occur, the States Parties concerned shall undertake consultations in accordance with article 15, paragraphs 2 and 3, of this Agreement.

Article 9

1. States Parties may establish manned and unmanned stations on the Moon. A State Party establishing a station shall use only that area which is required for the needs of the station and shall immediately inform the Secretary-General of the United

Nations of the location and purposes of that station. Subsequently, at annual intervals that State shall likewise inform the Secretary-General whether the station continues in use and whether its purposes have changed.

2. Stations shall be installed in such a manner that they do not impede the free access to all areas of the Moon of personnel, vehicles and equipment of other States Parties conducting activities on the Moon in accordance with the provisions of this Agreement or of article I of the Treaty on Principles Govern- ing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article 10

1. States Parties shall adopt all practicable measures to safeguard the life and health of persons on the Moon. For this purpose they shall regard any person on the Moon as an astronaut within the meaning of article V 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 and as part of the personnel of a spacecraft within the meaning of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.

2. States Parties shall offer shelter in their stations, installations, vehicles and other facilities to persons in distress on the Moon.

Article 11

1. The Moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article.

2. The Moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

3. Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including structures connected with its surface or sub- surface, shall not create

a right of ownership over the surface or the subsurface of the Moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.

4. States Parties have the right to exploration and use of the Moon without discrimination of any kind, on the basis of equality and in accordance with international law and the terms of this Agreement.

5. States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible. This provision shall be implemented in accordance with article 18 ofthis Agreement.

6. In order to facilitate the establishment of the international regime referred to in paragraph 5 of this article, States Parties shall inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of any natural resources they may discover on the Moon.

7. The main purposes of the international regime to be established shall include:

(a) The orderly and safe development of the natural resources of the Moon;

(b) The rational management of those resources;

(c) The expansion of opportunities in the use of those resources;

(d) An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directlyor indirectly to the exploration of the Moon, shall be given special consideration.

8. All the activities with respect to the natural resources of the Moon shall be carried out in a manner compatible with the purposes specified in para- graph 7 of this article and the provisions of article 6, paragraph 2, of this Agreement.

Article 12

1. States Parties shall retain jurisdiction and control over their personnel, vehicles, equipment, facilities, stations and installations on the Moon. The ownership of space vehicles, equipment, facilities, stations and installations shall not be affected by their presence on the Moon.

2. Vehicles, installations and equipment or their component parts found in

places other than their intended location shall be dealt with in accordance witharticle 5 of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.

3. In the event of an emergency involving a threat to human life, States Parties may use the equipment, vehicles, installations, facilities or supplies of other States Parties on the Moon. Prompt notification of such use shall be made to the Secretary-General of the United Nations or the State Party concerned.

Article 13

A State Party which learns of the crash landing, forced landing or other unintended landing on the Moon of a space object, or its component parts, that were not launched by it, shall promptly inform the launching State Party and the Secretary-General of the United Nations.

Article 14

1. States Parties to this Agreement shall bear international responsibility for national activities on the Moon, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forthin this Agreement. States Parties shall ensure that non-governmental entities under their jurisdiction shall engage in activities on the Moon only under the authority and continuing supervision of the appropriate State Party.

2. States Parties recognize that detailed arrangements concerning liability for damage caused on the Moon, in addition to the provisions 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 and the Conven-tion on International Liability for Damage Caused by Space Objects, may become necessary as a result of more extensive activities on the Moon. Any such arrangements shall be elaborated in accordance with the procedure pro- vided for in article 18 of this Agreement.

Article 15

1. Each State Party may assure itself that the activities of other States Parties in the exploration and use of the Moon are compatible with the provisions of this

Agreement. To this end, all space vehicles, equipment, facilities, stations and installations on the Moon shall be open to other States Parties. Such States Parties shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited. In pursuance of this article, any State Party may act on its own behalf or with the full or partial assistance of any other State Party or through appropriate international procedures within the framework of the United Nations and in accordance with the Charter.

2. A State Party which has reason to believe that another State Party is not fulfilling the obligations incumbent upon it pursuant to this Agreement or that another State Party is interfering with the rights which the former State has under this Agreement may request consultations with that State Party. A State Party receiving such a request shall enter into such consultations without delay. Any other State Party which requests to do so shall be entitled to take part in the consultations. Each State Party participating in such consultations shall seek a mutually acceptable resolution of any controversy and shall bear in mind the rights and interests of all States Parties. The Secretary-General of the United Nations shall be informed of the results of the consultations and shall transmit the information received to all States Parties concerned.

3. If the consultations do not lead to a mutually acceptable settlement which has due regard for the rights and interests of all States Parties, the parties concerned shall take all measures to settle the dispute by other peaceful means of their choice appropriate to the circumstances and the nature of the dispute. If difficulties arise in connection with the opening of consultations or if consultations do not lead to a mutually acceptable settlement, any State Party may seek the assistance of the Secretary-General, without seeking the consent of any other State Party concerned, in order to resolve the controversy. A State Party which does not maintain diplomatic relations with another State Party concerned shall participate in such consultations, at its choice, either itself or through another State Party or the Secretary-General as intermediary.

Article 16

With the exception of articles 17 to 21, references in this Agreement to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Agreement and if a majority of the States members of the organization are States Parties to this Agreement and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. States members of any such organization which are States Parties to this Agreement shall take all appropriate steps to ensure that the organization makes a declaration in accordance with the foregoing.

Article 17

Any State Party to this Agreement may propose amendments to the Agreement. Amendments shall enter into force for each State Party to the Agreement accepting the amendments upon their acceptance by a majority of the States Parties to the Agreement and thereafter for each remaining State Party to the Agreement on the date of acceptance by it.

Article 18

Ten years after the entry into force of this Agreement, the question of the review of the Agreement shall be included in the provisional agenda of the General Assembly of the United Nations in order to consider, in the light of past application of the Agreement, whether it requires revision. However, at any time after the Agreement has been in force for five years, the Secretary- General of the United Nations, as depositary, shall, at the request of one third of the States Parties to the Agreement and with the concurrence of the majority of the States Parties, convene a conference of the States Parties to review this Agreement. A review conference shall also consider the question of the implementation of the provisions of article 11, paragraph 5, on the basis of the principle referred to in paragraph 1 of that article and taking into account in particular any relevant technological developments.

Article 19

1. This Agreement shall be open for signature by all States at United Nations Headquarters in New York.

2. This Agreement shall be subject to ratification by signatory States. Any State which does not sign this Agreement before its entry into force in accordance with paragraph 3 of this article may accede to it at any time. Instruments of ratification or accession shall be deposited with the Secretary-General of the United Nations.

3. This Agreement shall enter into force on the thirtieth day following the date of deposit of the fifth instrument of ratification.

4. For each State depositing its instrument of ratification or accession after the entry into force of this Agreement, it shall enter into force on the thirtieth day following the date of deposit of any such instrument.

5. The Secretary-General shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or accession to this Agreement, the date of its entry into force and other notices.

Article 20

Any State Party to this Agreement may give notice of its withdrawal from the Agreement one year after its entry into force by written notification to the Secretary-General of the United Nations. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article 21

The original of this Agreement, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to all signatory and acceding States.

IN WITNESS WHEREOF the undersigned, being duly authorized thereto by their respective Governments, have signed this Agreement, opened for signature at New York on the eighteenth day of December, one thousand nine hundred and seventy-nine.

G. THE ARTEMIS ACCORDS

PRINCIPLES FOR COOPERATION IN THE CIVIL EXPLORATION AND USE OF THE MOON, MARS, COMETS, AND ASTEROIDS FOR PEACEFUL PURPOSES

The Signatories to these Accords;

RECOGNIZING their mutual interest in the exploration and use of outer space for peaceful purposes, and **UNDERSCORING** the continuing importance of existing bilateral space cooperation agreements;

NOTING the benefit for all humankind to be gained from cooperating in the peaceful use ofouter space;

USHERING in a new era of exploration, more than 50 years after the historic Apollo 11 Moon landing and more than 20 years after the establishment of a continuous human presence aboardthe International Space Station;

SHARING a common spirit and the ambition that the next steps of humanity's journey in space inspire current and future generations to explore the Moon, Mars, and beyond;

BUILDING upon the legacy of the Apollo program, which benefited all of humankind, the Artemis program will land the first woman and next man on the surface of the Moon and establish, together with international and commercial partners, the sustainable human explorationof the solar system;

CONSIDERING the necessity of greater coordination and cooperation between and amongestablished and emerging actors in space;

RECOGNIZING the global benefits of space exploration and commerce;

ACKNOWLEDGING a collective interest in preserving outer space heritage;

AFFIRMING the importance of compliance with the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, opened for signature on January 27, 1967 ("Outer Space Treaty") as well as the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, opened for signature on April 22, 1968 ("Rescue and Return Agreement"), the *Convention on International Liability for Damage Caused by Space Objects*, opened for signature on March 29, 1972 ("Liability Convention"), and the *Convention on Registration of Objects Launched into Outer Space*, opened for signature on January 14, 1975 ("Registration Convention"); as well as the benefits of coordination via multilateral forums, such as the United Nations Committee on the Peaceful Uses of Outer Space ("COPUOS"), to further efforts toward a global consensus on critical issues regarding space exploration and use; and

DESIRING to implement the provisions of the Outer Space Treaty and other relevant international instruments and thereby establish a political understanding regarding mutually beneficial practices for the future exploration and use of outer space, with a focus on activitiesconducted in support of the Artemis Program;

COMMIT to the following principles:

SECTION 1 - PURPOSE AND SCOPE

The purpose of these Accords is to establish a common vision via a practical set of principles, guidelines, and best practices to enhance the governance of the civil exploration and use of outer space with the intention of advancing the Artemis Program. Adherence to a practical set of principles, guidelines, and best practices in carrying out activities in outer space is intended to increase the safety of operations, reduce uncertainty, and promote the sustainable and beneficial use of space for all

humankind. The Accords represent a political commitment to the principles described herein, many of which provide for operational implementation of important obligationscontained in the Outer Space Treaty and other instruments.

The principles set out in these Accords are intended to apply to civil space activities conducted by the civil space agencies of each Signatory. These activities may take place on the Moon, Mars, comets, and asteroids, including their surfaces and subsurfaces, as well as in orbit of the Moon or Mars, in the Lagrangian points for the Earth-Moon system, and in transit between these celestial bodies and locations. The Signatories intend to implement the principles set out in these Accords through their own activities by taking, as appropriate, measures such as mission planning and contractual mechanisms with entities acting on their behalf.

SECTION 2 - IMPLEMENTATION

1. Cooperative activities regarding the exploration and use of outer space may be implementedthrough appropriate instruments, such as Memoranda of Understanding, Implementing Arrangements under existing Government-to-Government Agreements, Agency-to-Agency arrangements, or other instruments. These instruments should reference these Accords and include appropriate provisions for implementing the principles contained in these Accords.

(a) In the instruments described in this Section, the Signatories or their subordinate agencies should describe the nature, scope, and objectives of the civil cooperativeactivity;

(b) The Signatories' bilateral instruments referred to above are expected to contain other provisions necessary to conduct such cooperation, including those related to liability,intellectual property, and the transfer of goods and technical data;

(c) All cooperative activities should be carried out in accordance with the legalobligations applicable to each Signatory; and

(d) Each Signatory commits to taking appropriate steps to ensure that entities acting onits behalf comply with the principles of these Accords.

SECTION 3 – PEACEFUL PURPOSES

The Signatories affirm that cooperative activities under these Accords should be exclusively forpeaceful purposes and in accordance with relevant international law.

SECTION 4 – TRANSPARENCY

The Signatories are committed to transparency in the broad dissemination of information regarding their national space policies and space exploration plans in accordance with theirnational rules and regulations.

The Signatories plan to share scientific information resulting from their activities pursuant to these Accords with the public and the international scientific community on a good-faith basis,and consistent with Article XI of the Outer Space Treaty.

SECTION 5 – INTEROPERABILITY

The Signatories recognize that the development of interoperable and common exploration infrastructure and standards, including but not limited to fuel storage and delivery systems, landing structures, communications systems, and power systems, will enhance space-based exploration, scientific discovery, and commercial utilization. The Signatories commit to use reasonable efforts to utilize current interoperability standards for space-based infrastructure, to establish such standards when current standards do not exist or are inadequate, and to follow such standards.

SECTION 6 – EMERGENCY ASSISTANCE

The Signatories commit to taking all reasonable efforts to render necessary assistance to personnel in outer space who are in distress, and acknowledge their obligations under the Rescueand Return Agreement.

SECTION 7 – REGISTRATION OF SPACE OBJECTS

For cooperative activities under these Accords, the Signatories commit to determine which of them should register any relevant space object in accordance with the

Registration Convention. For activities involving a non-Party to the Registration Convention, the Signatories intend to cooperate to consult with that non-Party to determine the appropriate means of registration.

SECTION 8 – RELEASE OF SCIENTIFIC DATA

1. The Signatories retain the right to communicate and release information to the public regarding their own activities. The Signatories intend to coordinate with each other in advance regarding the public release of information that relates to the other Signatories' activities under these Accords in order to provide appropriate protection for any proprietaryand/or export-controlled information.
2. The Signatories are committed to the open sharing of scientific data. The Signatories plan to make the scientific results obtained from cooperative activities under these Accords available to the public and the international scientific community, as appropriate, in a timely manner.
3. The commitment to openly share scientific data is not intended to apply to private sector operations unless such operations are being conducted on behalf of a Signatory to the Accords.

SECTION 9 – PRESERVING OUTER SPACE HERITAGE

1. The Signatories intend to preserve outer space heritage, which they consider to comprise historically significant human or robotic landing sites, artifacts, spacecraft, and other evidence of activity on celestial bodies in accordance with mutually developed standards andpractices.
2. The Signatories intend to use their experience under the Accords to contribute to multilateralefforts to further develop international practices and rules applicable to preserving outer space heritage.

SECTION 10 – SPACE RESOURCES

1. The Signatories note that the utilization of space resources can benefit humankind byproviding critical support for safe and sustainable operations.
2. The Signatories emphasize that the extraction and utilization of space resources,

including any recovery from the surface or subsurface of the Moon, Mars, comets, or asteroids, should be executed in a manner that complies with the Outer Space Treaty and in support of safe andsustainable space activities. The Signatories affirm that the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty, and that contracts and other legal instruments relating to space resources should be consistent with that Treaty.

3. The Signatories commit to informing the Secretary-General of the United Nations as well asthe public and the international scientific community of their space resource extraction activities in accordance with the Outer Space Treaty.

4. The Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices and rules applicable to the extraction and utilization of space resources, including through ongoing efforts at the COPUOS.

SECTION 11 – DECONFLICTION OF SPACE ACTIVITIES

1. The Signatories acknowledge and reaffirm their commitment to the Outer Space Treaty,including those provisions relating to due regard and harmful interference.

2. The Signatories affirm that the exploration and use of outer space should be conducted with due consideration to the United Nations Guidelines for the Long-term Sustainability of Outer Space Activities adopted by the COPUOS in 2019, with appropriate changes to reflect the nature of operations beyond low-Earth orbit.

3. Consistent with Article IX of the Outer Space Treaty, a Signatory authorizing an activity under these Accords commits to respect the principle of due regard. A Signatory to these Accords with reason to believe that it may suffer, or has suffered, harmful interference, mayrequest consultations with a Signatory or any other Party to the Outer Space Treaty authorizing the activity.

4. The Signatories commit to seek to refrain from any intentional actions that may create harmful interference with each other's use of outer space in their activities under theseAccords.

5. The Signatories commit to provide each other with necessary information regarding the location and nature of space-based activities under these Accords if a Signatory has reason to believe that the other Signatories' activities may result in

harmful interference with or pose asafety hazard to its space-based activities.

6. The Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices, criteria, and rules applicable to the definition and determination of safety zones and harmful interference.

7. In order to implement their obligations under the Outer Space Treaty, the Signatories intend to provide notification of their activities and commit to coordinating with any relevant actorto avoid harmful interference. The area wherein this notification and coordination will be implemented to avoid harmful interference is referred to as a 'safety zone'. A safety zone should be the area in which nominal operations of a relevant activity or an anomalous event could reasonably cause harmful interference. The Signatories intend to observe the following principles related to safety zones:

(a) The size and scope of the safety zone, as well as the notice and coordination, shouldreflect the nature of the operations being conducted and the environment that such operations are conducted in;

The size and scope of the safety zone should be determined in a reasonable manner leveraging commonly accepted scientific and engineering principles;

(b) The nature and existence of safety zones is expected to change over time reflecting the status of the relevant operation. If the nature of an operation changes, the operating Signatory should alter the size and scope of the corresponding safety zone as appropriate. Safety zones will ultimately be temporary, ending when the relevant operation ceases; and

(c) The Signatories should promptly notify each other as well as the Secretary-General of the United Nations of the establishment, alteration, or end of any safety zone, consistent withArticle XI of the Outer Space Treaty.

8. The Signatory maintaining a safety zone commits, upon request, to provide any Signatory with the basis for the area in accordance with the national rules and regulations applicable toeach Signatory.

9. The Signatory establishing, maintaining, or ending a safety zone should do so in a manner that protects public and private personnel, equipment, and operations from harmful interference. The Signatories should, as appropriate, make relevant information regarding such safety zones, including the extent and general nature of

operations taking place withinthem, available to the public as soon as practicable and feasible, while taking into account appropriate protections for proprietary and export-controlled information.

10. The Signatories commit to respect reasonable safety zones to avoid harmful interference with operations under these Accords, including by providing prior notification to and coordinating with each other before conducting operations in a safety zone established pursuant to these Accords.

11. The Signatories commit to use safety zones, which will be expected to change, evolve, or endbased on the status of the specific activity, in a manner that encourages scientific discovery and technology demonstration, as well as the safe and efficient extraction and utilization of space resources in support of sustainable space exploration and other operations. The Signatories commit to respect the principle of free access to all areas of celestial bodies and all other provisions of the Outer Space Treaty in their use of safety zones. The Signatories further commit to adjust their usage of safety zones over time based on mutual experiences and consultations with each other and the international community.

SECTION 12 - ORBITAL DEBRIS

1. The Signatories commit to plan for the mitigation of orbital debris, including the safe, timely, and efficient passivation and disposal of spacecraft at the end of their missions, when appropriate, as part of their mission planning process. In the case of cooperative missions, such plans should explicitly include which Signatory has the primary responsibility for the end-of-mission planning and implementation.

The Signatories commit to limit, to the extent practicable, the generation of new, long-lived harmful debris released through normal operations, break-up in operational or post-mission phases, and accidents and conjunctions, by taking appropriate measures such as the selection of safe flight profiles and operational configurations as well as post-mission disposal of spacestructures.

SECTION 13 – FINAL PROVISIONS

1. Building on any consultative mechanisms in preexisting arrangements as appropriate, the Signatories commit to periodically consult to review the implementation of the principlesin these Accords, and to exchange views on potential areas of future cooperation.

2. The Government of the United States of America will maintain the original text of these Accords and transmit to the Secretary-General of the United Nations a copy of these Accords, which is not eligible for registration under Article 102 of the Charter of the United Nations, with a view to its circulation to all the members of the Organization as anofficial document of the United Nations.

3. After October 13, 2020, any State seeking to become a Signatory to these Accords maysubmit its signature to the Government of the United States for addition to this text.

Adopted on October 13, 2020, in the English language.

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