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The Orbital Chessboard: "USA, China and Russia, Space-based Power Politics"

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Abstract

Undeniably and more evidently, space in the twenty first century is gradually transforming into a significant region that embraces conflicts, especially between the present superpowers: The United States of America, China and Russia. This work examines the relatively mild competition of this "Cosmic Showdown;" in other words, to determine how these nation-states seek to deploy space as a strategic resource for the purpose of overpowering and dominating global geopolitics properties. Since this study uses an empirical study in space exploration and geopolitics, both the policy declarations and the analysis of the academic literature reflects a systematic approach towards space exploration. It synchronizes the benefits of technological advancement, influences resulting from space commerce, camaraderie and hostility of discretionary space societies. For these reasons, the paper concludes logically that as it is considered as a global common, cyberspace remains in the process of becoming a competitive space. It explains the existence of geostrategic factors in space activity and acknowledges the importance of the change of legislation and related global processes that will address new issues. It may be useful to politicians, researchers and other interested parties due to the absence of research on space geopolitics.

Key Words: United State of America, Transforming, Geopolitics, Cyberspace, China and Russia.

Introduction

In the contemporary world where inter- nation relations continue to warm up for conflict over space in a bid to seek domination the space has emerged as a theater of conflict. Such a change of narrative paradigm as a background to the human spaceflight story – from the American (and former Soviet) dominance to the Chinese and back to the emergent Russian hegemony speaks volumes as to the change that has taken place. It was this

new story that has put and this change, made space a part and parcel of World rivalries using another superpower into 'Orbital Chessboard'.

In this interstellar race of space, the stakeholders involve are the United States, China, and Russia given the fact that the strategic importance of space resources is not limited to the field of research only. These scientific ones will continue to exist but over the most recent two decades the space exploration has acted as the propaganda of geopolitics power and national security. Consequently, claiming its indispensability spans from satellites to space stations means that assuming a totally new tier of military, economical, and technological advancement and development must be embraced.

This research will analyze the legal, political and ecological effects of the "Cosmic Showdown" by:

- Identify the competing forces of Space Dominance
- The recognition of the negative impact of space debris
- Investigation of the complexities of competitive dynamics in space exploration

This is clear where the literature review provides a broad chronicle of past study noting the overlooked areas and opportunities for more investigation. This study acts as a guiding light, shedding light on the intricacies of the "Orbital Chessboard" and providing priceless knowledge into how strategic interests, technological advancements, and diplomatic maneuvers intersect to shape both space exploration and international relations.

1.1. Background of Space-based Power Politic

Figure 01: *Power struggles in space*

Throughout history, the United States has led the charge when it comes to exploring outer space and achieving major achievements such as landing human beings on the Moon - actions that helped enhance American power and worldwide influence.

It was not very long ago that the field of space exploration was a mostly bipolar affair between the USA and Russia. Most noticeable is how China has made rather impressive strides in Space exploration specifically around Manned Space Flight, with their establishing a permanent manned space station, and successful rover's missions to both moon and mars. As a result, they have developed into a serious threat to the supremacy that America enjoys when it comes to outer-space missions.

It looks like space has become an orbital chess as the giants of the world attempt to outcompete each other. Here strategies are used and modern apparatus to gain control and protect the interest of a country. These have important vectors for establishing norms, regulations and agreements for the space activities because density of satellites, space debris and potential military assets in outer space has become important with time. Subtopics such as orbital traffic regulation, control of space debris and prevention of accumulation of such wastes, regulation of militarization proclivities all form part of the effort to ensure the outer space environment is used peacefully.

1.2. Hypothesis

- "The intensification of competition among spacefaring nations is significantly correlated with the emergence of legal disputes, geopolitical tensions, and environmental challenges in the realm of space exploration"

It is suggested by this hypothesis that the escalation of competition between nations engaged in space exploration, particularly among the US, China and Russia would result in an increase of legal disputes. These disagreements may be related to varying interpretations of international laws relating to outer space or conflicts over claiming ownership and exploiting celestial resources as well as controversies concerning managing orbital traffic.

1.3. Objectives of the Research

This research seeks to continually analyze the balance of power politics in outer space. It revolves around the discovery on how the U.S, China and Russia work effort towards competition, cooperation when it comes to the space exploration.

1. **Geopolitical rivalry and space exploration:** This debate looks at the way the subject of space travel impacts diplomacy and world politics. It focuses on such consequences for international order and security.
2. **Legal challenges and disputes:** Consequently, the emphasis is on legal issues emerging from competition in space exploration. It casts light on such treaties and regulations relating to legal conflict as well as examples in the existing literature.
3. **Environmental consequences:** Highlight importance of stabilized measures and international collaboration in combating threat and preserving the perpetual welfare of outer space.

4. **Technological innovation:** The impute of technological advancement on competition in space exploration together with impact it has on the balance of power among countries that engage in space exploration.
5. **Balancing national interests and cooperation:** Space dreams drive national pursuits and international cooperation while at the same time desire for being ahead in space race.

1.4. Research Questions

What are the specific legal challenges and disputes arising from the intensification of competition among spacefaring nations?

Due to the increased rivalry between nations with space capabilities there have been a few legal issues and concerns. The significant challenge revolves around how individuals interpret international laws for space, mainly the 1967 Outer Space Treaty. (fig:02)

Figure. 2: *The parties, Signatories and Non-parties on 1967 outer space treaty*

Disputes may ensue from conflicting uses and rights to frequencies and orbits by the member nation that seek for strategic locations in communication and observation. Though governed by the International Telecommunication Union (ITU). However, due to political strategic competition, allocation of these resources can result to diplomatic tensions, legal practices, or both.

What are the environmental consequences of increased competition in space exploration, particularly in terms of space debris accumulation, pollution, and resource depletion?

From the legal perspective, the principles must be clear to provide a response on liability, Intellectual Property Rights and safety concerns resulting from the participation of the private sector in space exploration. Even though there is legal regulation put in by international agreements like The Outer Space Treaty which might offer some fundamental rules governing conduct in outer space, but it least covers all points concerning commerce such as mining and space travel - which are yet to reach an appropriate level of specification.

What role does technological innovation play in shaping the competitive landscape of space exploration, and how does it impact the balance of power among spacefaring nations?

Furthermore, technology influences the balance among countries that engage in space activities due to the enhanced military force and security agendas of the states. Surveillance satellites and missile alert systems and universal positioning systems (GPS) are all space-oriented resources that have been widely used in attaining strategic control, and in countering threats to security.

For instance, the introduction of reusable rocket systems by private players like SpaceX (fig:03) has affected traditional space launch markets while delivering cheap solutions that disrupt dominance that government-sanctioned organizations enjoy.

Therefore, international cooperation, transparency and regulation to measures of arms in space must be put in place to solve the challenges that come because of technological advancement in the space power. The Outer Space Treaty, Missile Technology Control Regime and the Prevention of an Arms Race in Outer Square (PAROS) are most well-known Multilateral agreements that establish guidelines to responsible behavior that can prevent weaponization of outer space.

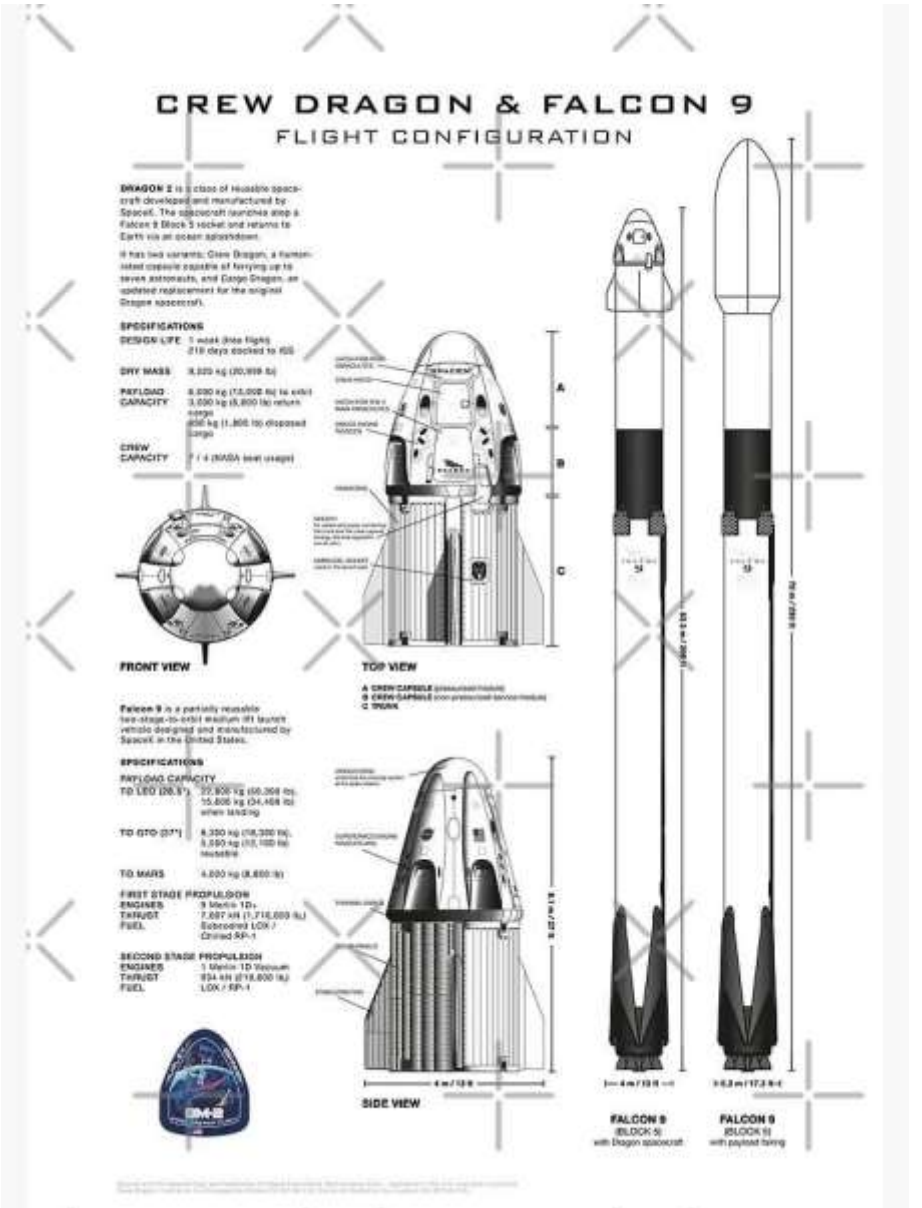


Figure 03: *SpaceX Crew Dragon Spacecraft & Falcon 9 Rocket*

How do spacefaring nations balance national interests and international cooperation in their pursuit of strategic advantage and dominance in space, and what are the implications for global stability and security?

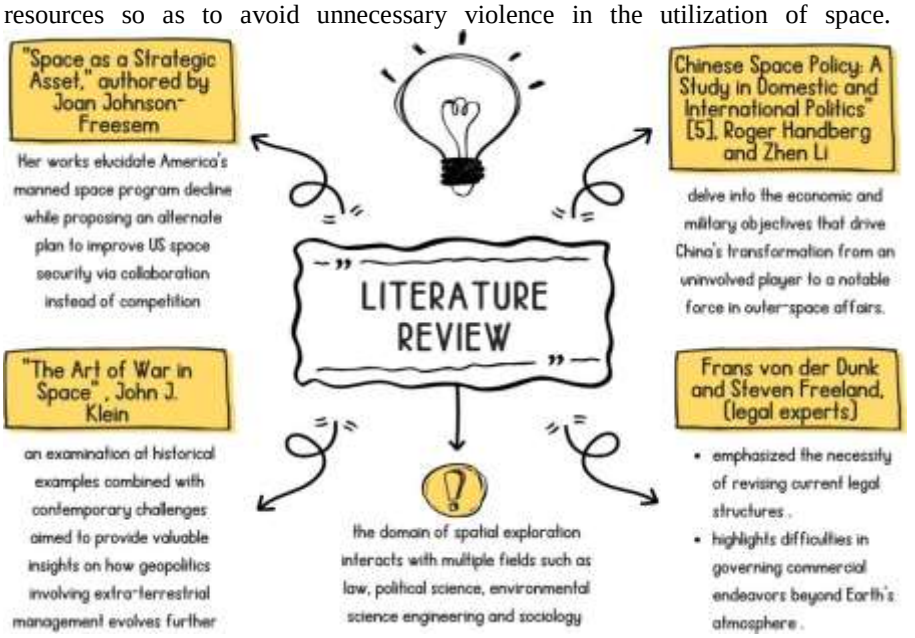
Military conquests and operation for control of space at the same time require cooperation and diplomacy between countries that possess space assets. Despite the pursuit of strategic advantage and dominance in space, collaboration and diplomacy among nations with access to space is essential. Space situational awareness, debris

management as well as emergency response demands teamwork to reduce risks, avoid conflicts and maintain overall sustainability for future endeavors. Efforts such as those by the Space Data Association (SDA) or United Nations Committee on Peaceful Uses of Outer Space (COPUOS) encourage sharing information about best practices & building capacity while promoting responsible conduct towards shared aims concerning international cooperation in spatial activities.

Literature Review

Space exploration has always been an exciting idea for humanity for many centuries. Although it has been defined as a science since the end of the nineteenth century, it only became a geopolitical commodity in several decades when different countries sought to establish domination beyond the earth's territories. Therefore, contemporary sociology is rich in literature analysis of the multifaceted processes occurring in this cosmic race. The purposes of this review are to explore major themes and outcomes of previous studies on space exploration that concerns with technological innovations, policies, cooperation of countries interlinked with consequences arising from rivalry of nations that are going for the outer space.

A comparison of technology and national security is another important area of specialization that is well covered in space exploration literature. One example about this subject, The Politics of Space Security by James Clay Moltz, analyses the synergy between technology and perceptions of space security threats. The work also raises the question regarding militarization of outer space and strong emphasis is made on how careful planning is crucial in the world where geopolitics is a constant variable. It is important for the people around the world to work together as Moltz suggests while calling for arms regulation as executives of outer space resources so as to avoid unnecessary violence in the utilization of space.



Methodology

Due to the significance of geopolitical rivalry in space exploration among the three powers – United States, China, and Russia- this research employs quantitative and qualitative research approaches.

Because of the limitations in budgetary resources and time constraints, an organized process of collecting predefined data resources and then performing methodical executions of analysis in order to arrive to meaningful conclusions.

Category	United States (NASA/Private)	China (CNSA)	Russia (Roscosmos)
Major Organizations	NASA, SpaceX, Blue Origin	CNSA (China National Space Administration)	Roscosmos (Russian Space Agency)
Key Satellite Constellations	GPS (Global Positioning System), Starlink (SpaceX)	BeiDou Navigation Satellite System (BDS)	GLONASS (Global Navigation Satellite System)
Manned Space Missions	Apollo, Space Shuttle, ISS (partnership), Artemis	Shenzhou program, Tiangong Space Station	Soyuz, ISS (partnership)
Mars Exploration	Perseverance rover, Ingenuity helicopter	Tianwen-1 (orbiter, lander, rover)	No active Mars missions
Moon Exploration	Artemis program (future), Apollo missions	Chang'e program (Chang'e 5, future missions)	Luna program (Luna-25 mission planned)
Space Station	International Space Station (ISS), partnerships with private sector	Tiangong Space Station (operational since 2021)	ISS (partnership), planned Russian Orbital Station
Space Launch Vehicles	Falcon 9, Falcon Heavy, SLS (Space Launch System), Starship	Long March series	Soyuz, Proton, Angara series
Deep Space Exploration	Voyager, New Horizons, James Webb Space Telescope	Chang'e (lunar missions), Tianwen (Mars)	Luna missions (planned for the Moon), ExoMars collaboration with ESA
Key Innovations	Reusable rockets (SpaceX), private sector partnerships, Mars helicopter	Heavy-lift rockets, modular space station	Heavy-lift rockets, long-duration human spaceflight
Future Goals	Mars colonization, Artemis to Moon, Lunar Gateway station	Lunar base by 2030, Mars sample return mission	Reviving Luna program, new space station by mid-2020s

Space capabilities and ambitions of the USA, China and Russia

Case Studies

Legal, political, environmental and economical approaches to space exploration are also discussed in the article analyzing the competition between the scientific data of China, Russia and USA; the examples from the article prove that the theories explained in the scientific articles can be used for the good purposes. Thus, from

this point further the basic research data described in the next section witnesses this change.

4.1. United States: The Commercial Space Launch Act and SpaceX

Background:

ln 1984 Commercial Space Launch Act and its subsequent modifications have defined the further development of commercial space market in the United States to a certain extent. The goals of these laws were mainly directed in bringing change in the monopolies created by government agencies and encourage private entities to explore outer space.

SpaceX and Its Impact:

No industry has been as clearly privileged by this legal climate as SpaceX, founded by Elon Musk in 2002. They have revolutionized space missions and have especially reduced costs associated with putting payloads into outer space through their invention of partially reusable Falcon 9 rockets.

4.2. China: The Chang'e Lunar Program

Background:

The Chinese Space Agency, known as the China National Space Administration (CNSA) is undertaking a lunar exploration program of robotic missions known as the Chang'e program, after the Chinese lunar goddess. The purpose is to gaining knowledge and understanding of the moon and with the desire to get humans there in the future. In particular, in the fact of Chang'e 3, which landed on the moon in 2013 and managed to deploy the Yutu rover. 2019 was significant by the landing of Change's 4 on the far side of the moon for the first time. in 2020 the Chang 'e 5 lunar mission succeeded in bringing back samples from the lunar surface for the first time in decades.is conducting a series of robotic lunar missions called the Chang'e program, which takes its name from the Chinese moon goddess. The objective is to study and investigate the moon with ambitions to establish humans there in due course.

Important Objectives

- In 2013, Chang'e 3 triumphantly touched down on the moon and was able to release its Yutu rover.
- In 2019, the landing of Chang'e 4 on the far side of the moon marked an unprecedented milestone.
- In 2020, Chang'e 5 accomplished the first mission in decades to transport lunar samples back to Earth.

4.3. Russia: The Soyuz Program and International Space Station (ISS) Collaboration

Background:

The Soyuz program which includes the Soyuz-S, Soyuz-T and Soyuz-TM is a reliable human spaceflight programme created by Russia, former Soviet Union that was launched in the 1960s. Ay many missions, Soyuz spacecraft has ferried people to different places like the International Space Station.

Significant Contributions:

Soyuz TMA & MS spacecraft models have been very integral in continuation of space explorations through ISS and astronaut & supplies transportation from its formation in 2000.

However, due to political conflict with other countries it still cooperates with NASA, ESA, JAXA and other international space organizations to support the ISS.

Technological Innovations in Space Exploration

5.1. Background

The essence of the modern concepts of space travel is closely bound with ideas or technology. Advancements in propulsion technologies, robotics, artificial intelligence and material science are presenting new possibilities for more ambitious missions as well as changing the ways that may be possible to reach out beyond the Earth.

5.2. Development of Propulsion Systems

Mr. Webster second identified reusable rockets by SpaceX as the Falcon 9 and Blue Origin as the New Shepard have played the major role in making space travel sustainable and financially viable by greatly lowering the access costs.

Thus, NASA's Dawn mission has demonstrated the efficiency of ion propulsion systems in mapping the asteroid belt and emphasized the subject capacity for long duration interplanetary voyages reducing the consumption of propellant.

5.3. AI and Robotics

Perseverance rover which launched by NASA comes with advanced Artificial Intelligence self-navigating mechanism, is momentous leap in robot-assisted exploration. Because it can execute complex scientific analyses on Mars, it is a significant contribution to the realm.

One of the impressive advancements made in the area of AI and automation was highlighted by the recent ESA's Rosetta mission which was able to navigate towards a comet and even land on it; the spacecraft executes itself.

5.4. Economic and Political Impact:

Economic Impact: The increase in technology supports the flow of the economy through the incentives of new industries, job creation, and investment opportunity while on the other side reducing costs and improving efficiency for space ventures.

Political Impact: Global space power offers countries mechanical advantages, bolstering their central political influence while also stimulating both cooperation and rivalry on the international arena.

5.5. Conclusion

The case studies included illustrate a complex and dynamic environment surrounding space travel/rendezvous, competition. The experiences of SpaceX and Blue Origin indicate that commercial space ventures are capable of hijacking industries while technological progress moves the ball forward in the bid to cut costs. Going to the Moon in conjunction with Mars mission's reveals much about

our tactical desires but also the importance that science advancements have for global economic, political, and technologies. These cases paint a complex picture to society of what is obtaining today.

Implications of the Study

6.1. Global Governance of Space

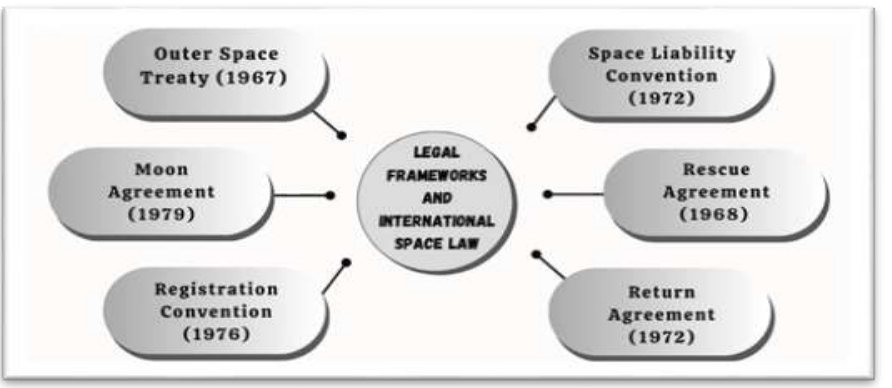


Figure 06: *International space law to regulate activities in outer space*

Space Treaties and Agreements:

The basic structure of international space law that has its origin in the older 1967 Outer Space Treaty is mainly built around the principles of non-aggression in the conduct of space exploration and use. We must ensure that these treaties remain up to date and capable of meeting all future technologies whilst at the same time, maintaining fair treatment and practice across all parties and if not, then the presently favorable relationship for the whole of the global community within this common area will be in jeopardy.

Role of International Organizations:

Organizations such as the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and other organizations are vital in creating awareness and formulating rules to ensure proper utilization of space. Such groups act as a platform where nations can meet, negotiate, and make calls for stability in any activities relating to outer space.

Suggestions

After examining these results, several suggestions have been put forward to tackle the obstacles and prospects revealed in space exploration.

- Enhance global collaboration and adherence to current space accords and pacts.
- Enact strategies to reduce the accumulation of space debris and encourage eco-friendly practices in space operations.
- To foster trust and cooperation in space exploration, promote diplomatic engagement and dialogue among nations with a presence in space.

- Foster the development of technological innovation and economic growth in the global space industry by promoting partnerships between public and private sectors, as well as collaborations across different industries.
- Increase public awareness and participation to promote backing for space exploration endeavors and guarantee sustained investment in the field of space exploration.

Implementation of these proposals may help the international space community navigate complex power relations concerning space issues and optimize the emerging opportunities for space exploration for people's benefit.

References

[1] Moltz, J. C. (2019). The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests.

[2] Johnson-Freese, J. (2007). Space as a Strategic Asset.

[3] Klein, J. J. (2019). Understanding Space Strategy: The Art of War in Space.

[4] Handberg, R., & Li, Z. (2016). Chinese Space Policy: A Study in Domestic and International Politic

[5] Freeland, S., & von der Dunk, F. (2018). Space Resources: Breaking the Bonds of Earth.

[6] Weeden, B. (2020). The Artemis Accords: An International Model for Space Exploration and Resource Utilization.

[7] McDowell, Jonathan. "The International Astronautical Federation: Space Advocacy in the Emerging Space Powers." Space Policy 44 (2018): 20-26.

[8] Logsdon, John M. "After Apollo? Richard Nixon and the American Space Program." Palgrave Macmillan, 2015.

[9] Handberg, R., & Li, Z. (2017). Chinese Space Policy: A Study in Domestic and International Politics. Routledge.

[10] Weeden, Brian, and Victoria Samson. "Geopolitical Conflict and Cooperation in Outer Space." The Journal of Strategic Studies 43.6-7 (2020): 833-860.

[11] Harland, D. M. (2007). The Story of the International Space Station. Springer-Praxis.

[12] Logsdon, J. M. (2010). John F. Kennedy and the Race to the Moon. Palgrave Macmillan.

[13] Burgess, C., & Dubbs, C. (2007). Animals in Space: From Research Rockets to the Space Shuttle. Springer-Praxis.

[14] Treaties and Principles on Outer Space. (2020). United Nations Office for Outer Space Affairs (UNOOSA)

[15] Pasco, X., & Coates, J. (Eds.). (2019). Space Security Index 2019. Project Ploughshares.

[16] Burgess, C., & Hall, R. C. (2009). The first Soviet cosmonaut team: their lives, legacy, and historical impact. Praxis Publishing.

[17] National Research Council. "Space Studies Board. Space Science and Environmental Policy: Challenges for the New Millennium." National Academies Press, 2003.