Contemporary Readings in Law and Social Justice
ISSN: 1948-9137, e-ISSN: 2162-2752
Vol 16 (1), 2024
pp. 1557 - 1568

Employing Technological Power in theAmerican-Russian Geospace Competition

[1]Nalin Khader Naif , [2]Dr. Mohamed Muysser Fathi

[1]Naleen.23psp8@student.uomosul

Department of International Relations College of Political Science, University of Mosul, Mosul, Iraq

[2]Orcid:0000-0002-1796-4389

mohamed-kamosh@uomosul.edu.iq

Department of International Relations College of Political Science, University of Mosul, Mosul, Iraq

Abstract

Objectives: This study aims at analyzing the performance of the international powers, particularly the United States of America and The Federal Republic of Russia in terms of increasing and developing their technological power and using it in the space aspects in addition to identifying and investigating the geo-space contest between them as well as identifying the essence of the geo-space power and the domains of contest between the Unites States of America and Russia.

Methods: The current study employed the descriptive-analytical approach in describing the concepts of power, technology and the geo-space power and their characteristics and features. Certain articles and academic studies were utilized, that are relevant to the scope of the geo-space domain and then these studies were analyzed to reach the findings and results. Also, the study employed the functional methodology that tackles the study of the survival factors of the countries and especially the effect of the techno-space power aspects that were reached through the references. Additionally, the methodology of the study involved studying the cases of the United States of America and Russia as these two countries have the potential and abilities in the scope of the geo-space contest.

Results: The study reached certain findings and showed that employing the technological power contributed to escalating the contest between the international powers in terms of the geo-space race and also, the technological development imposed on those power the contest (USA and Russia). Moreover, the space technological development led to producing new weapons and tools, particularly in the field of the satellites, artificial intelligence and the electronic and cyberspace wars and others.

Conclusion: The technological power motivated the international powers (USA and Russia) to contest in the geo-space aspect and they both strive for controlling and dominating this field of knowledge considered as an arena of the contest of the countries all over the world.

Keywords: power, technology, geo-space, technological contest, Russia, United States.

Received:19 March 2024 **Revised**: 26 May 2024 **Accepted**:20 June 2024

Introduction

In recent decades, the world has witnessed a radical shift in power dynamics, particularly with the rise of technology and its use by international powers to modify and disrupt geopolitical balances. These powers aim to increase and develop their influence, expanding areas of competition, especially in the geospatial field. Technology has become an essential component of interactions among global geopolitical powers, with geospatial competition between the United States and Russia serving as a prominent example.

This shift became particularly evident after the end of the Cold War, as the United States and Russia continued their competition in space. This rivalry introduced new dimensions to their conflict, focusing on achieving techno-spatial superiority across several key areas, such as satellite development, planetary exploration, and the use of space technology in geopolitical contexts.

The rivalry dates back to the beginnings of the space age in the 1950s, when both superpowers engaged in a race for space exploration. It began with the Soviet Union's launch of the first satellite, "Sputnik," in 1957, and continued with sending the first human into space in 1961. The United States responded strongly with ambitious space programs, most notably the "Apollo" program, which culminated in the first manned moon landing in 1969.

Thus, geospatial competition between the United States and Russia plays a major role in shaping global geopolitical power relations. Technological advancements in space enhance countries' soft power and contribute to their political, military, and economic influence. Furthermore, geospatial capabilities are strategic elements in achieving national and international security, given states' advanced capabilities in surveillance, reconnaissance, and communications.

The Importance of the Study

The importance of this study is underscored by the critical role of technological power in our contemporary world and the shift in power dynamics it has caused. International powers are increasingly developing their capabilities, particularly in the geospatial field, stemming back to the initial space race in the late 1950s. This study illuminates the significance of space competition, including the role of weapons, satellites, and artificial intelligence. Geospatial competition is now playing an integral role in shaping the policies and interactions of global geopolitical powers.

Scientific Importance

The scientific importance of the study lies in its contribution to understanding geospatial competition between major international powers (the United States and Russia), which may escalate into conflict involving advanced generations of warfare. This research supports scholars and practitioners in international relations and security studies, potentially opening new areas of inquiry for specialists and enriching resources, particularly in Arab libraries.

Study Objectives

This study seeks to achieve the following objectives:

1. Examine the interests of the United States and Russia in increasing and developing power through technology.
2. Define the concepts of power, technology, and geospatial competition.
3. Identify the areas and tools of U.S.-Russian geospatial competition.

Hypothesis of the Study

The hypothesis suggests a direct relationship between these international powers' possession of technological capabilities and their ability to excel and compete in geospatial arenas, aiming for geospatial dominance.

Methodology of the Study

The study employs a deductive methodology, appropriate for this novel topic. The competitive nature requires these powers to obscure or conceal data regarding their capabilities and technologies. The descriptive analytical approach is used to study and analyze reality, accurately describing and interpreting it based on collected information and data. Additionally, a functional approach, rooted in early sociology, focuses on analyzing the functions of social institutions and practices, emphasizing national defense. Geospatial competition areas were scrutinized for indicators of competition intensity

between the United States and Russia. The study also incorporates case study methodologies to ensure accuracy and validate the study's problem and hypothesis.

Previous Studies:

- **Ehab Khalifa (2019),** "Post-Information Society: The Impact of the Fourth Industrial Revolution on National Security": This study asserts that technological forces drive the engine of the smart revolution, which will significantly impact human lives and lead to the "fifth society, the information society." This transition could dominate industrial and human minds through algorithms, altering the concept of national security as cyberattacks become the most potent threats. States may increasingly use electronic weapons, form electronic alliances, and establish cyber military bases to defend state interests, prompting the international community to adopt treaties and laws to maintain peaceful inter-state relations.
- **Majid Muhammad Al-Hunaiti (2021),** "The Technology of Contemporary International Conflicts": The study examines technological developments and the rise of various international conflicts in the modern era, assessing both positive and negative aspects. It reviews technological innovations and their impact on electronic warfare, focusing on space warfare related to electronic information security, piracy, intelligence, and electronic psychological warfare. It utilizes available information to explore this field, particularly the extent to which modern technological advancements have exacerbated international conflicts.
- **Abdul Qadir Dandan et al. (2021),** "International Relations in the Era of Digital Technologies: Profound Transformations, New Paths": This book focuses on the impact of technological developments on the future of international relations across four key areas. It discusses the role of technological progress, the digital revolution’s impact, the significance of cyberspace, and the technological race between China and the United States. The book also addresses how these technological developments influence strategic security in various countries.
- **Giampiero Giacomello, Francesco Niccolò Moro, and Marco Valigi (2021),** "Technology and International Relations: The New Frontiers of Global Power": This study aims to bridge some theoretical and experimental gaps in international relations and security studies, especially concerning technological change's impact on international affairs. The book examines the relationship between technology and socio-political variables over recent decades, highlighting how technological change has reshaped global distribution and interests by empowering emerging countries and non-state actors. Although this process has varied across regions and countries, it stresses the need for comprehensive analysis and the role of international actors and public opinion in directing this change towards planet improvement, rather than contributing to its decline.

  Our study distinguishes itself by providing a new understanding of the link between technological power and geospatial competition. It explores the influence between these variables scientifically by examining geospatial competition among international powers in light of technological advancements that have redefined state power. The study highlights that both state and non-state actors can achieve strategic superiority through these advancements. Furthermore, technological progress has transformed the arms race from possessing conventional weapons to modern, sophisticated arms that can secure victory without human loss. This shift has expanded competition as countries, notably the United States and Russia, have begun to militarize space, making it a fifth dimension of conflict alongside land, sea, air, and cyberspace. Additionally, this study explores geospatial competition, driving increased military spending in this field, and tests anti-satellite weapons and systems.

Division of the Study:

- **Theme 1:** The Concept of Technological Power
- **The Second Axis:** Areas of Geospatial Competition
- **The Third Axis:** Geospatial Competition between the United States of America and Russia

Theme 1: The Concept of Technological Power

The term "technology" has been used in various fields with multiple and sometimes vague meanings. In contemporary times, it has become widely recognized due to its association with rapid changes affecting national power and as a key indicator of development and progress. The word carries connotations that are hard to define precisely, partly because technological advancements, like the development of steam engines, printing, and the telegraph, have driven significant revolutions over the past century. Specialists note that the term appeared in the 19th century, symbolizing progress in communication and information. To fully understand this concept, we must explore it further:

First: The Concept of Technological Power

1. **The Linguistic and Idiomatic Meaning of Power:**

- **Linguistic Meaning:** Power, in contrast to weakness, is defined as energy or the capacity for hard work, serving as a source of activity, growth, and movement (Anas et al., 2015).
- **Terminological Meaning:** The concept of power often faces ambiguity and overlaps with other terms. It evolves based on ability, influence, and application, central to international relations as it reflects changes and realities within them. This complexity leads to differing theoretical interpretations. Joseph Nye defines power as "the ability to influence others to achieve specific outcomes desired by the influencing party" (Nye, 2010). Hans Morgenthau describes power as "a man's control over the minds and actions of others." He views international relations as a constant struggle for power, making it a primary aim of state policies despite differing ultimate goals (Agwan, 2018).

  In political science, power is interpreted through three lenses: as the ability to influence others, as active participation in societal decision-making, and as control over political processes, impacting outcomes as desired (Moussa, 2018).

Second: The Meaning of Technology

- **Linguistic Meaning:** In Arabic, the equivalent term for technology does not exist as it is borrowed from Greek. "Technology" consists of "techne" (methods, human arts, industry) and "logos" (speech, logic, study), implying artistic knowledge grounded in logic and science (Muhammad, 2016).

  According to the Oxford Dictionary, technology merges "techno" (technical method or expertise) and "logic" (science of logic), resulting in "technical technology" (Oxford, 2019).

- **Terminological Meaning:** Politically, technology is defined as "principles, sciences, and inventions across industry, devices, machines, and production" (Al-Kayyali, 1979). Fahd Al-Obaid views it as accumulated knowledge and skills related to production, service, and machine management, essential for progressive science and comprehensive developmental growth (Al-Kurdi, 2023).

  The British Encyclopedia comprehensively defines technology as knowledge applications in natural sciences, pivotal for communication, life, and structural impacts on cultural, social, political, legal, and educational facets (Al-Moaini, 2009).

  Thus, technology is a broad concept encompassing the application of scientific knowledge to design tools and machines to solve problems and organize life, defining the current century and aiding human advancement. Those who master technology gain a marker of strength and superiority.

  Based on the above, we define technological power as "the ability of state and non-state actors to develop and utilize technology strategically to achieve superiority over others," establishing technology as a decisive factor in state status within the international system.

  “We are seeing really strong growth in the importance of space in national security,” says Elizabeth Seward, head of space strategy at BAE Systems. Space is now considered a fifth area of operations and warfare. Space programs exist in many countries around the world. The satellites we launch into space

orbit around the whole world, and they give us a view that you can't get from any other platform or any other field, so countries are looking at how to best use that."

The Second Axis: Areas of Geospatial Competition

Geospatial competition refers to the conflict and rivalry between international powers seeking to gain superiority and control in outer space. This competition encompasses developments in satellite deployment, space exploration, maintaining a continuous presence in Earth's orbit, and advancing space technologies for communication, remote sensing, and navigation—primarily for defense and security purposes. Outer space is a crucial domain, reflecting both conflict and cooperation among world powers, where scientific and technological objectives intersect with strategic, political, economic, and military goals (Kayali, 1979). John Collins, in his book "Military Space Forces," asserts that the next fifty years will be pivotal for military control in Earth's orbital space, which covers the globe. Control over this space equates to control over Earth itself, and control over the Moon translates to control over Earth's orbital space (Haddad and Qal'ul, CIESSM).

Below, we explore the key areas of geopolitical competition that hinge on technological advancements in the ongoing geospatial contest between global powers:

1. **Technological Arms Race:** In the last two decades, the world has seen a rapid technological boom, particularly in military and security advancements. Many major countries are employing advanced technologies associated with "artificial intelligence and its militarization" not only to enhance military capabilities and security but also to strengthen their global standing and influence changes in the international system (Fathi, 2017). The technological arms race between the United States and Russia is central to the geospatial and geopolitical tensions between them, involving a wide array of advanced military technologies, including nuclear weapons, missile defense systems, hypersonic weapons, and electronic and cyber warfare (Al-Bahi, 2022).

- **Nuclear Weapons:** The United States invests heavily in modernizing its nuclear arsenal through the Nuclear Warhead Extension Program, with approximately 3,800 active and stored nuclear warheads as of 2021. The modernization budget over the next 30 years is projected at $1.2 trillion. This includes developing new platforms for nuclear weapon launches, such as nuclear submarines and intercontinental ballistic missiles, alongside advanced missile defense systems like GMD, THAAD, and Aegis, which are designed to intercept ballistic missiles at various stages of their flight (Gilruth, Air and Space Museum).

  Conversely, Russia is also upgrading its nuclear arsenal, developing new nuclear weapons like the Sarmat intercontinental ballistic missile system and Borei-class submarines. It reportedly has around 4,310 active and stored nuclear warheads as of 2021. Russia is developing missile defense systems such as the S-400 and S-500, among the world's most advanced, and continues to innovate technologies to intercept hypersonic missiles and tactical nuclear weapons.

- **Hypersonic Weapons:** The United States is developing hypersonic weapons capable of traveling at speeds five times that of sound or more, including programs for hypersonic missiles like the AGM-183A ARRW. Meanwhile, Russia has deployed hypersonic weapons such as the Avangard missile and Kinzhal missile, designed to bypass existing missile defense systems.

- **Electronic and Cyber Warfare:** The U.S. is boosting its capabilities in electronic and cyber warfare to disrupt enemy communications and radar systems, jamming enemy signals, and enhancing offensive and defensive cyber capabilities. Russia has also strengthened its advanced capabilities in electronic and cyber warfare, using them effectively in regional conflicts and developing technologies to jam communications and GPS, interfere in elections, and penetrate government and corporate systems.

  This technological arms race, encapsulating diverse advanced military technologies, profoundly impacts global geopolitical and strategic dynamics. It enhances military capabilities in both nations but introduces significant challenges regarding the strategic stability of international security.

2. **Militarization of Space:** Outer space has increasingly become a battleground for competition among major space-faring nations. This militarization poses the risk that future conflicts could affect all of humanity, particularly with rising tensions and the preference for worst-case scenarios over peaceful coexistence, contrary to the principles outlined in the Outer Space Treaty (Al-Bahi, 2022). Militarization of space involves using space to support military operations across land, sea, and air. This includes enhancing space assets that bolster ground infrastructure for military and intelligence purposes, such as early warning systems, communications, command and control, surveillance, and remote sensing, all of which enhance battlefield operations.

   It's important to distinguish militarization from weaponization of space, which specifically refers to placing weapon systems in orbit capable of carrying out attacks during conflicts. These can include vehicles traveling faster than sound and missile defense systems designed to destroy space and ballistic targets. While most space technologies serve dual purposes—military and civilian—the weaponization aspect is a subset of broader space militarization efforts (Amin, 2006).

Item	**Treaty Ceiling**	**Russia February/September 2011 - 2022**	**variance**	**United states February/September 2011 - 2022**	**variance**
1_Deployed intercontinental ballistic missiles, submarine-launched ballistic missilesand heavy bombers	700	521	19	882	223
2_Nuclear warheads installed on intercontinental ballistic missiles, submarine-launched ballistic missiles and heavy bombers	1550	1549	12+	1420	380
3_Intercontinental ballistic missile launchers, submarine-launched ballistic missiles and deployed and non-deployed heavy bombers	800	865	106	1124	324

Table 1- Strategic Offensive Weapons of Russia and the United States 2011- 2022

Source: Arms and Disarmament and International Security, SIPRI Book 2023, Stockholm International Peace Research Institute, p. 15.

3. **Star Wars (Strategic Defense Initiative):** The concept resurfaced under President Ronald Reagan on March 23, 1983, with the announcement of the Strategic Defense Initiative (SDI), colloquially known as Star Wars. This initiative sought to mitigate the military impact of nuclear weapons by developing systems capable of intercepting intercontinental ballistic missiles at various phases of their trajectory. Despite its scientific complexity, high costs, and long development timeline, the Reagan administration pushed this space-centered defense strategy. It aimed to enhance ground stations for data reception and processing, develop satellite communication systems, strengthen satellite warning capabilities, and establish anti-satellite weapon and missile defense systems (Amin, 2006).

   The United States intended to deploy this system in the early 21st century, creating an integrated defense network that includes detection and warning systems, global command, control, communication, and intelligence capabilities, and sophisticated weapons deployable from space, air, land, sea, or underwater. These efforts are bolstered by auxiliary systems necessary for modern warfare, such as navigation and weather monitoring (Ahmed and Ali, 1988).

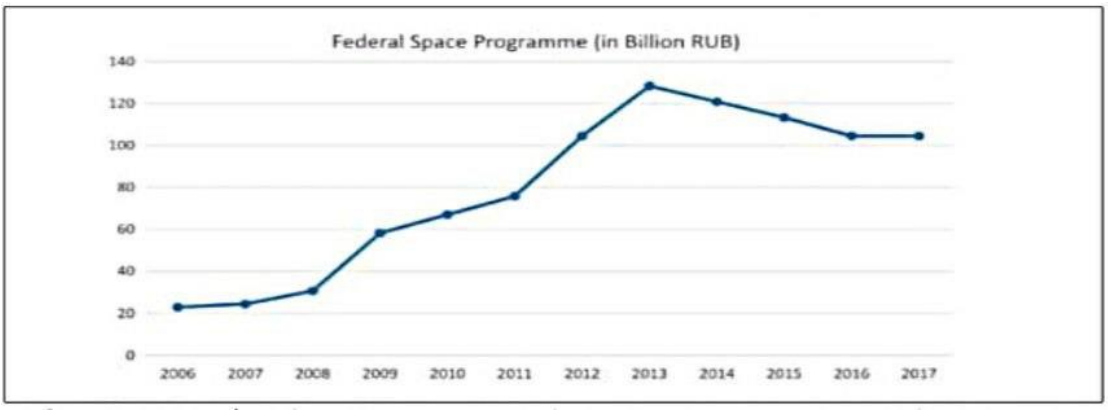
The Third Axis: Geospatial Competition Between the United States of America and Russia

General John Shaw, former deputy head of Space Command, asserts that the world has entered the "third space age." He explains that the first era was dominated by superpowers deploying large satellites dedicated to national security—spacecraft for intelligence gathering, early warning, and communications linked to nuclear deterrence during the Cold War. The second era saw the rise of companies and non-state actors providing telecommunications and other services from space, with satellites such as the Global Positioning System (GPS) revolutionizing conventional warfare. The third era integrates all these space services more than ever before into civilian life, especially as commercial companies like SpaceX have been able to reduce the cost of launching satellites (America, China, and Russia frantically compete for space, 2024, source).

American military activities in outer space have evolved to provoke international geopolitical competition with both China and Russia. In 1985, the US Space Command was established to coordinate the use of outer space and implement the Strategic Defense Initiative. The US initiated programs such as Starfish and ASM 135, a guided missile launched vertically from an F-15 targeting a US satellite orbiting at an altitude of 555 kilometers; the experiment was successful. This command was merged with the US Strategic Command in 2002 following the attacks of September 11, 2001. By 2018, the Trump administration issued the US National Space Strategy, and the US Space Force (USSF) was subsequently established in 2019. Consequently, the US Department of Defense issued its space strategy in 2020 (Blanc, et al., 2022).

Conversely, Russia conducted successful experiments beginning in November 1963 with the launch of a maneuver called Polyot-1, which aimed to test its capability to approach a specific satellite. However, the first successful practical targeting occurred in 1968. Unlike the American method, the Russians developed a special satellite for targeting, where the attack satellite gradually adjusted its orbit to approach the target satellite. Five years later, the anti-satellite system entered experimental service, becoming fully operational in 1998. This Cold War conflict evolved into what is now known as the Strategic Defense Initiative, or the Star Wars program, as discussed in the second axis.

Diagram No. 1: Spending on the Russian Space Program 2006-2017 (in billion rubles).



Source: Marco Aliberti Ksenia Lisitsyna, Russia's Posture in Space: Prospects for Europe, (Studies in Space Policy, Eurspean Space PolicyInstitute, Springer Inteational Publishing AG, 2019)p10.

Within the framework of this geospatial competition, the United States of America leads as the foremost power in military satellites, with approximately 123 of the 4,511 satellites it owns. The U.S. has expressed a strong commitment to maintaining its dominance amid intense international competition with the Russian-Chinese axis, while Russia owns around 177 satellites. In December 2019, Washington announced the formation of the Space Force as the sixth independent branch of its armed forces. This branch focuses on developing satellites capable of resisting attacks from adversaries, such as jamming or detection for spy satellites. One of the notable projects currently in development is the "NTS-3," set for launch in 2022, which features signals that protect against jamming along with programmable and directable frequencies (Al-Jazeera Center for Studies, 2024).

In a parallel move, Russian President Vladimir Putin announced in November 2019 that Moscow had successfully placed the portable military laser system "Peresvet" in orbit. This offensive weapon is part of Russia's space surveillance capabilities and can target satellites in any orbit. Russia is estimated to have 74 military satellites and is working to develop and increase their numbers, particularly focusing on spy and reconnaissance satellites. A recent successful launch was "Cosmos 2543" in 2019 (Haddad and Qaloul, source). Refer to Table -2- for more details.

In a short but significant development, Russia launched an anti-satellite weapon on November 16, 2021. The Russian Ministry of Defense reported the successful completion of an experiment that destroyed the inactive space object "Tsilina-D," which had been in orbit since 1982. Washington criticized this experiment as malicious, viewing it as a threat to the International Space Station's operation and crew due to the resulting space debris. U.S. Secretary of State Antony Blinken confirmed that the U.S. and its allies would not remain silent on what he termed Moscow's "irresponsible" behavior. Bill Nelson, head of NASA, also denounced the experiment, expressing shock at the "irresponsible and destabilizing action." Additionally, NATO expressed concern over the experiment, reflecting apprehensions about increased Russian militarization in space and its implications for combat readiness (Blacksmith and Qal'ul).

Table 2- Government Spending on Space Programs 2022-2023(Billion US Dollars)

The characteristic	2022	2023
United States	61.97	73.2
China	11.94	14.15
Japan	4.9	4.65
France	4.2	3.47
Russia	3.42	3.41
European Union	2.6	2.81

Germany	2.53	2.29
Italy	1.74	11.2
English	1.93	1.69

)Source: https://www.statista.com/statistics/745717/global-governmental-spending-on-space-programs-leading-countries/(

After analyzing the above table on government spending rates by major powers, it is evident that the competition for control over space tools is intensifying, particularly among the United States, China, and Russia. The United States maintains a significant advantage in spending, while the Russian Federation aims to mitigate this disparity through partnerships and cooperation with China, focusing on developing offensive geospatial weapons to counter American threats.

According to a team of researchers from the American Center for Strategic and International Studies, despite the advancements in American space capabilities compared to rival powers, Russia and China are progressing in developing geospatial counterweapons at a faster rate than the United States. There is a notable increase in the flexibility of space countermeasures, particularly with ongoing efforts to enhance cyber-satellite warfare capabilities.

As the militarization of space steadily progresses, the United States and Russia are entering a new era of space competition characterized by conflicts and asymmetric threats. This is especially challenging given the difficulties in protecting satellites. The global strategic environment reveals that world powers are rapidly advancing their dual-use geospatial capabilities, impacting the international strategic balance. Consequently, space-faring nations may find themselves engaged in future conflicts (Amin, 2006).

Conclusion:

From the analysis above, we observe that both the United States and Russia are advancing their technological capabilities in space. Each nation is actively working to sabotage or diminish the other's space infrastructure in an ongoing space technology arms race. The military operations of the twenty-first century heavily rely on space infrastructure for success. Thus, both countries continue to develop geospatial weapons capable of attacking and defending satellites. The race for technological supremacy in space is ongoing and may escalate into geospatial conflicts and wars.

Geospatial competition and technological investment in contemporary times are exacerbating due to the increased military uses of space and the growing number of nations driven by military ambition. World powers are conducting more military experiments within the realm of space armament, posing a significant threat to international peace and security. This threat is compounded by the current inadequacy of international legislation and laws to prevent a new—and not unlikely—Star Wars scenario amid intensified competition.

Furthermore, these conflicts are being exported to outer space, as countries and corporations develop planetary discovery programs for various purposes. They aim to exploit space through proactive defense and offensive strategies, particularly focusing on satellites equipped with sensors and early warning systems to monitor potential threats, such as missile launches. These capabilities facilitate global command and control of military forces, ensuring rapid deployment and coordination, which intensifies the competition and conflicts for space control and domination.

Study Results:

1. Both the United States and Russia have actively developed their techno-satellite capabilities and increased the testing of geospatial weapons to enhance their ability to attack and defend within the realm of geospatial competition and conflict.

2. This technological development has intensified the drive among international and regional powers to compete for technological dominance and accelerate access to space, which could escalate into future conflicts and wars.
3. The growing use of geospatial military tools and the weaponization of space by numerous international and regional powers, particularly the models studied, poses a significant threat to international peace and security.
4. Weak international legislation and insufficient laws regarding the protection of space, especially against space attacks, explosions, pollution, and debris, contribute to intensified geospatial competition.
5. The deployment of geospatial competitive tools, such as satellites, nuclear-tipped hypersonic missiles, spyware, and easily deployable electronic devices, will likely result in space control by a limited number of actors.
6. It is evident that the United States holds superiority over the Russian Federation in geospatial capabilities. In response, Russia is forming an alliance with China to address its weaknesses, focusing on offensive capabilities to counter potential American threats to its geospatial dominance.

Recommendations:

1. It is imperative for all countries to develop geospatial defense strategies that align with the advancements in technology, which have altered power dynamics and the tools of war and deterrence.
2. Enhance international cooperation in the use of geospatial power to strengthen global security.
3. Develop and improve the electronic and cyber infrastructure of countries, providing necessary tools and programs to protect space assets from geospatial attacks.
4. The United Nations and Security Council should legislate regulations that help reduce the militarization of space while promoting peaceful scientific competition, thereby enhancing international security.

References

1. Arabic Resources
2. The Holy Quran.
3. Anis et al., A. (2015).|||UNTRANSLATED_CONTENT_START|||□□□□□□ □□□□□□. |||UNTRANSLATED_CONTENT_END|||(ط2). Cairo: Al-Shorouk International Library.
4. Al-Jawahiri, A.(2005). *Dictionary of* Health.(1F Al-Zamakhshari, Jarallah Abu Al-Qasim Mahmoud bin Omar.(1987)Basis of rhetoric.tahkik ustad abdulrahman mahmoudBeirut: Dar al-Ma 'arifa.
5. Kayali, A.(1979). *Political Encyclopedia*.(E1.Beirut: Dar Al-Huda Publishing, Arab Foundation for Studies.
6. Al-Muaini, Kh.(2009). *New rims*. (s1)Damascus: Kiwan Publishing House.
7. Amin, M.(2006).*Encyclopedia of Types of Wars*. (s1)Damascus: Al-Awael for Publishing and Distribution.
8. Ahmed, A. T.(1988). *Star Wars technology and horizons*. (ط2). |||UNTRANSLATED_CONTENT_START||| عمان: دار الشروق للنشر والتوزيع.|||UNTRANSLATED_CONTENT_END|||
9. Aghwan, A.(2018). *The debates of the international system and major powers are reflections on the new global geopolitical scene*.(1F Amman: Dar Al-Hamed for Publishing and Distribution.
10. Wang, S., Hussien, A. G., Kumar, S., AlShourbaji, I., & Hashim, F. A. (2023). A modified smell agent optimization for global optimization and industrial engineering design problems. *Journal of Computational Design and Engineering*, *10*(6), 2147-2176.

11. Alijoyo, F. A., Prabha, B., Aarif, M., Fatma, G., & Rao, V. S. (2024, July). Blockchain-Based Secure Data Sharing Algorithms for Cognitive Decision Management. In *2024 International Conference on Electrical, Computer and Energy Technologies (ICECET* (pp. 1-6). IEEE.

12. Ramachandran, R., & Sujathamalini, J. (2024). Promoting Diversity And Inclusion In Higher Education: Strategies And Best Practices. *Educational Administration: Theory and Practice*, *30*(4), 6997-7007.

13. Shourbaji, I. A., & AlAmeer, R. (2013). Wireless intrusion detection systems (WIDS). arXiv preprint arXiv:1302.6274.

14. F. A. Alijoyo, B. Prabha, M. Aarif, G. Fatma, V. S. Rao and P. Valavan M, "Blockchain-Based Secure Data Sharing Algorithms for Cognitive Decision Management," 2024 International Conference on Electrical, Computer and Energy Technologies (ICECET, Sydney, Australia, 2024, pp. 1-6, doi: 10.1109/ICECET61485.2024.10698611.

15. Al-Janabi, Samaher & Al-Shourbaji, Ibrahim. (2016). A smart and effective method for digital video compression. 532-538. 10.1109/SETIT.2016.7939927.

16. Kalpurniya, S., Ramachandran, R., & Chandramohan, N. (2023). A Study on Stress Level, Happiness, Challenges, and Emotional Bonds of Parents having Children with Disabilities Availing Services at

17. NIEPMD, Chennai. *Integrated Journal for Research in Arts and Humanities*, *3*(5), 72-88.

18. Shourbaji, I. A., & AlAmeer, R. (2013). Wireless intrusion detection systems (WIDS). *arXiv preprint arXiv:1302.6274*.

19. Band, S. S., Ardabili, S., Danesh, A. S., Mansor, Z., AlShourbaji, I., & Mosavi, A. (2022). Colonial competitive evolutionary Rao algorithm for optimal engineering design. Alexandria Engineering Journal, 61(12), 11537-11563.

20. Singh, A., & Ramachandran, R. (2014). Study on the effectiveness of smart board technology in improving the psychological processes of students with learning disability. *Sai Om Journal of Arts & Education*, *1*(4), 1-6.

21. Katrawi, A. H., Abdullah, R., Anbar, M., AlShourbaji, I., & Abasi, A. K. (2021). Straggler handling approaches in mapreduce framework: a comparative study. *International Journal of Electrical & Computer Engineering (2088-8708)*, *11*(1).

22. Shiju, K. K., Breja, M., Mohanty, N., Ramachandran, R., & Patra, I. (2023). Importance of Special Education and Early Childhood General Education Teachers' Attitudes toward Culturally Linguistically Diverse People. *Journal for ReAttach Therapy and Developmental Diversities*, *6*(9s (2)), 1544-1549.

23. Band, S. S., Ardabili, S., Danesh, A. S., Mansor, Z., AlShourbaji, I., & Mosavi, A. (2022). Colonial competitive evolutionary Rao algorithm for optimal engineering design. *Alexandria Engineering Journal*, *61*(12), 11537-11563.

24. Ramachandran, R., & Singh, A. (2014). The Effect of Hindustani Classical Instrumental Music Santoor in improving writing skills of students with Learning Disability. *International Journal of Humanities and Social Science Invention*, *3*(6), 55-60.

25. Al-Shourbaji, I., & Duraibi, S. (2023). IWQP4Net: An Efficient Convolution Neural Network for Irrigation Water Quality Prediction. Water, 15(9), 1657.

26. Sudarsanan, S., Ramkumar Thirumal, H. D. K., Shaikh, S., & Ramachandran, R. (2023). Identifying the Scope of Reattach Therapy for Social Rehabilitation for Children with Autism. *Journal for ReAttach Therapy and Developmental Diversities*, *6*(10s), 681-686.

27. AlShourbaji, I., Helian, N., Sun, Y., & Alhameed, M. (2021). Customer churn prediction in telecom sector: A survey and way a head. International Journal of Scientific & Technology Research (IJSTR).

28. Kurdi, M.(2023).The relationship of digital technology to the productive efficiency of human capital. *Journal of Political and Economic Studies*,(2), p. 257.

29. Al-Bahi, R.(2022). The Militarization of Outer Space: An Analytical Vision. *Journal of the Faculty of Politics and Economics*,(16), p. 453.

30. M. 2017. .*The Future of Geo-strategic Equilibria: A Study in U.S. Comprehensive Strategy* and *Competitive Power Strategies.* (1F Amman: Dar Al-Hamed for Publishing and Distribution.

31. (b) 2016. *Contracts for the transfer of technology under private international law*, unpublished doctoral thesis, Ain Shams University, Egypt.

32. Moussa, A.(2018). *The Concept of Power in International Relations 1991-2017 American Perspective Case Study*, Unpublished Master's Thesis, Middle East University, Jordan.

33. International Center for Strategic Security and Military Studies. Blacksmith, R. B. U.S.-Russian Competition for Space. https://ciessm.org/category/

34. Al Jazeera Centre for Studies Al-Hafiz, Sh. Does Russia Start World War III from Space.(2024).

35. Report.(2024).America, China and Russia.. Fierce competition for space. Washington Translations. https://www.alhurra.com/arabic-and-international

36. English sources

37. Oxford...(2019)English, Arabic

38. Nye, J.(2010).*Cyber power,* Cambridge: Harvard Kennedy school belfer center for science and international affairs.

39. Gilruth, R.What Was the Space Race?, *national air and space* Museum. https://airandspace.si.edu/stories/editorial/what-.