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THE MOON AS AN INTERNATIONAL COMPETITION IN THE 21ST CENTURY. A POLITICAL SCIENCE PERSPECTIVE

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Abstract
This research article analyses the contemporary Moon race in the changing international environment, technological development and economic conditions. The following theses were verified in the research: (1) The Moon is the subject of competition between states, non-state and transnational entities; (2) the actions of the entities in the Moon race are influenced by the deterioration of international relations, including the worsening of US-Chinese relations and Russia's invasion of Ukraine; (3) the logic of the Moon race is influenced by the involvement of non-state actors, in particular private companies and start-ups. The theses formulated were confirmed during the course of the research. The Moon race has two main consequences: the formation of strategic alliances for the realisation of milestones in lunar exploration and the driving of a new space race and competition between states. It also serves to demonstrate space power and to build international prestige. The logic of the Moon race is changing with the entry of entrepreneurs and start-ups, mainly by pushing its commercial dimension.

Keywords
race to the moon, space race, United States of America, Russia, European Union, "space power"

Introduction

Although the first man set foot on the Moon in 1969 as part of the Apollo mission, the idea of landing on the Moon has long prior captured the imagination of mankind. Around 1611, the German astronomer Johannes Kepler wrote *Somnium* (*Dream*), which was published after his death. It told the story of a student, Tycho Brahe, who had travelled to the Moon (Levania) by occult means (Kepler, 2004, pp. 45–73). Kepler's dream of landing on the Moon came true in the 20th century, while contemporary plans for a lunar landing included the construction of a space station, the presence of spaceship crews, and space mining (Skalfist et al., 2019).

The contemporary race to the Moon encompasses numerous facets. Primarily, from a political standpoint, a nation's presence on the Moon serves as a propaganda triumph, both domestically and internationally. Secondly, from a technological standpoint, it signifies the acquisition of a technological and economic edge globally, encompassing the military domain. These endeavours catalyse the technological race, culminating in reduced production costs and the capacity to transport cargo into space. A salient factor is the involvement of entrepreneurs and start-ups. Thirdly, from an economic perspective, the value of the space market is increasing and is predicted to reach $1 trillion by 2040. Consequently, countries are competing for a position in sharing the benefits of this market, with a significant part of the space market value expected to be generated by mining on the Moon and the extraction of regolith minerals, such as helium-3 and ilmenite (Hickman & Dolman, 2002, p. 16; Radomska, 2024). The Moon's astropolitical significance is due to its position relative to Earth and the gravitational anomalies known as the Lagrange libration points. One attractive property of these points is that they always remain in the same position relative to the Earth and the Moon (Hickman & Dolman, 2002, p. 15; Dolman, 2023, pp. 161–162; Doboš, 2015, pp. 79–81; Doboš, 2022, p. 124).

The aim of the research described in this article is to analyse the contemporary rivalry for the Moon, taking into account the premises resulting from contemporary international relations, technological development and economic premises. The conquest of space became possible after the return to a realist concept in international relations, known as "Astropolitik", or astropolitics. The competition for the Moon is consistent with the principles of geographic determinist theory, which encompasses astropolitics, the study of the interplay between space, technology and the evolution of political and military strategy. In the astropolitical model known as Hohmann's transfer orbits, the Moon is designated as a nodal point (Dolman, 2023, p. 46). This concept enables the control of one's position, thereby ensuring dominance in both space commerce and terrestrial politics (Dolman, 2023, pp. 93–94; Hickman & Dolman, 2002, p. 3). The following theses are verified in the research:

1. The Moon is a subject of rivalry between states, non-state entities and transnational organisations. These entities compete with each other and cooperate on specific issues, such as the division of territory and zones of influence, to achieve their goals.
2. The actions of entities in the Moon race are influenced by the deterioration of international relations, particularly the worsening of US-Chinese relations and Russia's invasion of Ukraine.

3. The involvement of non-state actors, particularly private companies and start-ups, emphasises the commercial nature of the Moon race and has an impact on the logic of competition.

For the analyses carried out in the text, it is crucial to define the concept of space power. Since the 1950s, scholars have engaged in discourse regarding the nature of space operations and the necessity to develop a theory of space power. Consequently, an effort was made to develop a theory of space warfare, drawing parallels with existing models of air power or sea power (Klein, 2025, p. 3). One of the landmark works in the definition of space power is the 1996 article by Colin S. Gray, in which he defined it as "the ability to use space while denying reliable use to any foe" (Gray, 1996, p. 293). In a 1999 publication, he emphasised that "space power refers to the ability to use space and to deny such use to a foe" (Gray, 1999, p. 244). According to Gray, space power is as important in strategic planning as land, sea, air and cyber powers. In his work, he alludes to the Prussian strategist Carl von Clausewitz's theory of war that can be comprehensively understood to facilitate the development of strategies for military operations in and from space. According to Gray, space power is likely to play a supporting role during conflicts. As John J. Klein points out, theories derived from Grey lead to several key conclusions:

1. Space should no longer be seen as a sanctuary for armed conflict.
2. Arms control is an illusion, and introducing arms limitation legislation in international relations is illogical.
3. New strategic theories should be treated with caution.
4. Strategists must accept that predictions may be inaccurate.
5. The importance of space should not be exaggerated (Klein, 2021, pp. 49–53).

Klein's concept is predicated on the maritime strategy formulated by Julian Corbett, and naval strategy served as an inspiration for the formulation of the strategic principles and theoretical framework of space warfare and space warfare. As Klein notes in the second edition of his book, there have been many sweeping changes in space strategy in 20 years, and space is now widely regarded as an area of warfare. This assertion is substantiated by the actions undertaken by the United States, France, the United Kingdom, China and Russia, and the adoption of North Atlantic Treaty Organisation doctrine (Klein, 2025, p. XX). According to Klein, who refers to the strategic concepts of Clausewitz, Sun Tzu and Mao, future military activities in space will have an impact on politics and policy. It is evident that states will seek to defend their national interests in all domains, including land, sea, air, space and cyberspace (Klein, 2019, p. 2).

Everett C. Dolman draws on classic geopolitical analysis, particularly the concepts of Halford MacKinder. Using the principles of astrophysics as a reference point, he identifies key areas of interest, such as specific orbits, celestial bodies and Lagrange libration points. Dolman divides space into four regions: (1) Earth (*Terra*); (2) Earth space (up to geostationary orbit); (3) lunar space (from geostationary orbit to lunar orbit); and (4) solar space (beyond lunar orbit). The objective of all space operations is to control the Earth (Dolman, 2023, pp. 147–148; Doboš, 2020, p. 241). Furthermore, Dolman formulates the theory that the first superpower to dominate low Earth orbits will effectively control not only space, but also the Earth. According to Dolman, the United States should occupy this position as a "liberal hegemon", as all other actors would seek to abuse it. However, this view has been criticised by many authors, who argue that US hegemony in space would not necessarily

lead to peaceful development. Above all, it would prevent other states from making sovereign decisions (Dolman, 2023, pp. 149–152; Doboš, 2020, p. 242).

Bohumil Doboš's work (2019) draws on the methodology developed within the French geopolitical school, as well as the findings of Everett Dolman. The French school, represented by Gérard Dussouy, takes a holistic view of geopolitics, considering it to be a system encompassing all areas of human activity, as well as the physical characteristics of a given territory, its economic relations and its military power.[1]

The concept of space power encompasses the exploration of space for the purpose of establishing critical infrastructure and the commercialisation of space (Czajkowski, 2020, pp. 55–57; Czajkowski, 2018, p. 123). The term "space power" is employed to denote the capacity of states (defined as public institutions and entities that establish a distinct legal order within specific territories), non-state actors (entities that are autonomous yet affiliated with a particular state through their association with its legal system, pursuing their individual or corporate interests) and transnational actors (non-state actors that are not only autonomous but also not institutionally affiliated with a specific state and pursue economic, political, social, etc. interests) (Czajkowski, 2020, p. 11).

This study covers the current space powers, the United States, Russia (including its predecessor, the USSR) and the BRICS and European Union countries, new players in the space race. The analysis does not cover the specific issues of the participation of non-state actors and attempts to explore Mars. The text is divided into three parts. The first part analyses the rivalry for the Moon between the USA and the USSR during the Cold War. The second part deals with the post-Cold War period, the new rivalry for the Moon, the creation of new alliances and the involvement of new entities (state and non-state). The third part presents the European Union and its participation in space exploration. The study used desk research methods, mainly qualitative analysis based on source verification, legal and institutional analysis and content and data analysis based on online and press sources.

The Cold War space race and the Moon landing

During the Cold War, only two countries competed in space: the Soviet Union and the United States, the leaders of the blocs (Czajkowski, 2020, pp. 127–177). Post-war treaties/laws/space regimes, widely perceived as global cooperation, were in fact the product of Cold War competition and international rivalry (Dolman, 2023, p. 186). The Soviet Union was the first country to send a man into Earth's orbit, which led to increased spending by the United States and the sending of a man to the Moon. The space and arms races that began with the launch of Sputnik were intended to determine economic dominance and define the developmental model for emerging nation states. This "battle of paradigms" was inevitable and acted as a catalyst for the transformation of two fundamental beliefs about the world. Initially, the Soviet planned economy appeared to be technologically su-

[1] Dussouy based his geopolitical concept on an analysis of five spaces. The geopolitical infrastructure is constituted by three primary levels: demographic space, diplomatic-strategic space and economic space. These are in turn interwoven with physical space and symbolic space. The five aforementioned spaces are interconnected by the concept of power (Vernier, 2010, p. 15). Doboš refers to Dussouy's three spaces in his conception, for understandable reasons omitting the demographic and symbolic dimensions (Doboš, 2019, pp. 3–4).

perior to the American free market model. This was then taken as evidence of the USSR's superior level of social and political development (Dolman, 2023, pp. 198–199). Secondly, the Sputnik launch made the US government and society aware of the global insecurity posed by nuclear weapons. For the first time since 1814, American territory was under direct threat from outside. The United States could not afford to lose this competition, and even the most "technophobic" isolationists now responded with patriotic fervour, prepared to make sacrifices in the name of national interests. The 1958 U. S. Preliminary Space Policy Statement–the first U. S. space strategy document–emphasised the issue of prestige in space conquest (Czajkowski, 2020, pp. 148–149). As a result, by 1969 American pre-eminence in space was a given (Dolman, 2023, pp. 200–201). In response to these trends, US President John F. Kennedy made the space race one of the major themes of his presidency (Skalfist et al., 2019). Apart from ideology and prestige, several other factors determined the space race during the Cold War: time, the innovative implementation of new technological solutions and cost efficiency (table 1).

Table 1. The space race during the Cold War

Date	State	Mission	Achievement
21.08.1957	USSR	R-7 Semyorka SS-6 Sapwood	Ballistic Missile Basics
4. 10.1957	USSR	Sputnik 1	Artificial satellite (Earth orbit)
3.11.1957	USSR	Sputnik 2	An animal in orbit (dog)
31.01.1958	USA-ABMA	Explorer 1	Discovery of the Van Allen belts
18.12. 1958	USA-ABMA	Project SCORE	Telecommunication satellite
4.01.1959	USSR	Łuna 1	Artificial satellite (Sun-synchronous orbit)
17.02.1959	USA-NASA (NRL)	Vanguard 2	Weather satellite
25.06.1959	USA-Air Force	Discoverer 4	Reconnaissance satellite
7.08.1959	USA-NASA	Explorer 6	Photo of the Earth from space
14.09.1959	USSR	Łuna 2	Moon survey
7.10.1959	USSR	Łuna	Photo of the far side of the moon
12.04.1961	USSR	Wostok 1	A man in space
10.07.1962	USA-AT&T	Telstar 1	Active telecommunications satellite
29.09.1962	Canada	Alouette 1	Artificial satellite (not involving world powers)
16.06.1963	USSR	Wostok 6	Woman in orbit
26.07.1963	USA-NASA	Syncom 2	Geosynchronous satellite
18.03.1965	USSR	Woschod 2	Space walk
15.12.1965	USA-NASA	Gemini 6A/Gemini 7	Meeting in orbit
1.03 1966	USSR	Wenera 3	Landing a probe on another planet – Venus
16.03.1966	USA-NASA	Gemini 8	Meeting and docking in orbit
14.12.1968	USA-NASA	Apollo 8	Manned flight around the Moon.
20.07.1969	USA-NASA	Apollo 11	Man on the Moon

Date	State	Mission	Achievement
23.04.1971	USSR	Salut 1	Orbital station
14.11.1971	USA-NASA	Mariner 9	Satellite orbiting another planet – Mars
9.11.1972	Canada	Anik A1	Geostationary telecommunications satellite
15.07.1975	USSR USA-NASA	Sojuz-Apollo	The first joint US-Soviet mission

Source: Author's work based on: Riley (n.d.). *Timeline of the Space Race, 1957–69*. Britannica. https://www.britannica.com/story/timeline-of-the-space-race; *Chronology: Moon race* (n.d.) Russianspaceweb. https://www.russianspaceweb.com/chronology_moon_race.html; Duch, W. (2021, April 11). *Wyścig kosmiczny. Czyli rywalizacja w podboju kosmosu między USA a ZSRR*. Historia.org.pl. https://historia.org.pl/2021/04/11/wyscig-kosmiczny-czyli-rywalizacja-w-podboju-kosmosu-miedzy-usa-a-zsrr/; Teigens, V. (2020). *The Space race*. Cambridge Stanford Books.; *Wyścig kosmiczny* (n.d.). Wikipedia. https://pl.wikipedia.org/wiki/Wy%C5%9Bcig_kosmiczny

The American moon landing in 1969 allowed the Apollo programme to continue for another three years, but it was discontinued because of the high cost. Another factor in the programme's demise was the lack of a specific goal for returning to Earth's satellite. The 1980s saw the development of space technology in the form of shuttle flights, which were designed to provide a cheap and safe means of transporting people and cargo into Earth's orbit. The problem with space shuttles was their high failure rate and the cost of building and operating them, so it was eventually decided to end the shuttle flight programme in 2010 (Stankiewicz, 2010, p. 112).

In summary, the space race during the Cold War (1957–1975) included the landing of a man on the Moon and the exploration of space by artificial satellites. The space race became an important aspect of the cultural, technological and ideological rivalry between the two superpowers. Competition in space boosted international prestige. Apart from the two superpowers, Canada was the only country to make its presence felt in the space race.

Space Race 2.0: New strategies, new alliances and new solutions for lunar exploration in the post-Cold War era

The end of the Cold War changed the perspective of analysis in international relations. Competition, prestige and ideological approaches to state policy became less important, and the primacy of the United States ensured the implementation of certain democratic values, human rights and international law. Changes in the space race came with the acceleration of technological development and the rise in international importance of both Russia and China. Cooperation and harmony were supposed to lead to the peaceful exploration of space by mankind, instead they proved to be a way for states to secure technological, military and economic superiority (Hickman & Dolman, 2002, p. 16).

Space Race 2.0 describes the renewed space race of the 21st century, in which the number of competing entities is far greater than the number of governmental entities alone, largely due to very rapid technological development (Czajkowski, 2018, p. 118). The contemporary space race, also referred to as the billionaires' race, involves a competition between three non-governmental companies: Blue Origin (founded in 2000 by Jeff Bezos), Virgin Galactic (founded in 2004 by Richard Branson) and SpaceX (founded in 2004 by Elon Musk).

The primary objective of both Blue Origin and Virgin Galactic is to conduct manned suborbital flights. Blue Origin's objectives also include the development of a lunar lander. In contrast, SpaceX is engaged in the design and manufacture of rocket engines, launch vehicles and spacecraft. The company has successfully conducted missions that include the launch of satellites into orbit and the transportation of cargo and personnel to the International Space Station. The primary objective of SpaceX is to undertake the inaugural manned flight to Mars (Drąg, 2021).

The state participants of the Space Race 2.0 are not only the two main players from the Cold War era–the US and Russia (USSR)–but also China, the BRICS countries, Japan and the European Union. The return of Russia to the space race can be attributed to a number of factors. Primarily, this was due to the improvement of the financial situation after 2000, the assurance of security and the desire to rebuild its position as a superpower both internationally and among its own citizens. In the case of China, the decision to participate in the space race is a consequence of the country's economic and technological development, as well as the realisation of its national interests. In the case of both countries, the motivation is related to the prestige that space policy and participation in the space race provide (Czajkowski, 2018, pp. 120–121). As previously mentioned, Space Race 2.0 has a slightly different analytical scope. First, it differs in the number of entities involved and lacks transparency and leadership hierarchy. Within this framework, as in globalisation processes, states, non-state and transnational entities pursue their different interests. This rivalry is characterised by the conclusion of various multilateral and bilateral agreements in order to promote cooperation and the acceptance of their intentions by as wide an audience as possible.

The United States has changed its strategy several times in the 21st century, adapting it to new international conditions. Part of the new strategy is to participate in the construction of lunar landers by competing private companies SpaceX and Blue Origin (Brzeziński, 2024). The Artemis Accords[2], signed on 13 October 2020 between the US and seven other countries (Australia, Japan, Canada, the United Arab Emirates, Luxembourg, the United Kingdom and Italy), is crucial to the development of space exploration. Ukraine joined in November 2020 and Brazil expressed interest in December 2020. It creates additional areas of cooperation in the field of peaceful principles of space exploration, in particular the mining of mineral resources (Piotrowski & Zaremba, 2021).

The United States and the Kingdom of Saudi Arabia announced on 27 November 2024 their intention to expand bilateral cooperation in the exploration and use of outer space for peaceful purposes. The decision was announced during a visit to North America by the Saudi Minister of Communications and Information Technology and the President of the Saudi Space Agency. The countries reaffirmed their mutual desire to strengthen cooperation, including in the development of the commercial sector, responsible use of space, overall space security and Earth sciences (Mitkow, 2024). Brazil has received of-

[2] The Artemis Accords represent a series of non-binding, multilateral agreements between the US government and other states worldwide, with the purpose of clarifying the standards expected of participants in the space programme. By June 2025, a total of 55 countries had become signatories. The Artemis Accords, in turn, refer to the Artemis Programme, a US spaceflight programme run by NASA, private space companies and international partners. The objective of the programme is to facilitate the return of humans to the Moon, with the initial mission including the first woman and person of colour, and to utilise this as a foundation for subsequent missions to Mars.

fers of cooperation from the United States and Russia. The US offer to South American countries includes closer cooperation in space, including monitoring and preventing the destruction of the Amazon rainforest. Brazil is also a signatory to the Artemis Accords, an international agreement that provides a framework for cooperation in the civil exploration and peaceful use of the Moon, Mars and other celestial bodies (Kaczanowski, 2023).

India remains a significant player in the space race and joined the Artemis Accords in June 2024. According to Indian Prime Minister, Narendra Modi, the decision to sign the Artemis Accords was a major step forward in Indo-US space cooperation. Another element of the cooperation is the NISAR programme (NASA-ISRO Synthetic Aperture Radar), which is a satellite with a synthetic aperture radar that will be able to operate in the L- and S-bands radio spectrums and, in addition to warning of climate disasters, will provide intelligence data thanks to the SAR aperture. Interestingly, it will also be equipped with payloads (supplied by NASA) to provide GPS services and an efficient satellite communications system. At the beginning of the 21st century, the Russian Federal Space Agency predicted the development and maintenance of orbital space equipment for communication, broadcasting, remote sensing of the Earth's surface, crisis management and basic space research; the development of advanced launch vehicles; the modernisation of the Baikonur cosmodrome; and preparations for planning a mission to Mars (Bielawski, 2022, pp. 63–65). In July 2023, Russia offered the BRICS countries the opportunity to train their engineers and scientists at leading Russian universities. Places will be allocated with the help of Roskosmos, the Russian state corporation for space activities. According to Yury Ivanovich Borisov, the general director of Roscosmos from 2022 to 2025 and from 2018 to 2022, these countries have a common goal of ensuring the conditions for development in the age of digitalisation and the ongoing space race (Kaczanowski, 2023). Borisov made a similar proposal to African countries, where there is an opportunity to build national modules. He added that Russia was also interested in cooperating with other countries. Given the low level of development of the space sector in Africa, the construction of special modules is likely to be coordinated with Russia. With support from the US and Russia in the 1990s and early 2000s, China joined the ranks of countries capable of sending spacecraft into space. The official goals of the space programme include building environmentally friendly, low-cost and high-quality launch vehicles with increased payload capacity; implementing a new Earth observation system to fully monitor natural resources or prevent natural disasters; launching additional meteorological and telecommunications satellites; and conducting work in space (e.g. spacecraft docking tests) to bring China closer to establishing an orbital station and establishing bases on the Moon and Mars (Stankiewicz, 2010, pp. 114–115). Another element was the rapprochement of Russia and China as two entities implementing joint projects in space policy, including the agreement on the construction of a joint station in 2021 (Space24, 2021). The bilateral agreement for space cooperation between 2023 and 2027 was signed on 25 November 2022 and paves the way for the launch of the International Lunar Research Station (ILRS), scheduled for completion by 2035. The plans foresee the development of infrastructure in the orbit and on the surface of the moon between 2031 and 2035, in particular communication systems, electricity, research equipment and other facilities. Scientific activities are planned to be launched in 2036 (Mitkow, 2023). There is no shortage of opinions, not only on the Russian side, that China is pursuing its interests above all else. In the 1990s, China copied Russian technology (the Shenzhou capsules based on the

Soyuz spacecraft, spacesuits for working in a vacuum, medical procedures and training methods for flight personnel) and space and aviation training. Their capabilities in launch vehicle development, satellite communications and navigation and satellite destruction are comparable to those of the US. They lack experience in the number of flights completed, in the operation of space telescopes and observation systems and in manned missions. China's achievements are based on the successful transfer of Russian technologies in the 1990s and continued cooperation with Russia (Karwowski & Pelc, 2024).

As mentioned above, the Moon is an important element of Space Race 2.0 and space exploration. Both China and the US are planning to land and build lunar bases at the Moon's south pole. In the name of realist theory, the potential benefits (i.e. natural resources, prestige issues and new space exploration) may lead to another level of rivalry rather than the assumed peaceful coexistence of nations. The following list shows the lunar landings of individual rovers (table 2).[3]

Table 2. Moon landings by individual rovers

Date	State/Organisation	Mission
1.12.2013	CNSA	Chang'e 3
23.10.2014	CNSA	Chang'e 5-T1
7.12.2018	CNSA	Chang'e 4
23.11.2020	CNSA	Chang'e 5
11.12.2022	ispace	Hakuto-R M1
11.12.2022	UAESA	Emirates Lunar Mission
14.07.2023	ISRO	Chandrayaan-3
7.09.2023	JAXA	SLIM
8.01.2024	NASA, Astrobotic Technology	Peregrine Mission One
8.01.2024	UNAM	Colmena
8.01.2024	Carnegie Mellon University	Iris
15.02.2024	NASA, Intuitive Machines	IM-1 Odysseus
15.01.2025	Firefly Space	Blue Ghost Mission 1
15.01.2025	ispace	Hakuto-R M2 (Resilience)

Source: Author's work based on: *Loty kosmiczne. Archiwum* (n.d.). http://lk.astronautilus.pl/arch.htm.

The above analysis includes a list of lunar rover flights, which seems justified by the prestige and the possibility of implementing a broad information policy of the entity carrying out the mission. Three conclusions can be drawn from an analysis of the list. First, China is the leader in lunar landings (three successful landings); the other participants in the Artemis Accords (United States, Japan, United Arab Emirates) are working together

[3] For the sake of clarity, the list does not include space probe, satellites or exploration of near-lunar orbits.

on space exploration. Second, landing on the surface of a celestial body gives countries international prestige. Third, the Moon landing was televised around the world, a tool for building US "space power".

The European Union and its contribution to space exploration

The European Union and its member states are also competing for their position in the space race initially dominated by the rivalry between the US and the USSR (Smolik, 2017, pp. 124, 128–129). However, in contrast to the superpowers that dominated space during the Cold War and the present day, the European Union does not perceive space exploration as a military security issue. Instead, its focus is on the development of scientific research and economic activity. These activities, which are an expression of the EU's political aspirations, serve to build up and underline the European Union's soft power (Turczyński, 2020, p. 291). European space policy is therefore both an example of regional integration and an attempt to become independent of other space powers, in particular the United States (Smolik & Turczyński, 2022, p. 11).

The EU space policy is distinguished by a number of salient features, stemming from its unique character. First, European space policy is governed by international law, EU law and the laws of individual member states. Among them, the development of international law plays a key role, including international space regimes (Bryła, 2015, pp. 123–142) that delineate the responsibilities of entities engaged in the possession and utilisation of space resources, as well as European Union treaty law and soft law instruments. Additionally, the intricate relationship between EU internal law, the legal systems of individual member states and international law is of paramount importance. Second, the EU's space policy is the result of the interests of individual Member States, which pursue these objectives independently or through the European Space Agency (ESA). In this case, the aspirations of European countries coincide with the objectives of the space powers and are therefore aimed at strengthening national security and developing military potential. In this case, the pursuit of the European Union's strategic autonomy becomes an important issue (Smolik, 2024, pp. 259–271; Smolik, 2008, pp. 143–162). On the other hand, the use of space resources by ESA remains a separate issue, stemming from the provisions of the ESA Convention, which reserves the use of space resources for peaceful purposes and the development of scientific research. Third, the European Space Policy has a symbolic importance, as it becomes another element in the construction of a European identity through the potential strengthening of ties between EU citizens (Słomczyńska, 2017, p. 120). This aspect is also reflected in the need for regional cooperation, given the lack of sufficient resources. Fourth, the European Union, like the space powers, sees the propaganda potential of space exploration in terms of strengthening its international position.

The conquest of the Moon remains an important component of European space policy. The European Union's ambitions to participate in the space race are perfectly reflected in the vision outlined in ESA Agenda 2025 (European Space Agency, 2021):

> The year is 2035. ESA has just celebrated the 60th anniversary of its creation in 1975. Europe has grown as a global leader in space, alongside the US, Russia, China and other prominent space partners. Thanks to clever investments and new rules of engagement made by ESA, the EU, and national agencies, space has been opened up to private companies whose activities contribute to increased employment, profit and inclusive growth in Europe. Europe's presence in space has increased its global influence, prestige and economic standing worldwide. Eu-

> rope has had to revolutionise its launcher sector of the 2020s and has created a completely new, more competitive and reusable launcher system. European astronaut Aurora is about to start her adventure as the third European to land on the Moon. It will be her final training mission before the next big exploration leap: setting foot on Phobos, in orbit around Mars. The Phobos landing will cement Europe's exploration heritage and confirm Europe as part of humankind's next historic venture: a Mars landing.

ESA Agenda 2025, presented by ESA Director General Josef Aschbacher, has five strategic objectives:

1. Strengthen ESA–EU relations;
2. Boost green and digital commercialisation;
3. Develop space for safety and security;
4. Address critical programme challenges
5. Complete the ESA (European Space Agency, 2021, pp. 5–13).

The current reassessment of ESA's approach to space exploration is the result of changing trends in space exploration, in particular the definition of clear space policy objectives by countries participating in the new space race, the commercialisation of space, and investment in the development of the space industry by the world's richest people. The pressure to develop a coherent space strategy is mainly due to the fear that Europe will be excluded from the group of major participants in the space race and thus deprived of participating in the growing value of the space market.[4] Participation in the space race is also seen as an opportunity to bring European societies closer together, which in turn can help overcome the economic, social and health crisis and lead to sustainable development (European Space Agency, 2021, p. 3). Another factor influencing the change in the EU's position on space programmes is the sanctions imposed on Russia in connection with its aggression in Ukraine, including the termination or suspension of cooperation with Russia.

In consideration of the aforementioned, it can be posited that the European Union acknowledges five primary objectives in the context of space exploration. These objectives encompass the following:

1. The promotion of space exploration and the advancement of scientific research.
2. The governance of space mining, the formulation of sustainable development policies and the management of natural resources on the Moon.
3. The assurance of security and defence.
4. The facilitation of investment in space technologies and the enhancement of technological autonomy.
5. The promotion of international cooperation.

The exploration of the Moon is linked to the Artemis Programme, the main idea of which is to return humans to the Moon and establish a base to test technologies that will eventually be used in the mission to Mars. Artemis, which, unlike the Apollo Programme,

[4] The space economy consists of products and services related to launching products into space, maintaining them in space and generating revenue from them. Currently, the largest segment of the space economy is satellite navigation (accounting for almost half of the market value), followed by satellite communications and other services (including Earth observation). In 2022, the global value of the space industry was $464 billion, while in 2040 it could reach $1 trillion, with an average annual growth rate of 5%. The growth of the space market will be determined by the increasing share of ground-based equipment, a greater share of government orders and the development of services (radio satellites, broadband Internet, etc.). ; Polski Instytut Ekonomiczny, 2022, pp. 11–12; Kukołowicz et al., 2024, pp. 22–24).

is mainly made up of scientists, offers the opportunity to study the lunar rock material. Europe is represented in the Artemis Programme by ESA and Airbus, which is involved in the construction of the "Orion" spacecraft (Maciejewski, 2024). The Moon, dubbed the "Persian Gulf of the Solar System", is becoming the site of an international competition for mineral resources, including helium-3 (for energy production) and ilmenite (for the extraction of titanium and iron) (Krajczyńska, 2022). Another important compound is water ice, which will be of strategic importance in the planned mission to Mars. Competition for the Moon's resources could lead not only to another space race in the coming years, but also to conflicts over the right to extract mineral resources (PBE, 2022).

In the race for domination of the moon, the European Union faces two challenges. First, there are limited possibilities for financing space projects. Second, the problem is the lack of a coherent vision of EU activity in space (Posaner, 2019). This is also due to the fact that EU countries are establishing separate space agencies, some of which have budgets comparable to that of the ESA. The European Union's problem in the race to the Moon is limited resources. For example, the European Commission has budgeted €16 billion for space-related spending between 2021 and 2027. By comparison, NASA's annual budget is more than $20 billion, while China spends $8 billion a year (see also: Turczyński, 2020, p. 296). With limited resources, the European Union is forced to cooperate with other entities. In addition to the Artemis Programme mentioned above, another flagship Programme was ESA's cooperation with Russia within the so-called Russia-EU Common Economic Space. This cooperation focused on the Russian "Luna" project (Russia plans to land on the Moon by 2029–2035 at the latest). However, due to Russian aggression in Ukraine, ESA decided in April 2022 to suspend cooperation with the Russian agency Roscosmos and withdraw from three lunar missions, and to end cooperation in the ExoMars Programme earlier (Space24, 2022).

Conclusions

The race to the Moon is an important element in building a state's prestige and is also a demonstration of its space power. The concept of space conquest is congruent with the space power theories proposed by C. S. Gray, J. J. Klein, E. C. Dolman and B. Doboš. The research confirmed the theses formulated. First, it was confirmed that the Moon is the subject of competition between states, non-state and supranational entities. These entities compete with each other to achieve their goals, and in some cases they also cooperate. This is largely due to the lack of sufficient resources (financial, know-how) to carry out independent missions. Competition increases when participants have equal or similar technological and economic potential (USA and China). In the race to the moon, the US is cooperating with Japan, India, Brazil and Saudi Arabia, while Russia is cooperating with the BRICS countries. The European Union participates in this competition mainly through ESA, cooperating both with the US in the Artemis Programme and with Russia (until 2022). Second, the actions of the players in the Moon race will be influenced by the deterioration of international relations. Political tensions between the US and China may play a particular role in the division of spheres of influence in lunar mining and the sharing of potential profits or missions to Mars. This is why there are public calls for the creation of an organisation similar to NATO. Third, the involvement of non-state actors, in particular private companies and start-ups, emphasises the commercial nature of this

race and influences the logic of the competition for the Moon. The involvement of these actors has allowed for dynamic technological development while at the same time reducing the cost of space exploration.

References

Bielawski, R. (2022). Rozwój zdolności w domenie Kosmicznej Przez Potentatów Kosmicznych. *Kultura Bezpieczeństwa*, *42*, 58–69. https://doi.org/10.5604/01.3001.0015.9477

Bryła, J. (2015). Wkład Unii Europejskiej w rozwój międzynarodowego reżimu kosmicznego. *Rocznik Integracji Europejskiej*, *9*, 123–142. https://doi.org/10.14746/rie.2015.9.

Brzeziński, W. (2024, December 03). *Polityka kosmiczna USA. Cele NASA za kadencji Trumpa mogą się zmienić.* Tygodnik Powszechny. https://www.tygodnikpowszechny.pl/co-czeka-nasa-pod-rzadami-donalda-trumpa-189092

Chronology: Moon race. (n.d.) Russianspaceweb. https://www.russianspaceweb.com/chronology_moon_race.html

Czajkowski, M. (2018). Nowy wyścig kosmiczny XXI w. – USA, Chiny i Rosja. *Krakowskie Studia Międzynarodowe*, *15*(1), 117–141.

Czajkowski, M. (2020). *Przestrzeń kosmiczna w strategii bezpieczeństwa narodowego USA*. Księgarnia Akademicka. https://doi.org/10.12797/9788381381819

Doboš, B. (2020). Astropolitics: Yes, that is really a thing'. *Medjunarodni problemi*, *72*(1), 236–253. https://doi.org//10.2298/MEDJP2001236D

Doboš, B. (2015). Geopolitics of the Moon: A European Perspective. *Astropolitics*, *13*(1), 78–87. https://doi.org/10.1080/14777622.2015.1012005

Doboš, B. (2019). *Geopolitics of the Outer Space. A European Perspective*. Springer. https://doi.org/10.1007/978-3-319-96857-5

Dolman, E. C. (2023). *Astropolitik. Klasyczna geopolityka w erze kosmicznej*. Wydawnictwo Nowej Konfederacji.

Drąg, N. (2021, September 01). *Wyścig kosmiczny 2.0*. Innspace. https://innspace.pl/wyscig-kosmiczny-2-0/

Duch, W. (2021, April 11). *Wyścig kosmiczny. Czyli rywalizacja w podboju kosmosu między USA a ZSRR*. Historia.org.pl. https://historia.org.pl/2021/04/11/wyscig-kosmiczny-czyli-rywalizacja-w-podboju-kosmosu-miedzy-usa-a-zsrr/

Space24. (2022, April 14). *ESA kończy współpracę z Rosją w programie Łuna*. Space24. https://space24.pl/polityka-kosmiczna/swiat/esa-konczy-wspolprace-z-rosja-w-programie-luna

European Space Agency. (2021). *ESA Agenda 2025 "Make Space for Europe"*. https://www.esa.int/About_Us/ESA_Publications/Agenda_2025

Gray, C. S. (1996). The Influence of Space Power upon History. *Comparative Strategy*, *15*(4), 293–308. https://doi.org/10.1080/01495939608403082

Gray, C. S. (1999). *Modern Strategy*. Oxford University Press.

Hickman, J., & Dolman, E. C. (2002). Resurrecting the Space Age: A State-Centered Commentary on the Outer Space Regime. *Comparative Strategy*, *21*(1), 1–20. https://doi.org/10.1080/014959302317350855

Kaczanowski, W. (2023, July 27). *Rosja z kosmiczną ofertą dla państw BRICS. Czy USA zareagują?*. Space24. https://space24.pl/polityka-kosmiczna/swiat/rosja-z-kosmiczna-oferta-dla-panstw-brics-czy-usa-zareaguja

Karwowski, K., & Pelc, J. (2024, July 22). *Na plecach niedźwiedzia ku gwiazdom. Rola Rosji w chińskim programie kosmicznym*. INE. https://ine.org.pl/na-plecach-niedzwiedzia-ku-gwiazdom-rola-rosji-w-chinskim-programie-kosmicznym/

Kepler, J. (2004). *Sen czyli wydane pośmiertnie dzieło poświęcone astronomii księżycowej*. Wydawnictwo Naukowe Scholar.

Krajczyńska, E. (2022, November 17). *Badaczka: Księżyc w przyszłości może być źródłem cennych pierwiastków i minerałów.* Forsal.pl. https://forsal.pl/lifestyle/nauka/artykuly/8589867,ksiezyc-zrodlo-cennych-pierwiastkow-i-mineralow.html/

Klein, J. J. (2021). Some Lessons on Spacepower from Colin Gray. *Naval War College Review*, *74*1, 45–55.

Klein, J. J. (2025). *Space warfare: strategy, principles and policy*. Routledge.

Klein, J. J. (2019). *Understanding Space Strategy The Art of War in Space*. Routledge.

Kukołowicz, P., Lubasiński, J., Mądry, T., Święcicki, I., & Witczak, J. (2024). *Gospodarka kosmiczna*. Polski Instytut Ekonomiczny. https://pie.net.pl/wp-content/uploads/2024/06/Raport_PIE_Gospodarka-kosmiczna.pdf

Loty kosmiczne. Archiwum. (n.d.). http://lk.astronautilus.pl/arch.htm.

Mitkow, M. (2023, January 04). *Chiny i Rosja razem na Księżycu?*. Space24. https://space24.pl/polityka-kosmiczna/swiat/chiny-i-rosja-razem-na-ksiezycu

Mitkow, M. (2024, April 10). *Arabia Saudyjska stworzy siły kosmiczne? Wsparcie USA*. Space24. https://space24.pl/bezpieczenstwo/technologie-wojskowe/arabia-saudyjska-stworzy-sily-kosmiczne-wsparcie-usa

Piotrowski, M., & Zaremba, S. (202). *Porozumienie Artemis – w kierunku nowych zasad eksploatacji kosmosu*. Polski Instytut Spraw Międzynarodowych. https://www.pism.pl/publikacje/Porozumienie_Artemis__w_kierunku_nowych_zasad_eksploatacji_kosmosu

Polski Instytut Ekonomiczny. (2022, May 19). *Biznes w kosmosie*. https://pie.net.pl/wp-content/uploads/2022/05/Tygodnik-PIE_20-2022-1.pdf.

Posaner, J. (2019, August 18). *Europa nie ma ani wizji podboju kosmosu, ani pieniędzy na to.* [online]. Onet. https://wiadomosci.onet.pl/politico/europa-nie-ma-ani-wizji-podboju-kosmosu-ani-pieniedzy-na-to/8e96rxs

Radomska, A. (2024, November 29). *Księżyc – potencjał dla sił*. Space24. https://space24.pl/bezpieczenstwo/technologie-wojskowe/ksiezyc-potencjal-dla-sil-zbrojnych-analiza

Riley, P. (n.d.). *Timeline of the Space Race, 1957–69*. Britannica. https://www.britannica.com/story/timeline-of-the-space-race

Skalfist, P., Mikelsen, D., & Teigens V. (2019). *The Conquest of Space*. Cambridge Stanford Books.

Słomczyńska, I. (2017). *Europejska polityka kosmiczna*. Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej.

Smolik, B. (2008). Unia Europejska w obliczu głównych wyzwań polityki kosmicznej. *Wrocławskie Studia Politologiczne*, *9*, 143–162.

Smolik, B. (2017). Wizje podboju Marsa. Od literackiej dystopii do kluczowych decyzji politycznych. *Annales Universitatis Paedagogicae Cracoviensis Studia Politologica*, *18*(247), 120–134. https://doi.org/10.24917/20813333.18.10

Smolik, B. (2024). Pojęcie oraz techniczny wymiar autonomii strategicznej Unii Europejskiej. Przykład polityki kosmicznej. *Politeja*, *21*(2(88/2)), 259–271. https://doi.org/10.12797/Politeja.20.2024.88.2.17

Smolik, B., & Turczyński, P. (2022). Geneza europejskiej eksploracji kosmosu – rozważania wstępne. In B. Smolik, P. Turczyński P. (Eds.), *Polityka kosmiczna Unii Europejskiej. Zagadnienia prawne, polityczne i ekonomiczne* (pp. 11–14). Wydawnictwo Księgarnia Akademicka. https://doi.org/10.12797/9788381387750

Space24 (2021, March 10). *Wspólna budowa stacji księżycowej treścią porozumienia Chin i Rosji*. https://space24.pl/polityka-kosmiczna/wspolna-budowa-stacji-ksiezycowej-trescia-porozumienia-chin-i-rosji

Stankiewicz, W. (2010). Rywalizacja państw w kosmosie. *Przegląd Politologiczny*, *2*, 109–125.

Teigens, V. (2020). *The Space race*. Cambridge Stanford Books.

Turczyński, P. (2020). Europejska Agencja Kosmiczna (ESA) – ambitne plany, skromne możliwości, potężni konkurenci. *Rocznik Integracji Europejskiej*, *14*, 291–309. https://doi.org/10.14746/rie.2020.14.19

PBE. (2022, May 22). *Wyścig Chin i USA po minerały na Księżycu. Chodzi o miliardy dolarów*. Money.pl. https://www.money.pl/gospodarka/wyscig-chin-i-usa-po-mineraly-na-ksiezycu-chodzi-o-miliardy-dolarow-6770226565548544a.html/

Wyścig kosmiczny (n.d.). Wikipedia. https://pl.wikipedia.org/wiki/Wy%C5%9Bcig_kosmiczny

Venier, P. (2010). Main Theoretical Currents in Geopolitical Thought in the Twentieth Century. *L'Espace Politique*, *12*(3), 1–18. https://doi.org/10.4000/espacepolitique.1714