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THE SILK ROAD LEADS TO THE MOON: CHINA'S OUTER SPACE STRATEGY AND ITS FUTURE DEVELOPMENT

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Abstract: Recently, a growing number of countries in the world have been interested in the research of the so-called fourth dimension. Considering that conquering space provides numerous strategic benefits, as well as access to large reserves of untapped resources, some countries, particularly those with a high level of economic development, such as India and China, have demonstrated determination to join the prestigious 'club of spacefaring nations', which was reserved, until recently, for the United States, the Russian Federation, Japan, Canada and the European Union. The paper analyzes the space strategy of the People's Republic of China. After a brief account of the history of the development of China's space activities, special attention in the paper is given to the importance of the Moon. Its conquest is substantial for acquiring prerequisites for further exploration of outer space, but is also relevant having considered the fact that it represents a very large and yet unused resource base. In addition, the author analyzes the military component of the realization of the cosmic ambitions of the most populous country in the world, i.e., investigates whether the actions of China contribute to the militarization of the cosmos or the development of the fourth dimension as a zone of peace and prosperity that the whole of humanity can benefit from. Subsequently, the paper analyzes the current geopolitical and economic effects of the development of China's space strategy, with an overview of Beijing's space plans for the forthcoming period. The author infers that China will make a major contribution to space exploration in the future, which, if it adheres to its current principles in international relations, may qualify it as a key player in the exploration of the space potential.

Keywords: China, outer space, resources, strategy, the Moon, the Silk Road, development.

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INTRODUCTION

For some time now, the People's Republic of China has demonstrated it has the potential to become a global player, i.e., to influence the shaping of international relations. Its presence is visible in many parts of the world, often very far from its borders, such as the Balkans (Filijovic & Kilibarda, 2013), then in Africa and Latin America (The Economist Intelligence Unit, 2016; Djordjevic, Filijovic & Gacic, 2017), and even in polar regions (Filijovic, 2011; Alexeeva & Lasserre, 2012; Lino, 2020). Furthermore, it made its global ambitions open in 2013, urging Eurasian countries to join the so-called 'Belt & Road Initiative' (BRI) – a grand plan of closer integration of Europe and Asia, through the revitalization and construction of land and maritime infrastructure projects, with the aim of increasing the scope of east-west exchanges, intensifying trade and thus boosting the economic growth of its stakeholders.

According to the concept of the BRI creators, this mega-project basically links Asia and Europe, China and the EU, by land and sea, through the revitalization and construction of multiple infrastructures. As Liu Zuokui, Senior Research Fellow of the Chinese Academy of Social Sciences (CASS) states, the concept includes two simultaneous plans: development of the Silk Road Economic Belt and the 21st-Century Maritime Silk Road (Zuokui, 2017:3). The first one implies improvement and development of land connections, in other words – construction of the so-called Eurasian land bridge – a logistics chain from China's east coast to Rotterdam in Western Europe, as well as developing a number of economic corridors connecting China with Mongolia, Kazakhstan, Russia, Central Asia and South-East Asia. The second one includes the development of the maritime route, which goes from China's east coast to Europe through the South China Sea and the Indian Ocean. The aim of the maritime route is to build efficient transport routes between major ports in various countries, including the development of an economic corridor through the Indian Ocean, better connecting China with South Asia, the Middle East, Africa and the Mediterranean (Ge, Christie & Astle, 2015, pp. 4-6). In a wider sense, Tian Jinchen, Director of the Western Development Department of China's National Development and Reform Commission, explains: 'It aims to create the world's largest platform for economic cooperation, including policy coordination, trade and financing collaboration, and social and cultural cooperation' (Jinchen, 2016, p. 1). According to some experts, 'the plan has the potential to massively overshadow the US' post-war Marshall reconstruction plan, involving about 65% of the world's population, one-third of its GDP, and helping to move about a quarter of all its goods and services' (Phillips, 2017).

Apart from referring to the growing influence of the 'Asian dragon', such claims indicate the US got a relevant challenger, judging by international power relations from a global perspective. Accordingly, the information that China is firmly committed to confirming its presence in outer space should come as no surprise. On the one hand, it proves it is ready to compete with the most advanced nations in technological and political terms, and on the other, it makes everyone aware that it is interested in engaging in the exploration and exploitation of untapped space potentials. In this respect, it is important to emphasize that the most populous country in the world started working on the conquest of the fourth dimension in the 1950s, but that, for some reason, it only achieved significant progress in the early 21st century. Whether it succeeds in reaching or even surpassing other aspirants to outer space and its riches will depend on a multitude of more or less related factors. However, the fact is that it is increasingly approaching leading spacefaring nations, whereby its approach to implementing the cosmic agenda maintains certain specificities.

A BRIEF HISTORY OF CHINA'S SPACE PROGRAMME

The development of the Chinese outer space strategy is particular in many ways. According to Acuthan 'the beginnings of the Chinese space program can be traced back to the research and development (R&D) on missiles modeled on foreign sources in the late 1950s, reportedly with Soviet technological assistance, and to a lesser extent with some knowledge of the US missile program' (Acuthan, 2006, pp. 34-35).

According to Thompson and Morris (2001, p. 4), the founder of the Chinese space program is Tsien Hsue-shen, born in 1911, who, at the age of 24, left his home country and came to the United States to study aeronautical engineering at Massachusetts Institute of Technology (MIT) and later California Institute of Technology (CalTech). In May 1945, after the fall of Germany, Tsien was promoted to the rank of colonel in the U.S. Army and was in charge of evaluating the German missile program. However, under the investigation of Senator Joseph McCarthy, he was deported to China in August 1955. A year later, Mao Tse-tung formally announced the launch of the Chinese space program. Thompson and Morris consider Tsien's return to China as a significant factor in Mao's decision.

On the other hand, according to Williams (2019), in line with the ideology of communist solidarity, China had the support of the Soviet Union in developing a missile program until Stalin's death (1953), i.e., until Nikita Khrushchev came to power (1958). Subsequently, the author explains, Sino-Soviet relations began to deteriorate, resulting in the split in 1960, after which Beijing was virtually forced to develop its national cosmic agenda on its own.

Nonetheless, Chinese authorities achieved significant success a decade later. Namely, on 24 April 1970, China successfully launched its first Dongfanghong 1 satellite using the Long March 1 rocket, the manufacturing of which was credited to the Chinese Academy of Space Technology (CAST) founded in 1968 (Goswami, 2018, p. 75). Subsequently, Beijing also adopted its first human-planned space program, called Project 714, with the idea of sending two taikonauts (the Chinese term for an astronaut) into space in 1973 in the Shuguang spacecraft. However, although 19 potential taikonauts were selected as early as March 1971, the program was soon canceled due to increased domestic political tensions caused by the Cultural Revolution (1966-1976) (Williams, 2019).

In the ensuing time, China shifted its focus from human crew flights to other priorities. According to Mao's successor, Deng Xiaoping: 'As far as space technology is concerned, we are not taking part in the space race. There is no need for us to go to the Moon, and we should concentrate our resources on urgently needed and functional practical satellites' (Thompson & Morris, 2001, p. 4). In other words, China's space exploration budget was adjusted to meet somewhat more modest ambitions.

During the 1980s, Beijing focused on the development of missile technology, particularly the Long March program.[2] That turned out to be a good decision, especially after the US Challenger disaster, problems with Titan and Delta, as well as Europe's Ariane. The reason was that in the absence of a secure satellite orbiting system, Americans and Europeans were virtually forced to rely on Chinese and Russian technology. As Thompson and Morris explain: 'The China Great Wall Industry Corporation (CGWIC) has been actively marketing PRC launch services since those unfortunate events. The world's space failures in 1986 made the versatile and flexible Long March family of launch vehicles attractive to the international market. The first launches for paying customers involved experimental pay-loads using the Long March 2, first for a French company (Matra) in 1987 and then for a German consortium (Intospace) in 1988' (Thompson & Morris, 2001, p. 5). In addition, at that time, China was able to transport a large number of different communications and meteorological satellites into orbit (Lele, 2008, pp. 606-607), after which China's space activities accelerated, with a growing focus on geosynchronous communication satellites vital for the military command, control, and intelligence (Goswami, 2018:76).

The next major breakthrough in China's space program development came in 1999, when the first unmanned spacecraft Shenzhou 1 was successfully launched, followed by Shenzhou 2 and Shenzhou 3, in 2001 and 2002, respectively. China sent its first taikonaut into space in one of the rockets from the Long March series in Shenzhou 5 as early as 2003 (Goswami, 2018, p. 76; Koren, 2017). This was followed by two more flights – Shenzhou 6, with two crew members, in 2005 and Shenzhou 7, with three crew members, in 2008 (Williams, 2019).

[2] More information about the Long March program can be found at: https://graphics.reuters.com/SPACE-EXPLORATION-MOON/0100B0BH0NZ/index.html

In 2007, Beijing undertook two more important missions – it carried out its first anti-satellite missile test (Konjikovac, 2012, p. 34; Goswami, 2018, p. 76) and began the so-called Chinese Lunar Exploration Program. As Williams points out, 'intrinsic to this program was the development of heavy-launch vehicles such as the Long March 3B and 3C. It was these rockets that sent the first three missions in the Chinese lunar program to the Moon, with Chang'e 1 mission launching in 2007, Chang'e 2 in 2010, and Chang'e 3 in 2013' (Williams, 2019). However, the crown of the Chinese lunar program is the Chang'e 4 mission. That is to say, 'in 2018, the Chang'e 4 lander was sent to the far side of the Moon, where it deployed the Yutu 2 rover to explore the South Pole-Aitken Basin. The lander also carried the Lunar Micro Ecosystem (LME) experiment, a metal cylinder containing seeds and insect eggs designed to test the effects of lunar gravity on living creatures. The orbiter component of the mission also tested the ability to relay communications from the far side of the Moon' (Williams, 2019). As Myers and Mou (2019) point out, in addition to opening a new chapter in Moon exploration, this mission is also one of a series of successes that not only classifies China as an advanced spacefaring nation, but it can even make China a leader of a new space race.

Since it was virtually excluded from international cooperation in space exploration following the 1989 events in Tiananmen, China launched its own space station construction program (Konjikovac, 2012, p. 34). According to Koren (2017), in 2011, the China National Space Administration (CNSA) launched Tiangong 1, the first component for a prototype orbital laboratory like the International Space Station (ISS). A Shenzhou spacecraft carrying three astronauts, including China's first female taikonaut, Liu Yang, successfully docked with Tiangong 1 a year later. However, in 2016, due to the loss of control of Tiangong 1, the CNSA decided shortly afterwards to launch Tiangong 2, a small station capable of accommodating up to two astronauts. Considering that its life is limited to 1,000 days, the Chinese space agency carried out, according to the plan, a secure deorbitization in 2019. According to Etherington (2019), both of these and the forthcoming Tiangong 3 are intended as temporary orbital stations designed for testing key technologies in pursuit of the 'real' Chinese space station, which is set to begin its mission life in 2020 with the launch of the Tianhe 1 core module.

In addition, China is making rapid progress in deploying its own Beidou constellation of satellites for positioning, navigation, and timing (PNT) – a rival to the U.S. Global Positioning System (GPS) which China claims will one day be more capable and accurate than the U.S. system (Degang & Yuyou, 2016). As Harrison explains: 'Since 2000, China has launched six new types of remote sensing satellites, with at least 76 operational remote sensing satellites on-orbit as of 2016. Moreover, China has some 34 communications satellites on-orbit, at least three of which can be used to relay information from other satellites back to ground stations on Earth' (Harrison, 2019, p. 3).

As observed, the Chinese space program has a long tradition, with its development progressing in recent years. Many plans have already been implemented, while projects for the coming period are in the pipeline. With regard to this, while the Chinese space program is very complex, given a large number of stakeholders and the wide range of ambitions that Beijing authorities seek to realize, it seems that much of their attention is directed to the Earth's natural satellite for several reasons.

SIGNIFICANCE OF THE MOON IN CHINA'S SPACE CONCEPTIONS

As Goswami (2020) points out, many Chinese scientists and statesmen, who are highly respected in China, have emphasized the strategic importance of winning the Moon. For example, Ye Peijan, Director of the Chinese Lunar Exploration Program (CLEP), was awarded China's highest civilian honor for his contributions to the lunar program during the 70th-year celebration of the establishment of the People's Republic of China (PRC) last year. Lieutenant General Zhang Yulin, former deputy head of China's Manned Mission, and now the top commander within the People's Liberation Army (PLA) Strategic Support Force (China's version of a space force), highlighted the critical significance of cislunar for China's national rejuvenation in 2016. Apart from them, one should also mention Ouyang Ziyang, who became one of the key players in the CLEP in 2006 and who said four years earlier that lunar exploration is 'a reflection of a country's comprehensive national power… it is significant for raising our international prestige and increasing our people's cohesion'. That same year, he also pointed out that 'the Moon could serve as a new and the tremendous supplier of energy and resources for human beings… whoever first conquers the Moon will benefit first' and in 2013 that the Moon is 'so rich in helium-3, which is a possible fuel for nuclear fusion', that this could 'solve human beings' energy demand for around 10,000 years at least' (Goswami, 2020).

When it comes to helium-3 (3He), there are several things to note. It is a light, non-radioactive isotope of helium and is commonly discussed in the context of nuclear fusion (Southward, 2013). Contrary to nuclear fission, which divides the nucleus of an atom in half, nuclear fusion combines nuclei to produce energy. Since nuclear fusion has already been tested with hydrogen isotopes – deuterium and tritium – it has been shown that a large amount of energy is released in the form of radioactive neutrons as part of this process. This proved to be very unsafe, according to Horton (Horton, 2008). 3He, on the other hand, is completely safe. It does not emit any pollution and does not leave radioactive waste behind, so it does not pose a threat to the environment and humans.

As a helium isotope, 3He consists of two protons and one neutron. When heated to high temperatures and combined with deuterium, the reaction releases incredible amounts of energy. Only one kilogram of 3He combined with 0.67 kg of deuterium produces 19 megawatts of energy. This would mean that 40 tons of this material can produce an amount of energy sufficient for the entire US for the whole year (Southward, 2013). Although there is no such an isotope on the Earth, experts say the Moon is abundant in it. Moreover, it is estimated that the Earth's natural satellite contains more than one million tons of this element. The energy that can be produced from this amount is ten times the energy that can be produced from total fossil fuel reserves, but a commercial price of one ton of 3He would cost about 4 billion USD under the current circumstances. The problems that have accompanied this concept so far relate to the practical disadvantages of helium extraction and the fusion process setup. The existing fusion reactors have yet to reach the sustainable high temperatures required to generate electricity, and extraction of 3He from the lunar surface requires a lot of refining because it occurs at very low concentrations in the soil (Horton, 2008).[3] However, judging by the news coming from the most populous country in the world, these problems do not seem to discourage them in the least.

As explained by Goswami, 'in early January 2019, China dazzled the world with the landing of the Chang'e 4 spacecraft on the far side of the Moon, accomplishing a first for humanity. On December 14, its Yutu-2 rover set the record for the longest active rover on the Moon, breaking the record of the erstwhile Soviet Union's Lunokhod 1 that was active for ten and a half months (15 November 1970 to 4 October 1971)' (Goswami, 2020). But there is more to it. 'Soon after China had successfully landed on the far side, the CNSA announced several follow-on missions, to include the 2020 lunar sample return mission, Chang'e 5, followed by Chang'e 6, which will bring back samples from the lunar south pole, believed to be rich in resources like water ice. Chang'e 7 will land on the Lunar South Pole to carry out a comprehensive survey, followed by Chang'e 8, which will lay the groundwork for a research base on the Moon by 2036' (Goswami, 2020). The author concludes that Chang'e 4's success is a great achievement, both technically and symbolically. According to some opinions, China views this landing as just a stepping stone, as it also views its future manned lunar landing, since its long-term goal is to colonize the Moon and use it as a vast supply of energy (Myers & Mou, 2019).

Such a claim seems largely justified, considering the fact that many Russian and American scientists believe that areas near the Moon Poles are, in fact, optimal locations for permanent bases for two reasons. The first is the proximity of vast reserves of ice that reached the polar craters through comets and remained in those parts that sunlight never reaches. The other reason is the areas of the so-called tangential illumination, which allow the crew to work under constant light and thus

[3] For instance, for the extraction of one ton of 3He, it is necessary to dig three meters deep area of the lunar surface covering about 20 square kilometers (Duz, 2014).

avoid the cold night periods that last two weeks on the Moon (Nikolic, 2014). Flat terrain around the southern lunar pole, near Mount Malapert, would be the most suitable for installing a human colony. According to Alexander Ilyin, the chief engineer of a private Russian company Lin Industrial, the site directly shows the Earth and provides good conditions for communication and landing, with light illuminating the mountain 89 % of the day, while the night occurs only a few times a year and does not last longer than three to six days (Web Tribune, 2015).

In addition, the Moon is also interesting as a springboard for further space expansion (Duz, 2014), which greatly facilitates access to asteroids rich in various valuable resources. In other words, asteroids are rich in minerals like platinum, gold, titanium, iron, nickel, and, most importantly, water. Precious metals like titanium and gold sell for anything between 30,000 USD to 50,000 USD per kilogram. Scientists infer that a small asteroid 200 meters in length and rich in platinum could be worth 30 billion USD (Elvis, 2012). For example, Asteroid 2011 UW158, worth 5 trillion USD in platinum, sailed at a distance of 1.5 million miles from the Earth in July 2015 (Howell, 2015).

Within this context, it is interesting to observe that Luxemburg is the first in Europe to announce a government initiative to develop regulatory and legal frameworks to establish ownership of minerals extracted from asteroids (Schrieberg, 2017) and that the PRC recently signed an agreement with that country to establish a space exploration laboratory for peaceful purpose, including in the utilization of space resources (Ministry of Economy of the Government of the Grand Duchy of Luxembourg, 2018).[4]

As Goswami reminds, 'while analyzing China's success in space, it is critical to remember that the strategic narrative driving those space ambitions is the deep-seated ideological commitment by China to be first on the Moon and beyond. China takes its historical lessons of territorial firsts seriously, forwarding such first-presence claims on the resource-rich South China Sea, even establishing a nine-dash line there, 2,000 kilometers from its territorial shores, when the international limit set by the United Nations Convention on the Law of the Sea (UNCLOS) is 200 nautical miles for Exclusive Economic Zones (EEZ)' (Goswami, 2020). With that in mind, it should come as no surprise that decision-makers in Washington are becoming increasingly anxious about Chinese space ventures and that 'the Asian dragon' is more often accused of militarizing the cosmos, even though China constantly states that its explorations are conducted for peacetime purposes.

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[4] It is worth mentioning that Luxembourg joined the BRI initiative in March 2019, upon which the Bank of China chose Luxembourg to list its 500 million USD BRI bond (Goswami, 2019).

MILITARY ASPECT OF CHINA'S SPACE ENDEAVOURS

Accusations leveled against Beijing of carrying out space militarization as part of its engagement in the fourth dimension are based largely on the fact that the Chinese Army plays an important role in space exploration. However, there are other more specific reasons for this.

In other words, according to Lele (2005, p. 68), China is investing vast sums in space technologies overtly for civilian purposes and covertly for military purposes. Many of the current technologies used for space exploration and utilization may have different objectives. This is, among other things, the case of 2013, when a Chinese satellite, Shiyan 7 (SY-7, Experiment 7), with a prototype robotic arm 'demonstrated that it could capture another satellite in orbit, explained as a space maintenance mission by China, but with dual implications of grabbing adversary satellites. SY-7 also rendezvoused with two other Chinese satellites, the Chuangxin 3 (CX-3) and the Shijian 7 (SJ-7, Practice 7)' (Goswami, 2019). As clarified by Goswami, 'the strategic significance of these maneuvers at that time was that SY-7 surprised everyone by its sudden maneuvers with a completely different satellite, the SJ-7 (launched in 2005) instead of what the experts thought it would rendezvous with, the CX-3 launched along with SY-7 in 2013' (Goswami, 2019). Additionally, the same author points out, on 30 October 2015, China also tested the Dong Neng 3 exoatmospheric vehicle 'capable of ramming US satellites and destroying them' (Goswami, 2018, p. 76).

All the above-mentioned has contributed to the prevailing opinion in the US that China has spent the last 15 years testing different systems in an effort to develop methods for crippling American satellites during a conflict (Messier, 2019).[5] As summarized in the conclusions of the US-China Economic and Security Review Commission report, submitted to the US Congress: 'China views space as a critical U.S. military and economic vulnerability, and has fielded an array of direct-ascent, cyber, electromagnetic, and co-orbital counterspace weapons capable of targeting nearly every class of U.S. space asset. The PLA has also developed doctrinal concepts for the use of these weapons, encouraging escalatory attacks against an adversary's space systems early in a conflict, threatening to destabilize the space domain. It may be difficult for the United States to deter Beijing from using these weapons due to China's belief the United States has a greater vulnerability in space' (Report to Congress, 2019, p. 17). The report also says that: 'China's development of offensive space capabilities may now be outstripping the United States' ability to defend against them, increasing the possibility that U.S. vulnerability combined with a lack of a credible deterrence posture could invite Chinese aggression' (Report

[5] A more detailed overview of China's military capabilities in space, with information on the number and purpose of Chinese satellites, can be found at: https://monitoring.bbc.co.uk/product/c2012o3j

to Congress, 2019, p. 381). William Roper, Assistant Secretary of the Air Force for Acquisition, Technology and Logistics, testified to the Commission that Beijing is well aware of the extent to which U.S. sea, air, and land operations rely on space-based assets for communication, navigation, and precision fires and has thus concluded it is much more feasible to threaten these assets in space than the terrestrial capabilities they enable (Report to Congress, 2019, pp. 380-381).

What clearly raises concern with American authorities is the fact that 'China is becoming a military space power in a global context' (Covault, 2017) and that the universe in the eyes of the Chinese Army denotes 'new commanding heights in strategic competition' (Kania, 2018).[6] This impression is convincingly reinforced by a decision brought by the US President Donald Trump to establish a special section of the U.S. Army, the so-called Space Force, in response to China's Strategic Support Force established in 2015, which is meant to streamline and improve its space, cyber, and electronic warfare missions (Germanos, 2019; Feldscher & Zhen, 2019).

Beijing views the decision to create the US Space Command with resentment and accuses the US president of violating global consensus, emphasizing the importance of preserving space as a zone of peace and prosperity (Germanos, 2019). According to Chinese Foreign Minister Geng Shuang, 'the international community should adopt a prudent and responsible attitude to prevent outer space from becoming a new battlefield' (AFP, 2019). In other words, the Chinese have no desire to start a new space race or an arms race, decisively emphasizing that 'China is not the Soviet Union' (Feldscher & Zhen, 2019). Goswami also points to this by explaining that 'for China, investing in outer space goes beyond simply achieving prestige and reputation – as opposed to the flags and "footprints"-based moon race between the United States and the Soviet Union during the Cold War. Instead, China aims to establish a permanent space presence, which would offer long-term economic benefits' (Goswami, 2019).

GEOPOLITICS AND ECONOMICS OF CHINA'S SPACE STRATEGY

According to Messier (2020), China is using its growing space program to achieve a range of geopolitical and economic goals, including attracting partners for its BRI, improving economic and political ties with other countries, and deepening others' reliance on its space systems and data services.

[6] In a speech given to heads of military academies and training schools in November 2019, the Chinese president stressed the urgent requirement to create a new type of military personnel, proficient in new types of warfare, including space, and for whom loyalty to the Communist Party of China (CPC) trumps any other loyalties (Goswami, 2020).

The author's opinion also shared among many in the US, is largely based on the already mentioned report of the US-China Economic and Security Review Commission, filed with the U.S. Congress in 2019. It says that 'Beijing uses its space program to advance its terrestrial geopolitical objectives, including cultivating customers for the Belt and Road Initiative (BRI), while also using diplomatic ties to advance its goals in space, such as by establishing an expanding network of overseas space ground stations. China's promotion of launch services, satellites, and the Beidou global navigation system under its "Space Silk Road" is deepening participants' reliance on China for space-based services' (Report to Congress, 2019, p. 359).

Gibney (2019) points out that the China Manned Space Agency has selected scientists from 17 countries (out of 42 interested) who will participate in the experiments at the new China Space Station, whose work is scheduled to begin in 2022. The undertaking, supported by the United Nations Office for Outer Space Affairs (UNOOSA), will involve scientists from Russia, Japan and India, as well as scientists from countries with lower economic growth rates such as Kenya, Mexico and Peru, by means of which, according to Wang Qun, China's ambassador to the United Nations in Vienna, they want to encourage co-operation in the implementation of joint projects between developed and underdeveloped countries, with particular regard to the needs of the latter.[7] According to the same author, the US is not among the participants, since its scientists have been banned from collaborating with China since 2011 without special approval from the Congress. In this regard, the above-mentioned Congress report states the following: 'China's goal to establish a leading position in the economic and military use of outer space, or what Beijing calls its "space dream", is a core component of its aim to realize the "great rejuvenation of the Chinese nation". In pursuit of this goal, China has dedicated high-level attention and ample funding to catch up to and eventually surpass other spacefaring countries in terms of space-related industry, technology, diplomacy, and military power. If plans hold to launch its first long-term space station module in 2020 (2022 at the latest, *author's comment*), it will have matched the United States' nearly 40-year progression from first human spaceflight to first space station module in less than 20 years' (Report to Congress, 2019, p. 359). Commenting on this kind of performance by China, Harrison concludes: 'To emerge as a near-peer competitor to the United States and as a true global power,

[7] The experiments include an Indian–Russian observatory called the Spectroscopic Investigations of Nebular Gas, which will map dust clouds and star-forming regions of space using ultraviolet light. A group of European institutions, meanwhile, will study how microgravity and radiation in space affect the mutation of DNA in human 'organoids' — 3D biological structures that mimic organs. And a Saudi Arabian team will test how solar cells perform on the outside of the space station (Gibney, 2019).

China is building a network of partnerships around the world, as is evident in its One Belt, One Road initiative. Partnerships in space could be used as another lever to induce cooperation on the Earth. More specifically, China could use the prospect of human spaceflight missions to its new space station, to the Moon, and one day to Mars as an incentive for other countries to partner with it in ways that further its terrestrial ambitions' (Harrison, 2019, pp. 2-3). Bowe (2019, pp. 2-3) agrees and adds that if China continues to meet its declared space goals, it may be the only country to have an active space station after the U.S. government funding for the International Space Station (ISS) ends in 2024.[8]

In addition, China pays special attention to its Beidou navigation system. According to Bartholomew (2019, p. 6), China has nearly completed its own position, navigation, and timing satellite network known as Beidou, which will serve to increase China's influence in countries participating in its BRI and decrease China's dependence on the U.S.-maintained GPS. As explained by Sun and Zhang (2016, p. 24), the Beidou system is of particular importance for the promotion of the BRI in the Arab world, as it is an essential measure for deepening the strategic partnership between China and the Arab League in terms of interconnectivity, which can serve as an essential step for the Beidou 'going global' strategy as well, but also as an impetus for the 'opening up' of West Asian and African markets for years to come. In the US, they are certainly aware of this fact and believe that 'although Beidou is free to users, similar to the U.S.-built GPS, China has used it as a tool of geopolitical and diplomatic competition which would deepen users' reliance on China for space-based services, potentially at the expense of U.S. influence. For instance, after Thailand, a U.S. treaty ally, was granted access to Beidou in 2013, a Beidou expert from Wuhan University who participated in the negotiations with the Thai government claimed Beijing's goal was to show that Beidou "can do anything GPS does and in some areas it can do even better. If Thailand can embrace Beidou, other countries may follow, and the United States' power in the region will be reduced"' (Report to Congress, 2019, p. 369). On the other hand, while the majority of the political and professional public in the US agrees with such an assessment, some, such as Harrison, believe that these space capabilities are not, in and of themselves, threatening or unusual: 'One should expect that a country with the second-largest GDP in the world would possess such space systems. Moreover, many of the types of space systems China is developing to support its military are systems the United States has had for decades' (Harrison, 2019, p. 3). However, considering China's involvement in the field, there is a prevailing attitude in the US that 'China's single-minded focus and national-level

[8] For the sake of truth, according to some sources, there is still a possibility of extending the ISS funding to 2030 (Foust, 2019).

commitment to establishing itself as a global space leader harms other U.S. interests and threatens to undermine many of the advantages the United States has worked so long to establish' (Report to Congress*,* 2019, p. 15*)*. Additionally, it is openly acknowledged that 'China is well-positioned to assume a commanding role in a future space-based economy, as its steps to dominate the global commercial launch and satellite sectors through generous subsidies and other advantages have already threatened to hollow out the U.S. space industrial base. Should the China Space Station proceed as planned and the International Space Station be retired, China may also replace the United States as many countries' default partner in human spaceflight' (Report to Congress*,* 2019, p. 15). In other words, 'China views the United States and other democracies as in decline and sees an opportunity to expand its geopolitical influence at the expense of Washington and its allies' (Report to Congress*,* 2019, p. 13).

That such assessments are not without foundation is evidenced, among other things, by the fact that the Chinese president has authorized private companies to launch from military launch ramps. Specifically, as explained by Goswami (2019), as part of a civilian-military integration strategy, the PLA has opened its Jiuquan Satellite Launch Center for private launches. The Chinese president's decision to encourage private space startups in this way has resulted in an influx of investment. However, what is interesting to observe is that under the auspices of the strategy, Chinese investment firms have begun aggressively investing in US private space companies. For instance, as the author argues, 'China's Tencent Holdings Ltd has invested in Moon Express, one of the companies chosen by NASA for its Commercial Lunar Payload Services program. Tencent also invested in Planetary Resources (now acquired by ConsenSys, Inc.) and Satellogic, an Argentinian company specializing in satellite imagery. NanoRacks, another US private space company, established a commercial partnership with Kuang-Chi Science LTD in 2018 and China established its first overseas satellite ground station in Kiruna, Sweden, that year as well' (Goswami, 2019).

As the writers of the aforementioned report to the Congress warn: 'China is taking steps to establish a commanding position in the commercial launch and satellite sectors relying in part on aggressive state-backed financing that foreign market-driven companies cannot match. China has already succeeded in undercutting some U.S. and other foreign launch and satellite providers in the international market, threatening to hollow out these countries' space industrial bases' (Report to Congress, 2019, p. 16). They conclude that 'China views space as critical to its future security and economic interests due to its vast strategic and economic potential. Moreover, Beijing has specific plans not merely to explore space, but to industrially dominate the space within the Moon's orbit of the Earth. China has invested significant resources in exploring the national security and economic value of this area, including its potential for space-based manufacturing, resource extraction, and power generation' (Report to Congress, 2019, p. 16). After all, the statements issued by some high-ranking Chinese officials also indicate that 'China's goal is to be a major global space power by around 2030', i.e., that 'China aims to be a global leader in space equipment and technology by 2045' (Bowe, 2019, p. 2).

FUTURE OF CHINA'S SPACE EXPLORATIONS

China is adhering to its 'slow and steady' principle in the development of its space agenda, which is yielding excellent results. As Myers and Mou (2019) explain, although a latecomer for decades to space exploration, China is quickly catching up and could challenge the United States for supremacy in artificial intelligence, quantum computing, and other fields. After all, the development of China's Chang'e lunar program, which is being implemented in a very systematic manner by Beijing authorities, without resorting to provocations that could produce some kind of a new space race, is a confirmation striking enough. As emphasized by China's lunar exploration program chief, Wu Weiren: 'The international trend will not play a decisive role in China's planning on its lunar missions, and China is not going to compete with anyone over the matter' (PTI, 2019). Moreover, the Chinese approach further development of their lunar program in a very specific manner, which, among other things, indicates that there is a plan that the first Chinese to set foot on the Moon should actually be a woman. According to Dean Cheng, a senior research fellow at The Heritage Foundation who is an expert on China's space program: 'All 12 of the Apollo astronauts who walked on the Moon between 1969 and 1972 were men. And none of them stayed on the lunar surface for more than 75 hours' (Wall, 2019).

Goswami argues that there is ample evidence to suggest that a great power like China is 'viewing space less concerned with "securing the high ground" for espionage and nuclear deterrence and more for access to the vast material and energy resources of the inner solar system' (Goswami, 2018, p. 74). In addition to setting up a lunar laboratory and space station, other plans made by the Asian giant, such as the installation of the space-based solar power station by 2050, go in favor of this argument. Apart from the above-mentioned, at the space symposium in Colorado Springs in April 2017, the CNSA secretary-general Yulong Tian stated that China's major space goals in the next five years are to launch robotic missions to the Moon (as a precursor to further lunar activities – setting up a lunar laboratory and sending a mission with human crew), outline a policy for commercial space activities, conduct an automated Mars sample return mission by 2030, and launch deep space exploration of Jupiter, Venus, and asteroids (David, 2017) and even Uranus (Campbell, 2019).

According to McKie (2020), China has tried before to reach Mars in partnership with Russia. However, 'the Russian spaceship that was carrying China's Yinghuo-1 probe crashed in January 2012. After that, China started its own Mars exploration program and has completed a crucial landing test in northern Hebei province. Zhang Kejian, Head of the China National Space Administration, said the lander went through a series of tests at a sprawling site littered with small mounds of rocks to simulate Mars's terrain.[9] The Chinese probe, Huoxing-1, will deploy an orbiter that will circle Mars and a rover that will drop onto the planet's surface. The mission will be launched in July or August 2020 with a Long March 5 heavy lift-off rocket' (McKie, 2020).[10] Some experts also mention Long March 9, and in this regard, it should be noted that testing in the context of the development of the Long March program, despite some setbacks, is largely underway (Bowe, 2019:5-6). According to Jones (2020), the China Aerospace Science and Technology Corporation (CASC), a state-owned defense contractor, carried out 27 launches involving 66 satellites across 2019, with one failure, while the total number of launches for the same year was 34. As the author points out, China's main space contractor is aiming to carry out more than 40 launches in 2020, including lunar, interplanetary and space infrastructure missions (Jones, 2020).

China also plans to complete its Beidou navigation satellite system (Jones, 2020) and to build a space telescope with a field of view 300 times larger than the Hubble Space Telescope and with a similar resolution. This telescope will be placed in orbit near the space station to facilitate easier servicing missions throughout the life of the instrument (Johnson-Frese, 2018). Furthermore, the CASC issued a report recently claiming that China will achieve a major breakthrough by 2040 with regard to 'nuclear-powered space shuttles', which, according to some experts, will enable mining of space-based resources, including from asteroids, and the establishment of solar power stations. Moreover, the report also specifies that by 2035, China will possess fully reusable launch vehicles (Goswami, 2018, p. 76).

Considering all the aforementioned, Strout (2019) believes that the Chinese government and military are determined to meet ambitious goals for space leadership, if not dominance, and that China has connected its space program with its broader ambitions to become a terrestrial leader in political, economic, and military power. Bowe (2019) shares a similar opinion and comes to the conclusion that these goals are consistent with the important role China's leaders have assigned to China's space program as part of the country's attempts to advance its national

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[9] It should be noted that China also has Mars Base 1, built by private Chinese company C-Space. As Campbell (2019) explains, it is located in the northeast of Gansu Province and looks like a space station on the Earth, boasting an airlock, greenhouse, gymnasium, living quarters and control room, with the complex arranged to resemble the Red Planet.

[10] Carter (2020) argues that the Chinese are firmly committed to conducting a Mars-related mission within the stipulated timeframe and will not even allow the consequences of the emergence and spread of COVID-19 to prevent them.

interests and build up national strength. As he explains: 'Beijing's goal is to become the United States' peer in space militarily, diplomatically, commercially, and economically. It is able to do so since it consistently invests high levels of funding and political will to its space program, which has driven its steady progress in achieving important milestones. This support, along with a focus on improving and standardizing the quality of manufactured components, has helped create a mature space program whose development was previously constrained by poor infrastructure and less advanced technology. Compared to the U.S. space program, China's program is also more connected to the "levers of power", meaning its goals more often draw support from top leaders and are interconnected with the overall priorities of China's industrial and foreign policies. China's deliberate and comprehensive approach to its space program gives it opportunities to derive important economic, political, and diplomatic benefits, including domestic legitimacy, international prestige, and access to tasking information and observational data derived by international clients using its space platforms' (Bowe, 2019, p. 2).

CONCLUSION

Commenting on China's joint space exploration initiative, Simonetta Di Pippo, Director of the UNOOSA, stated in an interview to Xinhua that: 'This is an agreement which will allow the entire world to use, for scientific purposes, the China Space Station when it will be ready... it's the first time it is open to all member states' (Xinhua, 2018). According to Weihua (2019), having in mind where the remark comes from, along with the fact that 9 projects have already been selected and that scientists from 17 countries around the world will take part in their implementation, this sends a strong signal for international cooperation and peaceful use of outer space.

However, some countries disapprove of China's strengthening its space capabilities, although Beijing has consistently insisted that the future of space exploration should be cooperation-based while respecting the interests of all humanity. Even the name of a future space station that is about to come to life – harmony of the heavens – very strikingly evokes the way the Chinese think when it comes to the exploration and exploitation of space potentials. The fact that some people resent China's rapid ascent to space may have more to do with their weaknesses than the fear that the world's most populous country could use its space capabilities for military competition. In support of this, among other things, a recent study conducted in the US, EU and China is convincing enough. Specifically, a nonprofit study honoring the 50th anniversary of the first-person landing on the Moon involved 3,000 children between the ages of 8 and 12, divided evenly among the US, the UK, and China. The survey asked children to choose from five professions and answer which job they would like to do when they grow up:

astronaut, musician, professional athlete, teacher, or vlogger/YouTuber. While children in the US and UK put vlogger/You Tuber first, as many as 56% of children in China said they wanted to be an astronaut. In the US and the UK, an astronaut was the lowest-ranked out of these 5 professions, with only 11% of children opting for it (Cowing, 2019).

This information probably best illustrates the future that awaits not only the space nations that have already stepped into the fourth dimension but also those who would somehow want to be involved in various space exploration initiatives, such as the BRI. What gives the Chinese an advantage over others may not have as much to do with their current or expected degree of space program development, but it may have with the state of their awareness of how and in what manner space exploration should develop. In this respect, the idea more than 2,000 years old of connecting Europe and Asia through the Silk Road could be, under new circumstances, an adequate platform for such a venture, bearing in mind that China is 'slowly and steadily' winning the title of space power in a global context, but also having in mind words spoken back in 1959 by former U.S. President Lyndon B. Johnson, which are: 'Control of space means control of the world'.

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PUT SVILE VODI DO MESECA: KINESKA SVEMIRSKA STRATEGIJA I NJEN BUDUĆI RAZVOJ

Apstrakt: U poslednje vreme sve više država u svetu interesuje se za istraživanje tzv. četvrte dimenzije. Imajući u vidu da ovladavanje svemirskim prostranstvima donosi brojne strateške benefite, kao i pristup pozamašnim rezervama neiskorišćenih resursa, pojedine zemlje, a naročito one koje beleže visok stepen ekonomskog razvoja, poput Indije i Kine, iskazale su rešenost da se pridruže prestižnom 'klubu svemirskih nacija' koji je do nedavno bio rezervisan za Sjedinjene Američke Države, Rusku Federaciju, Japan, Kanadu i Evopsku Uniju. Rad analizira svemirsku strategiju Narodne Republike Kine. Nakon kratkog prikaza istorije razvoja kineskih svemirskih aktivnosti, posebna pažnja u radu posvećena je značaju Meseca. Njegovo osvajanje važno je radi sticanja preduslova za dalja istraživanja svemirskog prostranstva, ali i zbog toga što on predstavlja vrlo pozamašnu i još uvek neiskorišćenu resursnu bazu. Osim pomenutog, autor analizira i vojnu komponentu realizacije kosmičkih ambicija najmnogoljudnije zemlje na svetu, odnosno istražuje da li delovanje Kine doprinosi militarizaciji kosmosa ili pak razvoju četvrte dimenzije kao zone mira i prosperiteta od čega korist može imati celokupno čovečanstvo. Nakon toga, rad analizira aktuelne geopolitičke i ekonomske efekte razvoja kineske svemirske strategije uz pregled kosmičkih planova zvaničnog Pekinga za nadolazeći period. Autor zaključuje da će Kina u budućnosti pružiti veliki doprinos svemirskim istraživanjima, što je, ukoliko se bude pridržavala svojih dosadašnjih načela u međunarodnim odnosima, može kvalifikovati za poziciju ključnog aktera u domenu eksploatacije kosmičkih potencijala.

Ključne reči: Kina, svemir, resursi, strategija, Mesec, Put Svile, razvoj.

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