

**Space policy of China and the United States - or with
whom should the European Space Agency cooperate
in space?**

ERP321

2022.01.10

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

Contents

Introduction	2
Historical overview	3
Space environment in the United States	4
Space environment in the Soviet Union	8
Space environment in China	10
Challenges of space environment in the twenty-first century	14
Space Security environment in the European Union and the ESA	15
Research and developpement of the United States and China's space activities	19
The diplomatic background of the United States and China space activities	20
The financial background of the United States and China's space activities	23
Conclusion	25

Introduction

The concept of space security is fundamentally difficult to define, as it was originally created under a bipolar world order, adapted to that context. For this reason, the concept, often used as a talking point but rarely defined, has focused mainly on the military aspects. This has not changed to date, as the role of space security is to contribute to the maintenance of the military balance of power and the strength of states, to the detection of threats to states and satellites, and to the support of other military activities. In recent years, the term has become more widely used - although the military aspect remains dominant in this field, key changes have occurred in the definition of the term. But what has changed? In the Cold War era, states primarily considered armed threats from other states as a risk to their security. But it was not all threats. No attention was paid to the question of famine, the political stability of the state, the possible shortage of water. They were not looking at security threats that were not part of the terminology, that were not relevant everywhere. A definition of security was therefore needed that would cover all the problems that are present in the life of a society. Space security is being looked at in a similar way today. Space security needed to be broadened, therefore it is now applying to the activities of any state that wants to use space for social or economic purposes. Countries agree on certain aspects, but this does not mean that everyone uses the same definition of space security. National interests and approaches give a fundamentally different overall picture, but the pillars that make up a space security strategy remain the same.

This is also true of the definitions used by different countries and organizations, as most of them take the views set out in the 1967 Outer Space Treaty as the dominant view when talking about space and activities in space. We can observe Michael Sheenan's discussion the concept of security of space, in which he notes that each formulation basically has two elements in common.¹ The first is unrestricted access to space and unobstructed navigation in space. Although this is a definition that basically lays down the principles of space security and space activities, the Space Security Index also examines the expression in a more detailed way. It measures the development of space technology along factors that are used to assess the effects of space security in the world. This organization provides a complex view of the impact of space security, providing an orientation for both professionals and interested parties. As it was mentioned, the organization can measure the impact of developments through eight different factors, namely: space environment, space environmental awareness, laws, policies and doctrines, civil space and global utilities, commercial space, support to ground military

operations in space, protection of space systems, negation of space systems. The Security Space Index defines space security as "The secure and sustainable access to, and use of, space and freedom from space-based threats."² Following this definition and principles, I will examine the space security environment and strategies of the two major economic powers of today. To understand where space activity comes from, I will detail the development of space activity, the people who influenced it, and the milestones that have shaped and significantly influenced the positions of today. Furthermore, after considering the past and present of these systems, I will try to answer the following two questions: With whom should the European Space Agency cooperate to have a safely evolving and sustainable status in terms of space security? And does the changing geopolitical situation influence space policy matters?

Historical overview

In fact, space security issues are as old as space exploration. Astronomy as a science was developed long before man or man-made objects were ever outside the stratosphere. The foundations of space exploration can be traced back to Russia, where Konstantin Eduardovich Tsiolkovsky laid the foundations for rocketry and space exploration at the turn of the 20th century.³ Although Tsiolkovsky laid the theoretical foundations for the technical basis of the rocket devices used in today's space programs, the first rocket is not originated from him, or even from Russian soil. In fact, in the United States, Robert Goddard, based on Russian theory, created the first working rocket using a liquid propellant, called "Nell".⁴ In the period that followed, several theoretical works were published, some of which are still relevant to science today. The next major turning point came in the Second World War, when the German Reich developed its V-2 ballistic missile, although the design of the reactor and its experimental testing began in 1927. Interestingly, the composition of this missile was such that once it reached its altitude and its fuel, a mixture of ethanol and water, ran out of its tank, it suddenly began to free-fall silently and remained silent until the moment of impact, making it almost impossible to detect and intercept. The height of the trajectory was 97 kilometers, which is near to the 100 kilometers height, also known as the limit of space.⁵ At the end of the Second World War, the German designers and engineers involved in the development of the V-2 were taken over by the Soviets or the Americans. Some of them gave themselves up, others were captured. Eight engineers voluntarily surrendered to the US Army in order to avoid Soviet advancing troops or the Germans' final liquidation.⁶

The Americans took the post-World War II reckoning seriously. But the Operation Paperclip shows a new approach by the US government. This intelligence operation was not just a

program to round up former Nazi engineers and technical workers, but a deliberate elaboration of a plan to get more than 1600 Germans involved in technical innovation into American hands for use in the unfolding space race with the Soviet Union.⁷ Among the people who were successfully brought to American soil were Herbert Alois Wagner, the inventor of the Henschel Hs 293 radio-controlled glide bomb, and a key figure in the German space and rocket programs.⁸ The plan paid off in the long run, as Wernher von Braun was one of the creators of the Saturn V, which enabled man to reach the Moon, and Adolf Busemann, among others, was the inventor of the swept wing, which is responsible for the reliability of aircraft at higher speeds.⁹

Space environment in the United States

The Eisenhower administration in the United States ignored the fact that raising the country's prestige was a cardinal issue.¹⁰ Indeed, by the mid-1950s, both Washington and Moscow had reached the level of sophistication that would allow them to send a man-made device, also known as a satellite, into the atmosphere. And although the US government had several satellite programs long before 1957, and although testing and economic budgets were earmarked and the execution phase was ready for a year, Eisenhower backed the Vanguard program, rather than the aforementioned German Wernher Magnus Maximilian Freiherr von Braun's Redstone development which later caused him a reason to be blamed. As a result, there was a minor shock on 4 October 1957, the day the Soviet leadership launched its Sputnik 1 rocket into space, sending the first man-made object into space.¹¹ The loss of prestige was felt not only inside the Washington's government, but also outside. The Eisenhower administration then created the President's Science Advisory Committee and on July 29, and in 1958, the National Aeronautics and Space Administration was founded, now also known as NASA.¹² The President was under constant attack thereafter, and society seemed to be concerned with showing technical superiority to the outside world. J.F. Kennedy knew this, and in response he declared on the 25th of May 1961 that United States would put a man on the moon by 1970.

There are two things Sputnik-1 is worth to mention for. The first is that it proved that compensation was necessary for this historic feat by the Soviet Union. The US government had to prove itself not only to its own society but to the world. For by achieving this spectacular milestone, the Soviet Union had succeeded in making the world believe that it had the technical superiority over the other great power. This was to be achieved by economic and social support because what was more important than spectacular plans and stunts was real help, and of course there was also a political message, namely that the USA was prepared to fight the Soviet Union

against its expansionist and competitive policy. Eisenhower said, " But what makes the Soviet threat unique in history is its all-inclusiveness."¹³ They use every human activity as a weapon of expansion. Trade, economic development, military power, the arts, science, education, the whole world of ideas - all are hitched to the same chariot of expansion. The spy satellites are in a prime position to ensure that Soviet expansion does not compromise US security beyond prestige. A new aspect of national security thinking was added: space itself.

But looking at the period from 1957 onwards from a security perspective, we can find data that also play an important role in the development of space security. During this period, the two powers were constantly trying to arm themselves more quickly and more forcefully and to send space probes beyond the atmosphere. Although for technical reasons this was still a long time coming, this is how then Secretary of State Dean Rusk described the space environment: "There is an increasing danger that space may become man's newest battlefield." (Moltz, 2007, p. 187-195)¹⁴

However, space security reached a turning point in 1962, when J.F. Kennedy and Nikita Khrushchev reached an agreement. This was due to the fact that nuclear weaponization was progressing at such a pace that leaving nuclear aggression unchecked would have been irresponsible, as such an attack would have had unforeseeable consequences. Progress was dangerous and regulations were justified for clear defense reasons. The first important step to stop nuclear weaponization was the Partial Test Ban Treaty, codified in 1963, which banned nuclear testing. This was followed by the UN Resolution 2222, which called against territorial competition on the Moon. Although after that accidental and unofficial space flights ceased, and there was no longer such a threat of space competition, the most significant agreement had to wait until 1967. The Outer Space Treaty is a comprehensive treaty that calls on member states to prevent the launch of nuclear weapons into orbit, to communicate and coordinate continuously, and to avoid any form of aggression in space. It also stipulates that all states may engage in space travel and that any damage caused by man-made or space-based entities must be compensated by the states.¹⁵

Although the United States was able to send a man to the Moon in 1969 as part of the Apollo program, partly through the work of the aforementioned Wernher Magnus Maximilian Freiherr von Braun, and thus achieved a historic moment, the period 1970-1975 was a continuation and expansion of the communication already begun. The two powers extended the ban on ballistic missiles, agreeing to help closer communication, prediction, and navigation. During this 5-year

period, there was an unprecedented process of cooperation to promote the development of space exploration and the reduction of space weaponization.¹⁶

As good as this period was, the next 10 years were just as turbulent. The ease of communication between the two great powers changed and became rather difficult. The Reagan administration took a very different definition than previous administrations, as space exploration and space security were also given high priority especially when it came to launching ballistic missiles. This was a result of the Strategic Defense Initiative, which was announced by Ronald Reagan in 1983, and with which the production of ballistic missiles would have been consistent with the Anti-Ballistic Missiles Treaty (ratified in 1972), according to the president.¹⁷ However, the US Congress decided that the anti-ballistic missile agreement was not worth breaking, and therefore increased mutual control and extensive cooperation between the two countries remained the two leading elements.¹⁸ Also, in this decade, Washington began to widen its space institutions. In 1985, they founded the United States Space Command (USSC), of which main task was to divide of the organizations, although this organization was shut down and its tasks were taken under the Air Force Space Command (AFSC) later.

The Clinton administration, in addition to push for the development of ballistic missile defense systems at home, doubled the budget for this and began negotiations with the Russians on the Fissile Material Cut-Off Treaty (FMCT) which was mainly about to prohibit certain elements of nuclear weapons.¹⁹ This cooperative approach was fundamentally abandoned in the Bush administration and a more aggressive approach took over. In the short term, US withdrew from the Anti-Ballistic Missiles Treaty and put the emphasis on developing both defensive and offensive weapons.

In 2002, at the UN Conference on Disarmament, Washington also ruled out the possibility of discussing space security. As the then Ambassador Eric Javits put it, "There simply is no problem in outer space for arms control to solve."²⁰ (Eric M. Javits, 2002) With this opinion, the United States isolated itself in the debate, as other states, such as Russia or China, wanted to discuss the lack of space security.

In the course of the 2000s, the American government took a number of steps that essentially set a unique precedent. The great power repeatedly perceived that the actions and agreements of other great powers had consequences that would weaken the American air and space defense arsenal. The Bush administration has therefore faced a great number of domestic political difficulties which have prevented it from achieving its objectives, despite the deployment of a

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

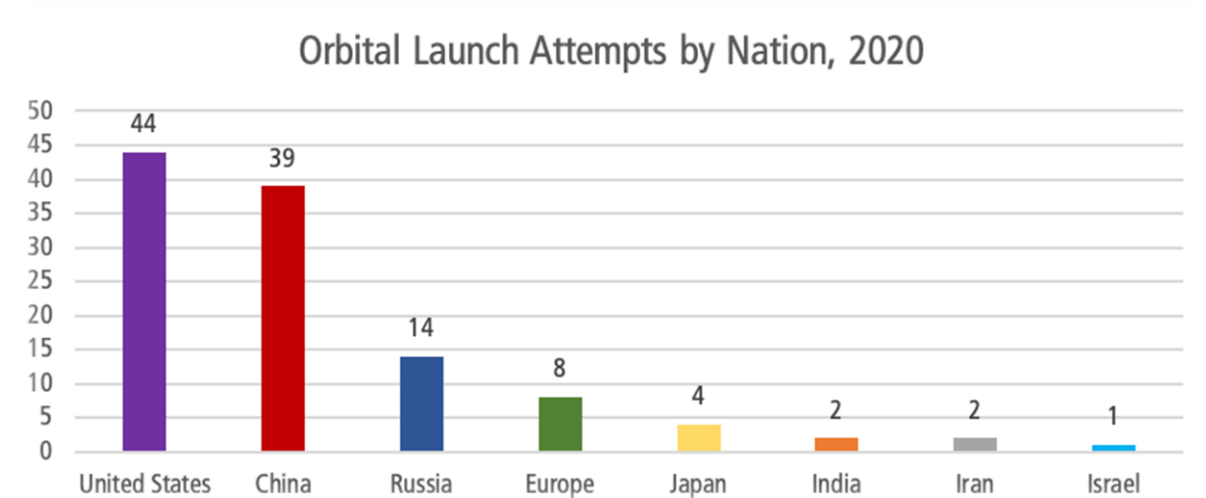
few interceptors on its territory. It is interesting to note that the government's ambition was not only to deploy the defense system on Earth, but also to deploy similar units in space centers. During the time of President Bush and afterwards, mainly for technical and financial reasons, Russian cooperation was the main way of working, even if it was not without diplomatic risks. This process was interrupted after the events in Crimea in 2014.²¹ This period was significant not only because of Russia, since in 2011, all bilateral and other cooperation with Beijing and Chinese government agencies was banned for NASA with Wolf Amendment.²²

For these difficult circumstances, the United States, later on, conducted a complete review of its space policy in 2006. Space debris was a key point of discussion at the time, and its reduction and limitation justified the development of a new approach that fundamentally changed the isolationist space policy within the White House. Political actors wanted more international cooperation, and, for the first time, economic actors also entered the debate, such as the leaders of Intelsat, who demanded further negotiations on tightening and banning satellite interception systems.²³

In sum, what the US administration had to realize was that a collective problem cannot be solved by individualistic and subjective attitudes. Current activities are just as important. Barack Obama's decision to extend the International Space Station (ISS) beyond 2020 is of historic importance, as it should enhance the technology and the value of the ISS by creating new observation systems, new cooperation plans, improving recycling, and modernizing the legal framework to make it more transparent. If we look at the 2020 space policy for the US, we can see that their goals include strengthening diplomatic and economic relations, promoting the private sector, and creating a safe, sustainable space environment, where challenges such as space debris and supply chain security are addressed alongside critical infrastructure and cyber defense.²⁴

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

In the future, robotic space exploration is planned, with the aim of exploring and collecting material on the Moon and Mars. But also, the launch of the James Webb space telescope in 2021, which will open new doors in space exploration.



1. The space report online: 2020 in Launches

Space environment in the Soviet Union

The other major power back in the day, the Soviet Union, also captured German scientists, turned them into contract developers between 1945-6, and then employed them in Operation Osoaviakhimi.²⁵ Although little is known about this period, we do know that the Germans were held on Gorodomlya Island, where they took part in programs such as G-1 and G-2. More importantly, it was these German engineers who made possible the historic moment that led to the launch of the first artificial satellite into space in 1957, better known as Sputnik 1.²⁶

But why to mention the Soviet Union? The reason is that this great power was one of the main protagonists of the coming period, which we refer to as the "Space Race". The Soviet Union achieved successes in missile development at several key moments, and in doing so, had several effects. Firstly, it developed itself, giving itself an opportunity to easily achieve great power status in space for the first time in history. Secondly, its competition with Washington also encouraged the other great powers to make huge investments and develop themselves. In addition to the creation of several state agencies that are still reputable today, US military and non-military missile development also gave the government a new perspective. This is not only because the state wanted to keep pace with the great power to the east, but because the outcry

in domestic society and among NATO allies was such that larger, more spectacular investments were justified, as the US had an interest in demonstrating its technical superiority over the Soviet Union. Third, it has encouraged several countries to start their own missile development. This allowed Chinese space exploration to begin on the Soviet model. In result, their first success came in 1959 with the Dongfeng missile.²⁷

The Soviet Union also worth mentioning because of their staggering achievements in Space in this period. Before 1957, they did not know whether humans could survive a space voyage, so they tried experiments with animals, but in 1961 the Soviets also made a breakthrough, sending a man into space. Yuri Gagarin left the atmosphere on 12 April 1961 and spent more than an hour and a half out there, giving the Soviets two space milestones.²⁸

The 1960s, however, did not continue smoothly. Sergei Korolev died in 1966, taking the biggest figure of the country's space programs out of the system. He was succeeded by Vasily Mishin, who was tasked with putting a manned spacecraft on the Moon. He hurriedly approved the untested launch of Soyuz-1, which resulted in the first fatal spacecraft accident in history in 1968. In reaction, the Soviet teams went into a frenzy, as not only had they lost the race to put a man on the moon, but the prestige that had been so heavily trumpeted in propaganda up to that point seemed to be disappearing, obscured by a single set of results. The next year saw successes with Soyuz-4 and Soyuz-5, which also established the first personal spacecraft which was able connect to another one.²⁹ The aforementioned easing and the emergence of communication and cooperation is also reflected in the Apollo-Soyuz program. However, the Eastern powers, in addition to several major achievements, were unable to sustain the arms race financially, and therefore many of their ideas were not realized.

The 1990s saw a resurgence of cooperation, partly due to a change in great power politics and the break-up of the Soviet Union in 1991, which fundamentally changed the geopolitical landscape globally. This was also formally manifested in the joint ISS project. Cooperation was also economically fruitful at that time, making aeronautical and political cooperation easier.

In 2010, there are two things that we can observe. One is that Russia is very interested in military development, and this includes missile development. The Russian Federal Space Agency is the main body for space programs and although its funding to date is still far below that of the US, it is not to say that it is not significant. US contracts were important in the 2000s, but after 2014 cooperation with others, such as the European Space Agency, China or other third parties, became particularly important. Today, Russia's largest spaceport is located in

Kazakhstan and is called Baikonur Cosmodrome. This is not a new site for Moscow, as it was founded in 1955, but after the fall of the Soviet Union, the strategically important facility was only maintained through a financial contract, which is now valid until 2050.^{30 31}

Space environment in China

China, beginning in the 1950s and growing in strength since then, has wanted to join the world's leading powers in every sense. This, of course, required a comprehensive national power, encompassing diplomatic, technological, military, and economic aspects. Already in 1956, we can report the creation of an organization called The Fifth Academy of the Ministry of Defense, which can be seen as the first step in the birth of China's missile and space programs.^{32 33} Mao, moreover, considered the Chinese nuclear program to be important, and lumped it in with the building of satellites. After Mao's death, Deng Xiaoping adopted a new approach, which called for the development of missiles and satellites that were exclusively necessary. In 1964, despite the technological and industrial limits, China has managed to execute their first test blasting with a nuclear bomb.³⁴ And although this was the start of development, it was only afterwards that the development of transport and precision shooting began. Qian Xuesen as the father of Chinese missile technology, who laid the foundations for modern missile technology and strategy of the superpower. The first satellite was launched in 1970, and the following years of the decade were dominated by modernization.³⁵ It would be difficult to imagine space activities without financial expenditure, so Deng Xiaoping reallocated the state's financial allocation, placing greater emphasis on space programs.³⁶

In the 1980s, Deng realized that space exploration and the pursuit of technological advances were even more necessary than he thought for the first time, as, as well as being a positive direction for the country from a security perspective, laying a firm foundation was key to future potential developments. As a result, Deng announced Plan 863 in 1986, which some say was inspired by the Strategic Defense Initiative presented by Ronald Reagan, aimed at broad technological development in order to make China technologically and financially independent of the great powers.³⁷ China had to understand that technological development is not only a national defense issue, but also an economic investment. Research meant studies, and studies meant intellectual capital, which could be used to produce new studies that could serve as examples for other countries looking for input for missile development or technological innovation. Not to mention the jobs created by the development institutions. But technological development required money, and what had to be understood was the fact that Chinese

companies could not create the kind of stimulus in the economy that the Western powers could. The solution was to produce alternative, widely used equipment and to attract foreign investment.³⁸ However, institutionalization was also one of the goals, one of the biggest achievements being the creation of the Chinese National Space Administration (CNSA) in 1993.³⁹

When China, under Mao's rule, saw only nuclear war as a vision, it began to develop its own weapons, taking a realistic view of the international role. The most important reason, apart from national defense, was the need to prepare for future wars, so that the Asian giant would not be left behind when it came to global armament. In the 1980s, however, after Mao's death, it became clear that the possibility of another world war was not possible, that the possibility of another world war was negligible. This realization fundamentally changed the questions of national strategy, because the key issue was no longer when nuclear war would happen in the future, but how we could maintain our nuclear deterrent while dealing with and resolving smaller, easily defined conflicts.

The answer was to move from quantitative thinking to qualitative thinking, and to explore new theatres of war, acquiring as much experience, knowledge, and strength as possible. This was of course also reflected in the military, especially with the advent of satellites, which were used exclusively for military purposes. These purposes were: surveillance/reconnaissance, mobile firepower, electronic and high-tech warfare, communication capabilities in a sustainable way in combat, deterrence, continuous and easy communication between deployed units.⁴⁰ This was the spirit that followed Chinese thinking. They observed Washington's high-tech elements, took the knowledge, and turned it to their advantage. This led to a way of thinking that at first was not about space security, but more about air power. This confirms that the synchronous orbiting satellite system developed in 2000, which is essentially based on the US model and provides the center with continuous information, even in the event of a conflict someone tries to disrupt or overload the cyber system of the PLA.⁴¹

China's two largest technology institutions, the China Aerospace Science and Technology Corporation (CASC) and China Aerospace Science and Industry Corporation, employ tens of thousands of people. The navigation and technology systems can be sold, and the parts that China produces can be bought by others.⁴² The market for these goods has grown by leaps and bounds in recent years. In addition to providing a financial return for China, they also strengthen the country's diplomatic power. Of course, for the production and operation of the technological

elements, there must be imports from other countries, and this is happening. Materials from Nigeria, Bolivia or Sri Lanka are essential to the process of space development in China.^{43 44}

In addition to the fact that these developments and achievements in space have functioned in a similar way to the Soviets or the Americans, as a pride factor, they have also had everyday effects such as simplifying weather reporting, because with the help of satellites the Chinese meteorological services have been able to report the weather much more accurately and over longer distances, thus simplifying navigation and basic telecommunications, not to mention the observation system, which, although not carried out by the meteorological service, is just as ordinary and important. In addition to weather, China has developed its diplomatic power by establishing pacts that focus on sustainable development, disaster prevention, forecasting, agro-cultural development advice. This was the case with the signing of the APSCO convention, which included, Bangladesh, Pakistan, Mongolia, and Peru.⁴⁵ China clearly dominates this group, both in terms of pan-industry and technology. The Chinese are deploying monitoring systems here, which are of course also used by other countries, providing them with alternative monitoring and forecasting capabilities. To facilitate the Shengzou program, China has started to deploy other stations in other countries, including Namibia, Kenya, or Pakistan where, in addition to being a supporting base for the Chinese space program, it is also increasing China's diplomatic and economic strength within the country.⁴⁶

In summary, in the early 2010s Dean Cheng stated in a published academic paper that: "Establishing space dominance, establishing information dominance, and establishing air dominance in a conflict will have influential effects".⁴⁷ And this was true to the space security as well. Space technology, in addition to those mentioned so far, is acting as a support for defensive and offensive military systems in China. Satellites enable powerful and precise strikes. This is not primarily a matter of operations against people, but of destroying strategic enemy military units, buildings, radio stations and supply centers or transport lines, or of eliminating satellites belonging to others, for which the precise arrival of missiles is crucial, and which require navigation systems that can only be achieved by developing space technology, as is the case for defense reconnaissance.⁴⁸

China has seen rapid development in the 2000s. The Western countries have responded by launching more cooperation and joint programs to increase Beijing's international power. Washington was also involved in joint programs with the CNSA, but a series of scandals, in particular the Cox report, led to a breakdown in relations, which led to changes in export regulations. This was followed by a loss of US market space in China, which was filled by

European powers.⁴⁹ China has been banned from the ISS, which has prompted the Chinese leadership to do two things. To build its own space station, and to cooperate with the European Space Agency and Roscosmos, which made it economically more difficult for the American market but helped the Chinese even more.⁵⁰ In this aspect, it can be said that the measures taken in Washington have been counterproductive.

Of course, during this period, Chinese domestic policy has also reacted to developments, with private companies playing an increasingly important role in satellite launching from 2014 onwards. Companies close to the state, such as vehicle manufacturer ExPace, have become satellite manufacturing stations, specializing their market in projects that the Chinese private sector can now comfortably afford.⁵¹ ⁵² The political establishment has also repeatedly expressed its strong support for space expansion, leading Christopher Newman to say that "President Xi Jinping has declared that China's 'Space Dream' is to overtake all nations and become the leading space power by 2045."⁵³

All in all, Beijing sees space as a single entity that contributes to the country's military, economic, technological, and diplomatic soaring. They see it as a system that, in addition to its tactical and strategic elements, can be understood as a space for everyday use, facilitating the flow of data and information. It is used for observation, orientation, and forecasting, without neglecting the security aspects. Space in China can be understood in both military and political terms, playing an important role in achieving the goals of both, and providing a continuous opportunity to be part of, or the basis for, a system that is instrumental in increasing the power of the policy at home and abroad.⁵⁴ Beijing entered the 21st century with an emerging ambition to become the world's leading power. It wanted to replace the East with the West, and to do so it saw the need to develop technology and space. This is where space security took shape today, despite the fact that it existed before, as nuclear ambitions had been on the table of the Chinese political leadership. The outstanding question is to what extent they have been able to compete with Washington in terms of space security and to what extent they are becoming an alternative as an emerging space power to the leaders of other countries when it comes to secure technological development and space ambitions. In 2003, China became the third country to put a man into space, and in 2004 it decided to send a man to the Moon.⁵⁵ This changed, however, and an exploration program was authorized by the Chinese leadership and carried out in 2007 as Chang'e.⁵⁶ A few years later, in 2011, China launched the Tiangong-1 instrument, which became the first of their own space station.⁵⁷ In 2018, Beijing conducted more rocket launches than anyone else on Earth, including maintaining a long-term team in space, a historic

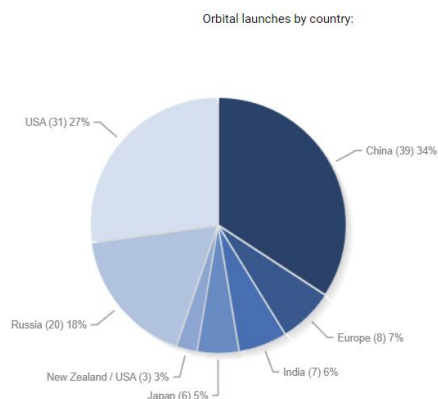
achievement.⁵⁸ The Chinese leadership's determination is also reflected in the fact that in 2021, China became the third country to land a unit on the Moon with the Zhurong rover.⁵⁹

International of space environment in the twenty-first century

Our world has changed a lot since the Cold War ended century. Processes such as globalization and increasing intercultural differences have fundamentally shaped the way countries perceive geopolitics, geostrategy and security. This is also true for space security. With the end of the Cold War, the time has come for a worldview in which more states are involved in space exploration and space security developments, and in which actors in the now globalized system, such as the European Union, are also involved. Today, 13 countries and the European Space Agency (ESA) have a satellite launch capability, although only seven can launch satellites heavier than a ton, and only three can launch humans beyond the atmosphere.⁶⁰

⁶¹ Of course, the three biggest powers today are still the United States, China and Russia, but countries have also joined which are largely close economically and technologically to the big powers, such as one of these three countries or the European Union, from where they have been able to develop their capabilities. Since the early 2000s, Japan has been an emerging player that attaches importance to space security.

The New Basic Space Law was announced in 2008, followed by the National Space Plan in 2009 by the United States.⁶² Most recently, they reaffirmed their commitment to space



2. Krebs, Gunter D. "Orbital Launches of 2018".

security with the establishment of the Office of National Space Policy (ONSP) in 2012.⁶³ They also lead the Asia-Pacific Regional Space Security Forum, the most important regional platform. India has started to prioritize its space ambitions at the initiative of Beijing, which has been reflected in the establishment of the Integrated Space Cell, housed within the Ministry of Defense, and led by military officials, underlining India's ambitions for military space activities.⁶⁴ Israel has followed a different path,

although roughly similar to India's. Here the military aspect dominated, but the primary objective was observation and the sale of these observation assets. Israel considered it important to have a cost-effective satellite observation system, but in the 2010s it also started planning a civilian space program, showing a move away from the military dimension.⁶⁵

In the Latin American world, it is clear that Brazil has the most advanced space technology, in addition to being geographically well positioned when it comes to deploying space facilities. The country had its first successful rocket launch in 2010, but the next step was to develop a unified program called Programa Nacional de Atividades Espaciais (PNAE) Planejamento 2012-2020.⁶⁶ From their membership of the BRICS, it is clear that their willingness to cooperate is basically directed towards Russia and China, but the China-Brazil Earth Resources Satellite (CBERS) program also demonstrates their cooperation with these powers.⁶⁷ They also planned to develop weather forecasting and observation units by 2020, an ambition they wanted to achieve in cooperation with the non-Western powers already mentioned.⁶⁸

In addition to individual states, international organizations have also established committees and entities that provide a basic framework for space security issues, and although not all of them may have been established in this century, the author considers it important to mention them here, in view of their impact and existence today. The UN Committee of Peaceful Uses of Outer Space (UNCOPUOS) has an important role to play, as it is the organization where cooperation processes are taking place on several fronts. This is the organization that has produced the five international conventions that are still considered the cornerstones of the world today, the most famous of which is the 1967 Outer Space Treaty.⁶⁹

It has several sub-committees, such as the UNCOPUOS Scientific and Technical Subcommittee's (STSC) Long-Term Sustainability of Outer Space Activities (LTSSA) initiative, and the Group of Governmental Experts on Outer Space Transparency and Confidence Building Measures (GGE on Space TCBMs), which supports multilateral work. For radio communications unity, the International Telecommunication Union (ITU), founded in 1865, is the main body.⁷⁰ This organization has the power to modify and revise radio frequencies, including for satellites. Committee on Earth Observation Satellites (CEOS), which is basically a space-based Earth observation programs organization that facilitates and supports the exchange of information between countries, thus helping decision-makers to work for the benefit of mankind.⁷¹ The World Meteorological Organization (WMO) facilitates and coordinates the work of meteorological satellites.⁷²

Space Security environment of the ESA

The attitude towards space in the European Union (EU) is very different from that of these countries. The Community was not based on defense, nor was space exploration and security a focus of any country. The common foreign and security policy principles were laid down in the Maastricht Treaty, which essentially defined the new attitude of the Community.⁷³

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

This was the beginning of a multi-year process that can be seen as external to European space security. The European Security Strategy, already established in 2003, set out the global challenges the EU would have to confront. This document states that direct armed confrontation against a state is unlikely and that it is necessary to confront enemies and threats that are less predictable, more diverse, and therefore more dangerous. Such threats included terrorism, weapons of mass destruction, regional conflicts on the Korean peninsula or in Pakistan, the situation of failed states, and organized crime.⁷⁴ Five years later, the same report came out with current security challenges at the time, including the use of weapons of mass destruction, terrorism and organized crime, cyber security, energy security and global warming.⁷⁵

As can be seen, the security challenges have changed significantly, and two things can be inferred from this by the political leaders of the time. One, it is not just a matter of dealing with the present and assessing today's problems, but of proactively being ready for new threats and being prepared to mitigate or eliminate them in a preventive way. Two, the problems had to be conceptually brought closer together, security had to be expanded and another, broader version of it had to be created in the European context so that threats could be detected, identified and managed by the leadership, and the process would not be disrupted administratively, conceptually or practically, as this could lead to an escalation of the threat, a growth of the problem. And the use of space was a good way of doing this.

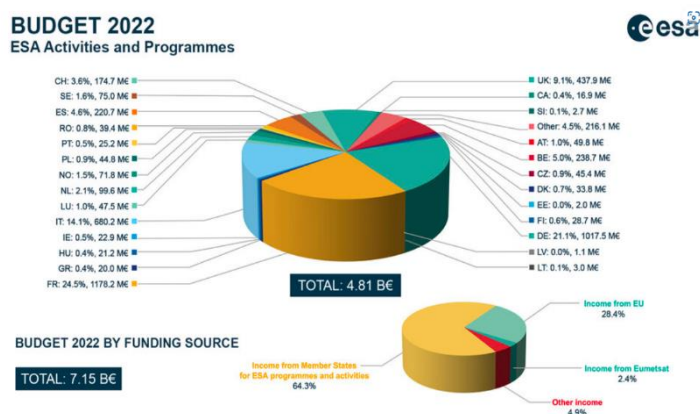
Although the European Space Agency (ESA) was already established and active in 1975, there was no legal basis for space activities within the European Union until 2007. It is important to note that ESA is not part of the European Union, although the funding indicators clearly show that the EU is the largest contributor to the organization. At that time, the Lisbon Treaty was adopted and entered into force in 2009, which included Article 189, which was in fact the first space clause in a European Union convention.⁷⁶ Organizations such as The European Framework Cooperation for defense, civilian security and space-related research (EFC) were perfect examples of exactly how ESA is trying to coordinate space research on a European platform. The ESA, by the way, has developed programs based on a mainly civilian initiative, and of course, in addition to carrying out civilian programs, it has not rejected government-organized initiatives as well.⁷⁷ Today, it is also involved in defense-related programs such as the Galileo satellite program and the Global Monitoring for Environment and Security (GMES) program, which makes global warming observations and conclusions easier and more accessible, this is a project founded by the European Union, which tells us about the dependency ESA has.⁷⁸

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

Two things follow from this. One is that, in the perspective of the last nearly two decades, there is a clear emergence of a comprehensive concept of security. Several organizations and programs have joined forces to monitor threats, and cooperations with other states and organizations have emerged with which the European Union is capable of addressing problems both within its borders as well as monitoring and anticipating problems that are distant in time and space. The other is the visible process of change in the way the European Union has seen its defense efforts as extremely important.

The sovereignty of the Member States may be somewhat eroded when one promotes a common foreign and security policy concept in the European Union, but progress in the Member States, common progress in the Union and the contribution of foreign policy partners can form a comprehensive, complex, and workable system, which has also been developed in the European Union. The EU's common foreign and security policy program has thus become a globally recognized concept, and ESA has gained a powerful role among space organizations. It is no coincidence that today it is mentioned in the same group as organizations such as NASA or the Chinese National Space Administration (CNSA). Interestingly, because of its organizational specificity, ESA will always be more difficult to identify, as it is an intergovernmental organization, but the spectrum.

11 of its activities illustrates the breadth of the organization and the many opportunities for profit. But what are these activities? Telecommunications, exploration, robotic development, forecasting and space security activities. As you can see, with this spectrum of activities, it fits



perfectly into the ranks of space organizations of the major powers. The ESA currently has 22 members, plus Canada, Latvia, Lithuania, Slovakia, and Slovenia have an agreement with the organization, and Malta has a separate agreement to participate in training programs.⁷⁹ The organization currently runs fifteen programs in the areas

3. The European Space Agency: Founding

mentioned above, and eight new programs are in the pipeline, with objectives such as exploring

the dark universe, or exploring extra-solar planetary systems and planets with a habitable biosphere similar to Earth.⁸⁰

As already mentioned, ESA has built its projects mainly on citizens' initiatives, and the cooperative projects are a good symbol of this. Initiatives such as the Triton-X project are exclusively between ESA members, but it is common to see the involvement of organizations from other countries or based in other countries, but with space exploration and security as a cardinal issue.⁸¹ The other partnerships are mainly European, with private companies in France, Spain, the UK and Canada, through the special agreement between the two countries and ESA mentioned above. In fact, in the Pioneer Programme, in which the participants try to create a space environment intended for demonstrating new technologies, systems, services, and applications.⁸² Denmark is even involved as a contributor. Alongside large-scale projects such as Neosat, which is essentially a commercial satellite system, the list of partnerships also includes organizations which basically show with whom the European space community prefers to work. One such organization is NASA, with which there is a partnership agreement between the two parties on projects related to the Moon.⁸³ In addition, there are projects that do not necessarily show a tendency towards Western powers in European space activities. For example, in the Pioneer Programme, mentioned above, although the parties are mainly working with British companies, if we check the companies that are British in name, we see that they are companies with non-European oriented board members or investors, such as Open Cosmos, where not only is the Director, Aleix Megias, who was involved in the construction of the Russian landing systems, but the company also has a Chinese board member in Han-Sheong Lai. Han Lai is also Vice President for International Relations.⁸⁴ Another example is The Aspire program. It is run by ten US companies, including Black Rock, whose largest owner is the Vanguard Group, also from the US, showing that private groups and cooperation with them does not only work within Europe.⁸⁵ This tells us that like most industries, space, space exploration and space security have been transformed. Here too, globalization has blurred national borders and created opportunities for cooperation between the major powers, in theory. In practice, however, the fact that international political events are having an impact on space activities is becoming apparent. Even though international agreements such as The Outer Space Treaty, The rescue agreement, The liability convention, the Registration Convention or The Moon agreement apply to everyone, tensions between countries are a fundamental indicator of who prefers to make agreements with whom.

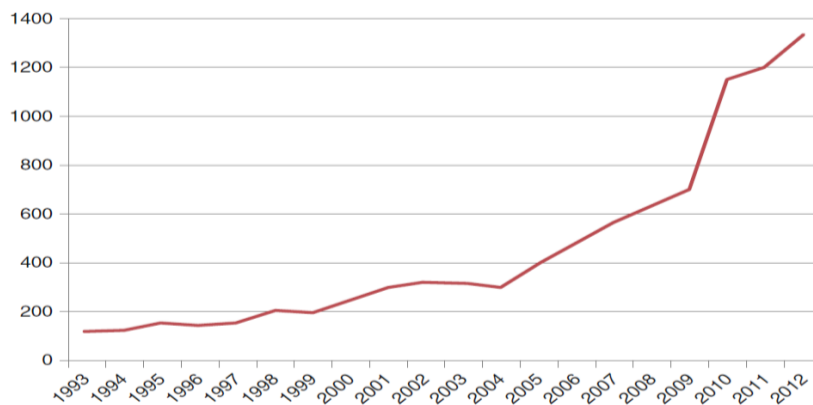
We could see that while China basically concludes most of its agreements with Brazil, India or Russia or with their state-owned companies, the United States basically prefers Western and Japanese public and private partners. This is not to say that there is no overlap, since great power cooperation is essentially inevitable to achieve comprehensive space activity, which is the same as agreements in international organizations. The success of these activities requires inter-state agreements and cooperation, even if most of the reasons for this are provided for in the agreements already mentioned. The question raised in this thesis is where exactly Europe and ESA stand in this system.

Research and development of the United States and China's space activities

Beijing and Washington started their space activities from fundamentally different positions. Of course, this does not only mean their technical or diplomatic position, but also the intellectual aspect, which is just as important for space activities as technical preparedness. By intellectual background, I am referring in particular to material, articles, studies or books that have been published in a form accredited by experts, with a view to being used in the procedures of a program or in science, and to drawing conclusions from them, thus providing a breeding ground for intellectual development. More precise data on China is much harder to find, as the material that serves as intellectual capital for priority programs is often classified, not only in the space spectrum. According to the ISI Web of Knowledge, Beijing has experienced an average annual quantitative growth rate of 45% each year between 1993 and 2012.⁸⁶

China is ahead of intellectual superpowers such as Germany, France, Russia, and the US in terms of publications. The latter leads the way, acting as a kind of autocrat in this field. The Chinese side has changed somewhat. It has changed in the sense that it has continued to produce a high level of specialized material on various subjects, has strengthened itself and its intellectual capital has grown rapidly, which has had a major impact to date. This is evidenced by the interview with Ming Gao in 2021, in which he reports that by 2024 the Chinese Space Station will have conducted more than 1,000 experiments in life sciences and human body research, microgravity physics, space and earth sciences, and space technologies and applications.⁸⁷

If you look at the fact that in 2012 China published 1329 articles on space technology and space policy, and now, in 2022, it wants to carry out 1000 experiments in one project, you can see the leap forward that Beijing has made.⁸⁸ China also pays great attention to supporting development and studies at the government level, which is reflected in the fact that the China National Space Administration (CNSA) is the second largest organization in the world with the largest budget, behind the US NASA and third with ESA.⁸⁹ What we can see from this is that whatever survey we look at, China always comes up as a strong second, or a rapidly emerging fourth or third. Not for nothing does Washington see Beijing as its biggest competitor. China has the financial



4. International space S&T publications from Chinese scholars (Source: Counted based on data of ISI Web of Knowledge)

and economic base and the political backing to become a premier space superpower, but development and potential do not equate to sustainable success and reliability. And although Beijing is engaged in cooperative activities with the ESA, such as

they are both members of the „The International Charter Space and Major Disasters” there is currently no sign of closer cooperation from European agency.⁹⁰

The diplomatic background of the United States and China space activities

China and America use different techniques, not only in their domestic but also in their foreign policies, which, apart from changing the social set-up of a country, also affect its basic attitudes and opinions on divisive issues and affect diplomatic relations. But what is the basis for deciding who belongs where and how? The United States has always belonged to the West because of its historical roots, and of course people like the British, the French, the Spanish or the Portuguese who have had closer ties with the country have had a great influence on the cultural relations that have developed there. Washington has therefore always been close to Europe, and sometimes for economic reasons, sometimes for security reasons, but basically it has shared, and continues to share the western values.

Of course, this is not only due to historical and cultural proximity, as there are close cooperative alliances between the two regions. This is the case of NATO, which was created with the

participation of America and only Western powers.⁹¹ But so is the G7, in which all participants except Japan are Western powers. Here I feel it necessary to note that Japan has always been the one of the Far Eastern states that has had the closest relations with the West throughout its history, even if this has been sometimes only for economic reasons.⁹² Of course, this does not mean that America does not have closer ties with other parts of the world. As a global superpower, it has the ability to impose its will anywhere in the world, and it uses it to its advantage, whether it is a case of direct or indirect security, energy, diplomacy, economic issues, or any intersection of these groups.

Proof of this is provided by the US spending table, which shows that the Western superpower has spent more money than NATO only in a few places. These are Asia Pacific Economic Cooperation (APEC), International Hydrographic Organization (IHO), International Organization for Migration (IOM), Office of the United Nations High Commissioner for Refugees (UNHCR), The Global Fund to Fight AIDS, Tuberculosis, and Malaria (The Global Fund), United Nations Children's Fund (UNICEF), World Food Program (WFP).⁹³

So, we can see that global action and problem solving is the absolute priority for the government, but right after that it spends the largest amount of money on the alliance with the North Atlantic. However, it is not only the US government that thinks this way. A survey by the New York Times reveals who US citizens consider their most important allies.⁹⁴ The list of fifteen countries includes only European powers, with two exceptions, but those two countries have close ties to Europe. In the same survey, people were also asked to list Washington's greatest enemies. China was not among the top fifteen. The federal system works in a similar way when it comes to NASA. With few exceptions, only Western powers. China is not on the list this time either, there is not a joint international space project due the aforementioned scandals. There is close cooperation with Russia on the international space station, but beyond this, there are only those projects which are in alliance with countries that are non-European but still close allies of the Western world, namely Canada and Japan. Beyond this, only France, the United Kingdom and the other ESA member states are on this list, which is perfectly representative of Washington's diplomatic policy on space.⁹⁵

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

China is taking a different path. Its political system is very different from that of the Western powers, and this has led to disagreements on more than one occasion. China has long been known as a bastion of innovation and invention, and just as it invented paper and



5. Which Country Is America's Strongest Ally?

gunpowder in the past, it is now trying to show its place on the world map of scientific innovation with the latest technological advances. Processes such as globalization mean that it is no longer possible to get everything within the country's borders, and growing ambitions and long-term prestige have forced China to open to other countries. But who could they open to? The West was out of the question, as the civilization that had dominated much of the world for due their success in colonization.⁹⁶ The reason was simple, the West would not have treated Beijing as an equal, nor would they have wanted to because of ideological differences. On the other hand, China always measured its own progress against the weakening of the West, so it would have been illogical to voluntarily forge closer ties with them.⁹⁷ Whereas with the United States it was mainly at war, with the Soviet Union it was more often friendly. This did not mean, of course, that there were no political conflicts, but a spectacular deterioration in the quality of the situation can be felt and recorded to this day. In 1969, the Sino-Soviet border conflict led to a deterioration in relations between the two sides, and after twenty years of uneasy relations for ideological and military reasons, it was not until 1989 that relations between the two sides normalized.⁹⁸

Of course, China's relationship was not just with the Soviet Union. In the 1970s, Beijing was given a permanent seat on the United Nations Security Council, and also developed stable diplomatic relations with multilateral organizations such as the Association of Southeast Asian Nations (ASEAN), in which it later took on a greater consultative role with other Asian countries, but also the Regional Comprehensive Economic Partnership (RCEP).^{99 100} China has strong and stable economic relations with countries such as India and Russia and has since developed closer ties with both as a result of their joint membership of BRICS. The relationship

between India and China is restrictive in the sense that one country is willing to prevent the other from doing business that would hinder the other. This was the case when China wanted to provide military assistance to Pakistan and when India wanted to strengthen its ties with the US.¹⁰¹ China is also paying particular attention to North Korea, with whom it held several meetings in the early 2000s on the Korean nuclear program.¹⁰² In sum, China's closest relations are at the regional level. The countries surrounding this great power have a constant sense of Beijing's power and its economic diplomacy.

Despite the fact that the Far Eastern power has built close ties with several major powers, the BRICS and the Shanghai Cooperation Organization (SCO) are the two strongest alliances of which it is a member. Although significant, these organizations are quite different from NATO. The BRICS is an economic and financially focused organization with no military cooperation side, while the SCO functions as a consultative platform based on mutual trust. We can also see that the economic ties and the diplomatic threads that they create overlap in China's relations, reinforcing the great power aspirations that can only be achieved through financial stability and continued cooperation.

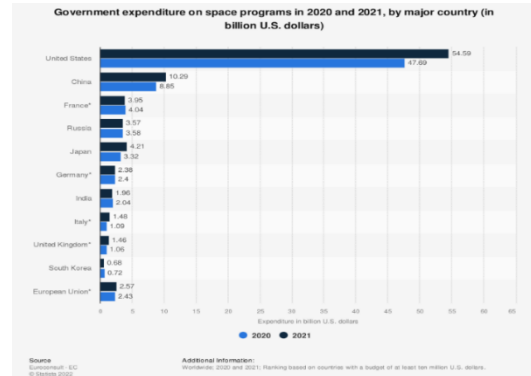
We can see that, although China considers it important to maintain a dialogue with everyone and to keep economic relations stable, it would like to develop on its own, without occasional projects, and without letting anyone get too close. But what about space activities?

China has a licensing agreement between the China Manned Space Agency (CMSA) and the United Nations Office for Outer Space Affairs (UNOOSA), established in 2016, which allows non-Chinese research teams to participate in research on the Chinese space station. In 2008, the Asia-Pacific Space Cooperation Organization (APSCO) invited China to act as a facilitator to other countries in the region to promote space exploration activities by other countries through education and educational research. Within the Forum of China-Africa Cooperation, Beijing is helping countries to combat climate change by providing technology and education. China has also concluded 125 bilateral agreements with governments, space agencies and research institutes, resulting in cooperation on weather forecasting, data exchange and disaster management within 80 countries.¹⁰³

To sum up, China wants to reach out everywhere in terms of space diplomacy, including the West, but all indications are that for the great power this is a business arrangement, which can be beneficial for both parties to the current agreement, but also where the primary goal is to gain leverage and influence for Beijing.

The financial background of the United States and China's space activities

The money spent by the great powers on space activities has been a cardinal issue in world politics. Disasters around the world do not seem to have affected spending in recent years, as world powers have earmarked more spending for space in 2021 than in 2020. This is also interesting in the light of the COVID-19 pandemic, as the financial difficulties this period has put the powers that be under are difficult to circumvent. So far, we can see that this figure represents 0.5% of the US GDP, which accounts for 58% of the world government space budget. Washington spent \$19.655 billion on NASA projects in 2017, \$24,041.3 billion in 2022 on the same area, and if nothing changes, this trend will continue.¹⁰⁴

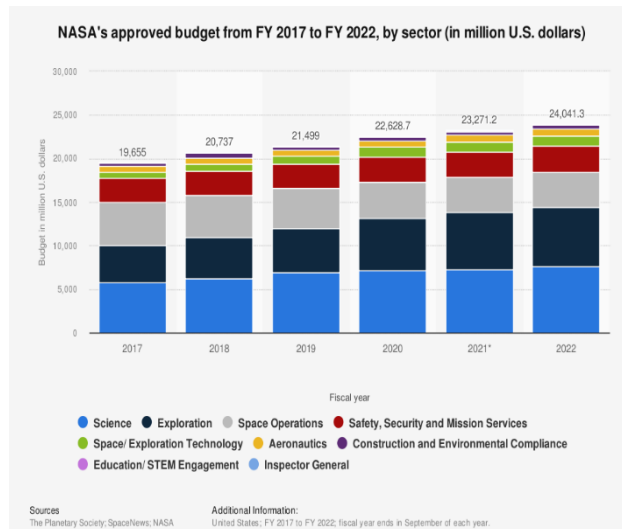


6. Government expenditure on space programs in 2020 and 2021, by major country

This is evidenced by the fact that Washington has more innovative and ambitious plans for the future that will require an increase in its current spending. One of these is the Moon 2024 project inside the Artemis II program, which aims to send a permanent human crew to orbit around the Earth within two years.¹⁰⁵ The Artemis program is also at the top of the priority list, given its ambitious goals. For this project, it is important to note that NASA is not working alone, with the European Space Agency, the Japan Aerospace Exploration Agency (JAXA) and the Canadian Space Agency working in partnership with the US side. Not only do they want a permanent human station on the Moon, but they also want a Gateway space station orbiting the Moon. But it's not just the Moon that is in the pipeline, but also Mars. With the ambition of finding raw materials and putting humans there, the United States has undertaken the most ambitious Mars mission to date. These included the development and deployment of the Perseverance and Ingenuity devices.

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

As I mentioned earlier, China is a very solid second, or a very strong third or fourth in all surveys. Here the former prevailed. China spent \$8.85 billion in 2020 to support the CNSA,



7. NASA's approved budget from FY 2017

rising to \$10.29 billion in 2021.¹⁰⁶ With this indicator, China stands out among all other space-funding states, but still lags far behind the United States. This budget is only likely to increase in the coming period, as China has ambitious plans for the period ahead. In addition to the historic achievements of sending a lunar probe to the far side of the moon in 2019, China sees its own space station as an alternative to all the research that must

end when the International Space Station project is completed in 2030.¹⁰⁷ This project is not exclusively between the two parties, anyone can join, as it is an alternative to the Washington-led programs. China also wants to put a man on the Moon by 2030.¹⁰⁸ In the same period, a space probe will be sent to Jupiter, and a nuclear-powered spacecraft is planned for 2040, with a view to China becoming the leading space power by 2045.¹⁰⁹ The political support is there, the catching-up process has begun, and the question is whether sufficient resources can be allocated to these ambitions to turn plans into reality.

Conclusion

It is obvious that the United States of America and the People's Republic of China will determine the period of space activity in the near future, and from the various databases and surveys we can deduce who exactly will be more productive in the next 20-30 years. Although space competition in the classical sense has come to an end, a certain competitive behavior between the major powers can be observed when it comes to space activities. The implementation of larger, more spectacular, and more formidable ideas and actions can be used to gain technical, military and diplomatic prestige, thereby demonstrating not only to the outside world but also to the population of the country, that the state in question has a place on the map. The aim of the competition is to achieve the big goals and to overtake the other powers, and if it has the advantage, not only to maintain it, but to increase it. In this way, states are not competing with each other, as there is no exact goal to achieve, like getting to a planet or

developing a technology. The only relevant objective is to keep innovating and gaining an advantage. We could say that development has become an indicator of itself.

Most of the surveys show that the United States currently leads the global ranking in every sense of the word from the perspectives highlighted in this paper, but China is not a country to be underestimated. The Eastern superpower's ambitions to become an economic, military and diplomatic leader are undeniable, and this is reflected in all the areas this thesis has examined and those it has not. The question is this: from Europe's point of view, with whom is it worth getting close in space? Judging from current projects and collaborations, Europe is definitely closer to Washington than to Beijing. This is evidenced by the experience of recent years, with NASA and ESA working in joint cooperation with others on the International Space Station, while the CNSA has only been involved in past cooperations such as the Double Star project, or only in negotiations on potential projects such as the Chinese program to explore the southern Moon.¹¹⁰ China certainly has fine-sounding plans for the future, such as building its own space station, sending a first man to Mars, or building a permanent lunar station as part of its long-term plans, but Washington has just such ambitious plans, and space is not just a financial issue for the state.

Europe is often criticized for being driven not by values but by interests, yet it seems that Europe sees another factor important when it comes to space cooperations, trust. In terms of space activity, trust seems to be as important a factor as the ability to make a profit. But why?

Given the very high risks involved in these programs, and the fact that they can be very financially demanding, everyone wants to work with parties they can trust and with whom they can work fairly, not only successfully but for the long term. A good example of this lack of trust occurred not long ago when the United States banned China from the International Space Station on the grounds of internal espionage. Europe, too, must now learn to work permanently close with parties with whom it is not risky to share technology or classified data. China uses cooperation with other countries as a territorial and diplomatic show of force in order to increase its influence within its territory, as is happening in many countries where Beijing provides technology. The great power in the East has signed treaties with a number of countries far weaker than itself, where China is seen to be providing services, and this gives it an advantage that is difficult not to interpret as an increase in influence. In addition, Beijing has been accused of espionage on several occasions, and although most of these accusations have not been proven, the confidence factor has been greatly reduced, which, as I said, is very important for space projects.

All these reasons suggest that the ESA is best advised to favor cooperation with NASA and companies linked to the United States. This would be to the advantage of the European Space Agency not only because Chinese private companies are under the influence of the state, but also because they are much less technologically advanced and less transparent than US companies. It is not just the greater financial capital and local, reliable technology that says so, but the sustained intellectual and physical work overtime that Washington has demonstrated time and again that it can maintain its competitiveness, its first place and its rapid progress. Long-term agreements are in place for projects already under way, and agreements have already been made to implement future plans. At present and in the past, the trust already mentioned is extremely important, and Europe has always cooperated with the US as an ally in times of danger and assistance, and there is no indication that this strong cooperative relationship should change. After all, although there is no crisis now, there are threats, and in one of the strongest platforms where Europe and the US work together, NATO, Beijing is already seen as such a threat, and this has implications for other areas of the actors' relations.

Of course, this is not to say that the aim of this essay was to suggest that ESA and CNSA should sever or weaken their relationship, since space law and realistic thinking dictate that the major space agencies should maintain a relationship with each other. Maintaining stability and mutual respect is extremely useful and necessary, as well as being the basis of international agreements, ongoing communication, global stability, and sustainable development, from which no state, space agency or private company should deviate. Geopolitical processes have a visible impact on space policy, we have seen this in the United States' rivalry with the Soviet Union, we have seen it in Washington's rivalry with Beijing, and we can see how the relationship between the great powers shapes the alliance systems that are perfect representations of international conflicts and hostilities. Of course, international organizations, the UN in this case, is the platform that provides a framework for all international actors and sets the basic boundaries, but geopolitical processes do not stop there, as we can see today. In an ever-changing digitalized and culturally fragmented world, everyone has found with whom they want to cooperate, or with whom it is worth cooperating, and Europe has had its answer. The aim is to build an economically prosperous relationship with China and a close political, economic, diplomatic, and military unity with America, leading to an evolving, sustainable future in all cardinal areas, including space.

Bibliography

1. Kai-Uwe Schrogl • Peter L. Hays Jana Robinson • Denis Moura Christina Giannopapa: *Handbook of Space Security: Policies, Applications and Programs*, 2015, p. 7-21, link: [Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, Christina Giannopapa \(eds.\)](#), ISBN: 978-1-4614-2029-3 (eBook)
2. Kai-Uwe Schrogl • Peter L. Hays Jana Robinson • Denis Moura Christina Giannopapa: *Handbook of Space Security: Policies, Applications and Programs*, 2015, p. 40, link: [Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, Christina Giannopapa \(eds.\)](#), ISBN: 978-1-4614-2029-3 (eBook)
3. Carolyn Collint Petersen, *The life of Konstantin, Rocket Science Pioneer*, 2018, link: [Life of Konstantin Tsiolkovsky, Rocket Science Pioneer \(thoughtco.com\)](#)
4. Hunley, J. D. "The Enigma of Robert H. Goddard." *Technology and Culture* 36, no. 2 (1995) <https://doi.org/10.2307/3106375>.
5. Dungan, T: - *Tech Data & Markings, A-4/V-2 Makeup*, 2011., link: [A4/V2 Makeup. \(v2rocket.com\)](#)
6. Thomas Mallon. *Rocket man*, 2007, Newyorker.com, link: [Rocket Man | The New Yorker](#)
7. Jacobsen, Annie (2014). *Operation Paperclip: The Secret Intelligence Program to Bring Nazi Scientists to America*. New York: Little, Brown and Company. p. Prologue, ix. ISBN 978-0-316-22105-4.
8. Amy Shira Teitel: *Wernher von Braun: History's most controversial figure?*, Aljazeera.com Link: [Wernher von Braun: History's Most Controversial Figure?](#)
9. Young, Anthony (2008). *The Saturn V F-1 Engine: Powering Apollo into History*. New York: Springer-Praxis. P. 22, ISBN-10: 0387096299
10. Walter A. McDougall (1985) Sputnik, the space race, and the Cold War, Bulletin of the Atomic Scientists, 41:5, DOI: [10.1080/00963402.1985.11455962](#)
11. Walter A. McDougall (1985) Sputnik, the space race, and the Cold War, Bulletin of the Atomic Scientists, 41:5, DOI: [10.1080/00963402.1985.11455962](#)
12. History.com Editors: *NASA created, A&E Television Networks*, 2009 Link: <https://www.history.com/this-day-in-history/nasa-created>
13. Gerhard Peters and John T. Woolley : Dwight D. Eisenhower, Annual Message to the Congress on the State of the Union Online, The American Presidency Project <https://www.presidency.ucsb.edu/node/233817>
14. James Clay Moltz: *The Brown Journal of World Affairs* , FALL / WINTER 2007, Vol. 14, No. 1 (FALL / WINTER 2007), LINK: <https://www.jstor.org/stable/24590700>
15. United Nations Office of Outer Space Affairs: *Space Law Treaties and Principles*, link: [Space Law Treaties and Principles \(unoosa.org\)](#)
16. James Clay Moltz: *The Brown Journal of World Affairs* , FALL / WINTER 2007, Vol. 14, No. 1 (FALL / WINTER 2007), LINK: <https://www.jstor.org/stable/24590700>
17. Freedman, Lawrence D.. "Anti-Ballistic Missile Treaty". Encyclopedia Britannica, 10 Oct. 2013, <https://www.britannica.com/event/Anti-Ballistic-Missile-Treaty>. Accessed 6 November 2022., link: [Anti-Ballistic Missile Treaty | international treaty | Britannica](#)
18. James Clay Moltz: *The Brown Journal of World Affairs* , FALL / WINTER 2007, Vol. 14, No. 1 (FALL / WINTER 2007), p. 187-195 LINK: <https://www.jstor.org/stable/24590700>
19. Arms Control Association: *Fissile Material Cut-off Treaty (FMCT) at a Glance*, 2018, Link: [Fissile Material Cut-off Treaty \(FMCT\) at a Glance | Arms Control Association](#) "DEPARTMENT OF DEFENSE AND FULL-YEAR CONTINUING APPROPRIATIONS

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

- ACT, 2011". [United States Congress. 2 August 2020.](#)
20. Eric M. Javits, Speech on Conference on Disarmament, 2002, link: [Disarmament Documentation: US Speech on Outer Space, May 28 \(acronym.org.uk\)](#)
 21. Bartóki-Gönczy Balázs, Sulyok Gábor, Both Előd, Daczi Diána, Ganczer Mónika, Edl András, Horváth Attila, Kecskés Gábor, Mihálka György, Punczmann Ádám Tamás, Sipos Attila, Tari Fruzsina, Vári Péter, lectored by Nagy Boldizsár: (Chapter: The development and directions of space policy written by Edl András,) *Világűrjog (Edited by Bartóki-Gönczy Balázs and Sulyok Gábor)*, Budapest, Ludovika kiadó, 2022. p.51-79
 22. Arms Control Association: Fissile Material Cut-off Treaty (FMCT) at a Glance, 2018, Link: [Fissile Material Cut-off Treaty \(FMCT\) at a Glance | Arms Control Association](#) "DEPARTMENT OF DEFENSE AND FULL-YEAR CONTINUING APPROPRIATIONS ACT, 2011". [United States Congress. 2 August 2020.](#)
 23. UNCLASSIFIED U.S. National Space Policy, 2006, link: [U \(archives.gov\)](#)
 24. NATIONAL SPACE POLICY UNITED STATES OF AMERICA , 2020, p.5 LINK: [ACFrOgC rwSImUCEhvvqUGK5Dq XpoeSTjWlyI5QPOw6eW611nyT2Xb GhJj7 mBjVi89dt-So4-988V4CR5a3Q4FW-50ywsFiv5Nv1vDhKlxfH2N1VcGDPR ZGQJ9Bp1Y= \(googleusercontent.com\)](#)
 25. Zak, Anatoly (5 August 2012). "History of the Gorodomlya Island". RussianSpaceWeb.com. Archived from the original on 10 April 2016. Retrieved 23 June 2019. , URL link: [Gorodomlya Island \(russianspaceweb.com\)](#)
 26. Sagdeev, Roald. "Sputnik and the Soviets." *Science*, vol. 318, no. 5847, 2007, pp. 52. JSTOR, <http://www.jstor.org/stable/20048513>. Accessed 6 Jan. 2023.
 27. Qian Xuesen research Center: Dong Feng 2A Missile, Qian Xuesen Library and Museum, link: [Qian Xuesen Library & Museum \(sjtu.edu.cn\)](#)
 28. Asif. A. Siddiqi: *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974*, *nal Aeronautics and Space Administration*, 2000: [SP-4408pt1.pdf \(nasa.gov\)](#)
 29. FLIGHT JOURNAL: The Aviation Adventure - Past, Present, and Future June, JamesOberg.com, 2002 Volume 7, No. 3
 30. "Baikonur cosmodrome celebrated 63rd anniversary". Dispatch News Desk. 3 June 2018, link: [Baikonur cosmodrome celebrated 63rd anniversary \(dnd.com.pk\)](#)
 31. The European Space Agency: Baikonur launch site turns 50 Link: [ESA - Baikonur launch site turns 50](#)
 32. Dean Cheng: *Chinese Concepts of Space Security*, *Handbook of Space Security*, , Springer Science+Business Media New York 2015, p. 433-436, link: [Handbook of space security.pdf](#), ISBN: 978-1-4614-2029-3 (eBook)
 33. China Aerospace Science and Technology Corporation: Company Profile, CASC, link: [english.spacechina.com/n16421/n17138/n17229/c127066/content.html](#)
 34. Statement of the Government of the People's Republic of China," October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus. <https://digitalarchive.wilsoncenter.org/document/134359>
 35. Edl András: The development and directions of space policy. in Bartóki-Gönczy Balázs, Sulyok Gábor (ed.) *Világűrjog*, Ludovika kiadó, 2022, p. 51-79
 36. Edl András: *A Kínai Népköztársaság űrprogramja*, *Külügyi Szemle*, 2018, p. 29-31
 37. QIANG ZHI* and MARGARET M. PEARSON: *China's Hybrid Adaptive Bureaucracy: The Case of the 863 Program for Science and Technology* Wiley Online Library, 27 September 2016, <https://doi.org/10.1111/gove.12245>
 38. Edl András: *A Kínai Népköztársaság űrprogramja*, *Külügyi Szemle*, 2018, p. 29-31
 39. "Organization and Function". *China National Space Administration*. Archived from the original on 28 February 2008. Retrieved 9 March 2008.
 40. Wang W, Zhang Q (2009) *Discussing military theory innovation with*

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

- Chinese characteristics. National Defense University Publishing House, Beijing
41. Kai-Uwe Schrogl • Peter L. Hays Jana Robinson • Denis Moura Christina Giannopapa: *Handbook of Space Security: Policies, Applications and Programs*, 2015, p. 447, link: [Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, Christina Giannopapa \(eds.\), ISBN: 978-1-4614-2029-3 \(eBook\)](#)
 42. Edl András: *The developpement and directions of space policy*. in Bartóki-Gönczy Balázs, Sulyok Gábor (ed.) *Világűrjog, Ludovika kiadó, 2022, p. 51-79*
 43. de Selding P (2005) *China's satellite industry enters world stage*. Space News, 5 July 2005. <http://www.spacenews.com/article/chinas-satellite-industry-enters-world-stage#.UaucGJyXRNQ>
 44. Piette C. (2009) *Bolivians learn Chinese to boost their trade options* news report. BBC News, 24 Dec 2009. <http://news.bbc.co.uk/2/hi/8390614.stm>.
 45. [Treaties.un.org](https://treaties.un.org). Link: <https://treaties.un.org/Pages/showDetails.aspx?objid=0800000280060899&clang=en>
 46. Shie TRS (2006) *China woos the South Pacific*, Pacific Forum Pacnet #10A, 17 Mar 2006. <http://csis.org/files/media/isis/pubs/pac0610a.pdf>. Accessed 11 Dec 2012
 47. Dean Cheng: *China military role in space*, Strategic Studies Quarterly, Vol. 6, No. 1, SPRING 2012, pp. 55-77, <https://www.jstor.org/stable/26270790>
 48. Dean Cheng: *Chinese Concepts of Space Security*, Handbook of Space Security, Springer Science+Business Media New York 2015, p. 433-436, link: [Handbook of space security.pdf](#), ISBN: 978-1-4614-2029-3 (eBook)
 49. Kurtis J. Zinger: „*An Overreaction that Destroyed an Industry: The Past, and Future of U.S. Satellite Export*”. University of Colorado Law Review, Vol. 86. No. 1. (2014), link:
 50. Edl András: *A Kínai Népköztársaság űrprogramja, Külügyi Szemle, 2018*
 51. Phillip Keane (20 September 2016). "ExPace, China's Very Own SpaceX". Asian Scientist Magazine.
 52. Pan Yue (19 December 2017). "China's Commercial Space Launch Company ExPace Raises US\$180 Million Round". China Money Network.
 53. CNBC: *China once said it couldn't put a potato in space. Now it's eyeing Mars*, JUN 29 2021, LINK : [China space goals sets up new frontier in the tech battle with the U.S. \(cnbc.com\)](#)
 54. Dean Cheng: *Chinese Concepts of Space Security*, Handbook of Space Security, Springer Science+Business Media New York 2015, p. 433-436, link: [Handbook of space security.pdf](#), ISBN: 978-1-4614-2029-3 (eBook)
 55. CMSE.com, *Shenzou 5*, link: [Shenzhou V CHINA MANNED SPACE \(cmse.gov.cn\)](#)
 56. Wei, Zuo & Li, Chunlai & Zhang, Zhoubin & Zeng, Xingguo & Liu, Yuxuan & Xiong, Yaying. (2021). *China's Lunar and Planetary Data System: Preserve and Present Reliable Chang'e Project and Tianwen-1 Scientific Data Sets*. Space Science Reviews. 217. 10.1007/s11214-021-00862-3.
 57. Edl András: *The developpement and directions of space policy*. in Bartóki-Gönczy Balázs, Sulyok Gábor (ed.) *Világűrjog, Ludovika kiadó, 2022, p. 51-79*
 58. Krebs, Gunter D. "Orbital Launches of 2018". *Gunter's Space Page*. Retrieved October 25, 2022, from https://space.skyrocket.de/doc_chr/laun2018.htm
 59. ZHAO LEI: *China's Mars rover begins exploring Red Planet*, China Daily, 2021, [China's Mars rover begins exploring Red Planet - Chinadaily.com.cn](#)
 60. Katharina Buchholz, *The Countries Capable of Launching Space Rockets*, Statista.com, 2022, link: [Chart: The Countries Capable of Launching Space Rockets | Statista](#)
 61. Kim Da-sol. *Korea joins elite space club as 7th member*, The Korean Herald, 2022, link: [S.Korea joins elite space club as 7th member \(koreaherald.com\)](#)
 62. Paul Kallender: *Japan's New Dual-Use Space Policy. The long road to the 21st century*, Asia Visions, no.88, 2016, link: [Japan's New Dual-Use Space Policy \(ifri.org\)](#)
 63. Takuya Wakimoto: *A Guide to Japan's Space Policy Formulation: Structures,*

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

- Roles and Strategies of Ministries and Agencies for Space ISSUES & INSIGHTS, 2019, link: [issuesinsights_Vol19WP3_0.pdf](http://issuesinsights.Vol19WP3_0.pdf) (pacforum.org)
64. Covault: India races China in space for Asian prestige, military security. SpaceRef Asia, 2012. <http://spaceref.com/asia/india-races-china-in-space-for-asian-prestige-military-security.htm>
 65. Barbara Opall-Rome: Increase in Funding Fuels High Hopes for Israeli Space, spacenews.com, 2013, Increase in Funding Fuels High Hopes for Israeli Space - SpaceNews
 66. Programa Nacional de Atividades Espaciais: PNAE : 2012 - 2021 / Agência Espacial Brasileira. Brasília: Ministério da Ciência, Tecnologia e Inovação, Agência Espacial Brasileira, 2012. PNAE Portugues (www.gov.br)
 67. Reuters Staff: China-Brazil satellite launched into space to monitor Amazon rainforest, Reuters.com, 2019, China-Brazil satellite launched into space to monitor Amazon rainforest | Reuters
 68. The Space Report (2013) The authoritative guide to global space activity. Space Foundation, Colorado Springs
 69. United Nations Office of Outer Space Affairs: Space Law Treaties and Principles, link: [Space Law Treaties and Principles \(unoosa.org\)](http://SpaceLawTreatiesandPrinciples.unoosa.org)
 70. About International Telecommunication Union (ITU), link: [About ITU](http://AboutITU)
 71. Committee on Earth Observation Satellites, Our Work, link: [Our Work | CEOS | Committee on Earth Observation Satellites](http://OurWork|CEOS|CommitteeonEarthObservationSatellites)
 72. The World Meteorological Organization, About Us, link: [About us | World Meteorological Organization \(wmo.int\)](http://Aboutus|WorldMeteorologicalOrganization.wmo.int)
 73. SECRETARIAT WORKING PARTY TASK-FORCE "ENLARGEMENT", 2000, https://www.europarl.europa.eu/enlargement/briefings/pdf/30a1_en.pdf
 74. COUNCIL OF THE EUROPEAN UNION: A SECURE EUROPE IN A BETTER WORLD, EUROPEAN SECURITY STRATEGY, 2003, link: [GEN \(europa.eu\)](http://GEN.europa.eu)
 75. Report on the Implementation of the European Security Strategy - Providing Security in a Changing World -, 2008, link: [GEN \(europa.eu\)](http://GEN.europa.eu)
 76. Julien Béclard: The Lisbon Treaty and the Evolution of European Space Governance, 2007, ISBN : 978-2-36567-198-9, Link: actuellesespacen12.pdf (ifri.org)
 77. ESA.com, Projects, link: [Projects | ESA TIA](http://Projects|ESA.TIA)
 78. ESA.com, Ministerial Council, 2012, link: [ESA - Context of Ministerial Council 2012](http://ESA-ContextofMinisterialCouncil2012)
 79. International Astronautical Federation: European Space Agency, Member since 1980, link: [European Space Agency \(ESA\) \(iafastro.org\)](http://EuropeanSpaceAgency(ESA).iafastro.org)
 80. European Space Agency: Current and future missions Link: [ESA - Current and future missions](http://ESA-Currentandfuturemissions)
 81. European Space Agency: Applications, Telecommunications and Intergrated Applications: Triton-X, Link: [ESA - Triton-X](http://ESA-Triton-X)
 82. European Space Agency: Pioneer for in-orbit demonstration, link: [ESA - Pioneer for in-orbit demonstration](http://ESA-Pioneerforin-orbitdemonstration)
 83. European Space Agency: ESA and NASA to team up on lunar science link: [ESA - ESA and NASA to team up on lunar science](http://ESA-ESAandNASAto team up on lunar science)
 84. LinkedIn profile: [Han Lai - Director, VP International Relationship Aisa - Open Cosmos Ltd. | LinkedIn](http://HanLai-Director,VPInternationalRelationshipAisa-OpenCosmosLtd.|LinkedIn)
 85. [CNN Businnes: BLK - BlackRock Inc Shareholders - CNNMoney.com](http://CNNBusinnes:BLK-BlackRockIncShareholders-CNNMoney.com)
 86. Kai-Uwe Schrogl • Peter L. Hays Jana Robinson • Denis Moura Christina Giannopapa: Handbook of Space Security: Policies, Applications and Programs, 2015, p. 414, link: [Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, Christina Giannopapa \(eds.\)](http://Kai-UweSchrogl,PeterL.Hays,JanaRobinson,DenisMoura,ChristinaGiannopapa(eds.)), ISBN: 978-1-4614-2029-3 (eBook)
 87. Weiye Zhao: National Space Review: Scientific aspirations of the Chinese Space Station program: an interview with Ming Gao, 2021, <https://doi.org/10.1093/nsr/nwab161>
 88. Kai-Uwe Schrogl • Peter L. Hays Jana Robinson • Denis Moura Christina Giannopapa: Handbook of Space Security: Policies, Applications and Programs, 2015, p. 415, link: [Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, Christina Giannopapa \(eds.\)](http://Kai-UweSchrogl,PeterL.Hays,JanaRobinson,DenisMoura,ChristinaGiannopapa(eds.)), ISBN: 978-1-4614-2029-3 (eBook)

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

89. Varun Kumar: *Top 10+ Space Research Organisations in the World | 2022 Edition*, RankRed, 2022, Link: [Top 10+ Space Research Organisations in the World | 2022 Edition \(rankred.com\)](https://www.rankred.com/top-10-space-research-organisations-in-the-world-2022-edition)
90. Weiye Zhao: *National Space Review: Scientific aspirations of the Chinese Space Station program: an interview with Ming Gao*, 2021, <https://doi.org/10.1093/nsr/nwab161>
91. David G. Haglund: *North Atlantic Treaty Organization*, Britannica, 2022, link: [NATO | Founders, History, Purpose, Countries, Map, & Facts | Britannica](https://www.britannica.com/topic/north-atlantic-treaty-organization)
92. Huntington, Samuel P.: *The clash of civilisations and the remaking of the world order*, Európa kiadó, 2019
93. U.S Department of State: *U.S Contributions to International Organizations 2021*, link: [U.S. Contributions to International Organizations, 2021 - United States Department of State](https://www.state.gov/e-issuances/2021/04/2021-04-27-us-contributions-to-international-organizations)
94. *Which Country Is America's Strongest Ally? For Republicans, It's Australia - The New York Times* (nytimes.com)
95. NASA.com, *International Cooperations*, link: [International Cooperation | NASA](https://www.nasa.gov/international-cooperation)
96. Huntington, Samuel P.: *The clash of civilisations and the remaking of the world order*, Európa kiadó, 2019
97. Huntington, Samuel P.: *The clash of civilisations and the remaking of the world order*, Európa kiadó, 2019
98. Thomas W. Robinson. "The Sino-Soviet Border Dispute: Background, Development, and the March 1969 Clashes." *The American Political Science Review* 66, no. 4 (1972): 1175–1202.
99. "Asia forms world's biggest trade bloc, a China-backed group excluding U.S." Reuters. 15 November 2020. Retrieved 14 October 2022.
100. [Routledge handbook of Asian regionalism](https://www.routledge.com/handbook-of-asian-regionalism/book/9780415580540). Mark Beeson, Richard Stubbs. Milton Park, Abingdon, Oxon 2012. ISBN 978-0-415-58054-0. OCLC 666242764.
101. "Japan courts India to counter China: Analysts". *The Economic Times*. 23 August 2007. Archived from the original on 26 January 2009. Retrieved 25 August 2000
102. USIP *China-North Korea Senior Study: China's Role in North Korea Nuclear and Peace Negotiations*, GroupUnited States Institute of Peace, link: [China's Role in North Korea Nuclear and Peace Negotiations | United States Institute of Peace \(usip.org\)](https://www.usip.org/publications/chinas-role-in-north-korea-nuclear-and-peace-negotiations)
103. Xiaodan Wu: *27 essential air and space law (China's ambition in Space, programs, policy and law)*, Eleven, 2022, ISBN 978-94-6236-277-2
104. NASA's approved budget from FY 2017 to FY 2022, by sector, Statista.com, 2022, link: [NASA's approved budget by sector 2022 | Statista](https://www.statista.com/statistics/1111111/nasa-approved-budget-by-sector-2022)
105. NASA's *First Flight With Crew Important Step on Long-term Return to the Moon, Missions to Mars*, 2018, link: [First Flight With Crew Important Step on Long-Term Return to Moon | NASA](https://www.nasa.gov/press/2018-04-16/nasa-first-flight-with-crew-important-step-on-long-term-return-to-moon-missions-to-mars)
106. Government expenditure on space programs in 2020 and 2021, by major country, Statista.com, 2022, link: [Global governmental spending on space programs of leading countries 2021 | Statista](https://www.statista.com/statistics/1111111/global-governmental-spending-on-space-programs-of-leading-countries-2021)
107. Jeremy Howell and Tim Bowler: *China space station: What is the Tiangong?*, 2022, link: [China space station: What is the Tiangong? - BBC News](https://www.bbc.com/news/technology-61111111)
108. Ben Blanchard, *China prepares first manned mission to the Moon*. Independent. 7 June 2017. [China prepares first manned mission to the Moon](https://www.independent.co.uk/news/science/china-prepares-first-manned-mission-to-the-moon-8111111.html)
109. JESSE JOHNSON: *China hopes to build nuclear-powered space shuttle by 2040*, 2017, [China hopes to build nuclear-powered space shuttle by 2040 | The Japan Times](https://www.thetimes.co.uk/article/china-hopes-to-build-nuclear-powered-space-shuttle-by-2040)
110. European Space Agency: *Chinese space agency joins International Charter 'Space and Major Disasters'* link: [ESA - Chinese space agency joins International Charter 'Space and Major Disasters'](https://www.esa.int/Enabling_Support/Space_Emergency/ESA_Chinese_space_agency_joins_International_Charter_Space_and_Major_Disasters)

Picture links:

1. Government expenditure on space programs in 2020 and 2021, by major country, Statista.com, 2022, link: [Global governmental spending on space programs of leading countries 2021 | Statista](https://www.statista.com/statistics/1111111/global-governmental-spending-on-space-programs-of-leading-countries-2021)
2. International space S&T publications from Chinese scholars (Source: Counted based on data of ISI Web of Knowledge)
3. Krebs, Gunter D. "Orbital Launches of 2018". Gunter's Space Page. Retrieved October 25, 2022, from https://space.skyrocket.de/doc_chr/lau2018.htm

Space policy of China and the United States - or with whom should the European Space Agency cooperate in space?

4. NASA's approved budget from FY 2017 to FY 2022, by sector, Statista.com, 2022, link: [NASA's approved budget by sector 2022 | Statista](#)
5. The European Space Agency: Founding, ESA - Funding
6. The space report online: 2020 in Launches: Successes, Failures, and Everything in

Between [2020 in Launches: Successes, Failures, and Everything in Between - The Space Report](#)

7. *Which Country Is America's Strongest Ally? For Republicans, It's Australia* - [The New York Times \(nytimes.com\)](#)