

## THE GREAT POWER SPACE RACE: HOW THE US, RUSSIA AND CHINA COMPETING IN SPACE EXPLORATION

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### ABSTRACT

The modern space race among the Joined together States, Russia, and China is a complex marvel driven by a huge number of components, counting geopolitical control, financial interface, logical disclosure, national glory, asset utilization, colonization, inspiration, inventive headway, financial improvement, national security, worldwide participation, and long-term survival. This competition has driven to critical accomplishments in space investigation, counting lunar missions, space stations, carry programs, and heavy-lift rockets. The Joined together States, Russia, and China have accomplished momentous points of reference in space investigation, illustrating their mechanical capabilities and progressing human information. The Artemis program, lunar investigate stations, and heavy-lift rockets are confirmations to their inventive ability. Worldwide participation, such as the Universal Space Station program, has moreover encouraged collaboration and information sharing among nations. However, the space race has moreover been stamped by mischances and disappointments, coming about in the misfortune of lives and shuttle. These mishaps serve as a piercing update of the dangers and challenges inalienable in space investigation. In spite of these challenges, space organizations and private companies proceed to thrust the boundaries of space investigation, driven by the interest of logical disclosure, financial benefits, and national prestige. The benefits of space investigation expand past national interface, contributing to human headway and understanding of the universe. Space inquire about has driven to various spin-off advances, moving forward day by day life, commerce, and rousing future eras to seek after careers in science, innovation, building, and arithmetic (STEM).

**Keywords:** Space Race, Great Powers Competition, Space Based Assets, Space Administration, Private Industry, Global Politics and Relations, Space Approach.

### INTRODUCTION

**Definition:** Space is the boundless and nearly interminable three-dimensional field in which all matter and vitality exist, counting planets, stars, systems, and interglacial matter.

These are the characteristics of space. Space is essentially unbounded, with an assessed 93 billion light-years in diameter. This is extending, with universes moving absent from each other. This is a near-perfect vacuum, with greatly moo weight and temperature. This is bended, with gigantic objects distorting its texture (agreeing to Einstein's hypothesis of common relativity). The space has three measurements: length, width, and depth. These

are the components of space, the universes, stars, planets, space rocks, comets and dark gaps.

The great and powerful countries of the world, America, Russia and China have joined a new space race. These countries are interested in the race of space research to surpass each other in this race of space research. The space race has been a cornerstone of geopolitical competition and scientific progress for decades. America, Russia and China are growing from all over the world in this competition. Every country is expanding its frontiers of space research and development. From the beginnings of Sputnik and Apollo to the present era of international cooperation and private enterprise,

the space race has faced many tragic failures along with significant successes. This article explores the space race's history, issues, current state of the space race, global influence, technological progress, and its implications for resource exploration.

The following are the reasons for the interest of these countries.

Launching a new program in space is considered a sign of military capabilities and global influence. Space-based items such as satellite manufacturing launch rockets, space vehicles and all these services can generate significant income by selling them to other countries, thereby greatly benefiting and developing the country's economy. Scientific Research in Space It allows expanding knowledge and drawing conclusions by debating the previous issues of the universe. National prestige and security. There are vast resources such as energy sources and minerals in space that can play an important role in providing facilities to man in the future and meeting his needs.

Some countries have reached this level of research. They have said that they want to build permanent settlements for humans on the planets and their moons in space to prolong the survival of their nation and the human race. Space program Encourages future generations to pursue careers in developing fields. The space programs leads to new technological innovations. GPS, satellite communication and material science have greatly benefited the society. These developments have led to improvements in daily life and commerce. In this way, the establishment of new industries has also taken place.

Space research and the development of space-related industries such as satellite manufacturing and promoting space tourism pave the way for economic development. In this way, people get new jobs. It is very helpful by creating new employment opportunities for them. This could lead to the creation of new markets, including space tourism and resource extraction. Satellites in space are used to protect national borders, monitor military operations, send messages and communicate. They play a significant role in national security and prestige. Space research provides opportunities for international cooperation, developing diplomatic relations and establishing mutual relations between people.

Due to the current condition of the earth and climatic fluctuations, developed countries are planning to

explore and settle other planets. Space provides us with a vast and unique environment to conduct scientific experiments. Thus, our scientific experiments in space such as uranium deposition are very suitable for it.

These powerful countries of the world are standing in line of competition to excel each other in various aspects. In order to get ahead of each other and prove their superiority, they are developing their technology on a priority basis in order to achieve space goals. He has made a space history by performing prominently in the space field. Which we will review. But first, let's discuss the important issues on which they are trying hard to excel. These objectives are as follows.

The United States has the Artemis program. The aim of which is to send humans back to the moon by 2025. China and Russia are jointly working on a lunar research station. Which is the basis of the future planning of the moon. The United States leads the International Space Station (ISS) program. While China has launched the Tiantong Space Station. Russia is working on the Luna 28 mission to return soil samples from the southern side of the Moon.

China has made significant progress in long-distance landings with Chang'e 4. Russia's Luna 25 and Luna 26 missions are focused on lunar exploration. SLS is while China is developing the Changzheng 9 heavy lift rocket. Russia's Yenisei Super Heavy Lift Launch Vehicle is facing development challenges.

The United States has the largest space budget, estimated at \$8.9 billion in 2020. After that is China and Russia's budget is less than them. China has overtaken Russia. Compared to Russia's 17 launches, China has surpassed Russia with 35 successful launches. The United States leads the International Space Station (ISS) program. It has signed agreements with countries like Australia and Japan. While China and Russia are cooperating in moon research. Because Russia is also working with the EU on projects like the Exo Mars mission.

This new space race reflects the geopolitical tension and competition between the three countries, which has potential implications for global influence, technological development and resource exploration. After reviewing the above objectives. We briefly review the space history of the three countries America, Russia and China.

The United States won the space race the day it landed its first man on the moon in 1969. Neil

Armstrong was the first person to walk on the surface of the moon. He was accompanied by two other companions, one Edwin “Buzz” Aldrin who joined Neil Armstrong on the lunar surface. While his other partner Michael Collins was orbiting the moon in his spaceship Apollo 11. This scene of stepping on the moon was shown live on television around the world. According to an estimate, around 723 million people around the world watched this scene live on television.

After these great countries America, Russia and China, 22 European countries with the multinational collusion (ESA) European Space Organization, Norway, Denmark India, Japan, France, Australia, Brazil, Iran, Israel, Kenya South Korea, North Korea and Ukraine entered in the field of space research.

### **What we want to discuss in this article?**

In this article, we will consider the following points and discuss them thoroughly. What is definition and characteristics of space? We will also apply research methodology on this topic. What are the reasons for space exploration? We know the beginning of America’s space research and its history. What achievements were made? When did Russia take the first step in the field of space research and what achievements did it achieve? What are the achievements of China in its space research and how many achievements have been achieved? What were the successes and failures of these three great powers during space exploration? Which country won in the field of space research? After these three great countries America, Russia and China, which country entered the field of space research? What theory applies to this research? Keeping all these issues in mind, the research on this subject will be carried forward.

### **What research methodology is applied to this article?**

The content shows up to be a comprehensive outline of the space race between the Joined together States, Russia, and China, covering their accomplishments, penances, and current endeavors. We apply four types of research methodologies on this article: realism, national interest, historical research and comparative research. Now we know about these research methodologies. How are these methodologies applied?

**Realism:** The content highlights the competition and geopolitical pressures between the three nations,

reflecting the realist viewpoint of worldwide relations.

**National Interest:** The content emphasizes the interest of national interface, such as military capabilities, worldwide impact, asset investigation, and national glory, which is a center guideline of realist theory.

**Historical Research:** The content gives a point by point history of the space programs of the three nations, counting their points of reference, accomplishments, and setbacks.

**Comparative Research:** The content compares the accomplishments and budgets of the three nations, highlighting their qualities and weaknesses.

### **MAIN DISCUSSION:**

#### **Space Research Achievements:**

America’s 1959 to 1963 Project Mercury, in which Alan Shepard became the world’s second and America’s first astronaut in 1961. Project Gemini 1961 to 1966 carried out long-duration flights with 10 crew members, focusing mainly on spacewalking and docking. Apollo 1961 to 1972 Apollo 11 successfully landed astronauts on the lunar surface in 1969. Skylab 1973 to 1974 America’s first space station. Space Shuttle Program 1981 to 2011 A reusable spacecraft that carries crews and equipment to Low Earth and Bit.

The United States has released the International Space Station from 1998 to date with the participation and cooperation of other countries. The current US program is NASA’s Artemis program, which aims to send humans back to the moon by 2025, while private companies such as Space X and Boeing are developing new spacecraft for various purposes in space.

October 4, 1957, the USSR successfully launched Sputnik One into orbit around the Earth. November 3, 1957, Sputnik 2 was launched. Sputnik 2 carried a dog named Lika into space. Thus, the USSR became the first generation. Who sent an organism into space. April 12, 1961, Yuri Gagarin became the world’s first astronaut to make a single orbit around the Earth. June 16, 1963 Valentina Tereshkova became the first woman astronaut who spent almost three days in space.

March 18, 1965 Alexei Leonov made the first spacewalk in space. In 1971, the USSR launched the first space station. Some parts of it later became core parts of ISS. In 1975 The first operational Apollo Soyuz mission was launched. Thus the space race

symbolically ended. In 1986 Launched the Mir space station has six modules that can support the crew and machines for long periods of time. In October 2000, the first ISS mission was delivered by the Soyuz spacecraft. 2022 Russia announced important projects in cooperation with China, in which Russia will build an outpost orbiting the Earth. And by the middle of 2030, Russia and China will also build a joint base on the moon.

Now we examine China's space. China launched a sounding rocket carrying animals in 1964 to study the effects of space travel. China launched its first satellite in 1970 named Dong Fang Hong I. China launched its first recoverable satellite in 1975, Fanhui Shi Weixing. The Chinese government funded 863 programs in 1986, including science technology and space capabilities. In 1992, China approved the Manned Space Program, the purpose of which was to develop human space travel and space flight capabilities. In 1993, the China National Space Administration (CNSA) was established.

The first unmanned spacecraft was launched in 1999. 2003 Yang Li became the first astronaut to go into space with Shenzhou 5 Mission. In 2005 Shenzhou Mission Six flew for the first time with multiple crew members for a multi-day stay. Was launched in 2011 from the Tiangong space station. In 2021, China started construction of Tiangong space station. The construction of Tiangong was completed in 2022. In 2024, China announced plans to conduct 100 space missions, including satellite launch testing, crew replacement, cargo transport, and more.

### **China's Great Achievement:**

China's Chang'e-6 mission was propelled on May 3, 2024. It consisted of four spacecraft, an orbiter, a lander, an ascent vehicle, and a re-entry capsule, whose task was to collect samples, launch them, and detonate them to load them into the resender. Chang'e 6 landed inside the Mongolian desert on Tuesday, June 25, 2024, after a nearly two-month long mission. Chinese scientists were eagerly waiting for Chang 6. That it can answer their questions. How are planets formed?

Now China has become the only country which has landed far on the surface of the moon. Earlier, China has done this in 2019 as well. Thus, it is very difficult to reach the surface which is very far from the earth. Since of its separate and its troublesome territory and few level surfaces, it has gotten to be more troublesome. Since it has not been found some time

recently and no investigate has been done on it. Therefore, Chinese scientists were more interested in this aspect. It is expected that there may be traces of snow. Which water can be gotten for oxygen and hydrogen?

The Chang'e-6 mission to the Moon is a source of pride for the Chinese nation, which has accelerated its mission to the Moon. This mission has also attracted the attention of China's rival America. Because China's official media has shown the staff there putting up the Chinese flag after the successful landing of the Chang'e Six capsule in the Mongolian desert.

Later, Chinese President Xi Jinping congratulated all the personnel and personnel present at Chang'e-6's Mission Command Center over the telephone. Mr. Xi expressed his good wishes to them and expressed his wish that we will continue deep research in space. So that we can uncover the hidden secrets of the universe. Thus our research will continue. We will continue our research and reach greater heights. So that humanity can benefit and the Chinese nation can move forward and develop.

### **High Cost of Failures in Space Travel:**

All the three countries have worked hard to achieve the above achievements. Behind his achievements is a long list of many sacrifices due to which he has achieved these achievements. These sacrifices are not only financial but also personal. In order to achieve these achievements, these countries invested large budgets at the national level, which were wasted in hundreds. Many aircrafts, satellites, space shuttles and space rockets have been destroyed and scattered within a few kilometers after being launched from the earth.

Some of them were destroyed during the return landing because the landing was not correct and in some the crew was also killed. In this way, many lives have been lost, and after repeated attempts and failures, the success that is achieved is the happiness on the faces and the determination to plan for the future by compensating for the previous loss. We now present a brief overview of the accidents that made these achievements possible.

On April 19, 1971, the Soviet Union launched the first ever space station, Salyut One. A few days later, the Save 10 mission failed due to a problem with the docking hatch. Then on June 6, 1971, Saves 11 was launched. In which three astronauts Georgy Dobrovolsky, Viktor Patsayev, and Valdislav

Volkov became the first men to ride on the station orbiting the earth. All three died from decompression caused by the opening of a valve during the initial descent, which created a vacuum in the space. There were only three people who died in space. In April 1967, Vladimir Komarov was killed when the capsule crashed into the ground at high speed after the parachute failed to open properly. Michael J. Adams died during X-15 flight 3-65-97 in November 1967. When X-15 spin into match 5 on re-entry at an altitude of 266000 feet. The Space Shuttle Challenger disasters In January 1986, the crew of the Space Shuttle Challenger were killed when the space shuttle disintegrated 73 seconds after lift-off at an altitude of 15 km. In February 2003, Space Shuttle Columbia disintegrated during re-entry after a thermal protection system was damaged at an altitude of just less than 65 km, returning from its two-week mission. Seven crew members also died in it. Apollo 1 Gus Grissom, Edward White, and Roger Chafee were killed when their spacecraft burst into flames during an important ground test. The Virgin Galactic Spaceship's two pilots were killed when the spacecraft crashed during a test flight.

#### **Cold War:**

The space war refers to the growing competition and tension between the US, Russia and China in space. These three countries are increasing their technological capacity and development to lead the space research race. Although this war is not a traditional cold war with direct military confrontation. Rather, it is a battle of far-reaching research and ideological differences. We describe the important aspects of the space cold war in the following.

In which the development of space technology, in the field of space research, the three countries are looking for ways to find other space bodies in space apart from the Moon and Mars. All three countries are developing the latest satellite technology capabilities. The United States and Russia operate the International Space Station while China has its own Tiananmen 1 space station. All three are selling their military space capabilities. This includes anti-satellite weapons and sensors.

This Cold War also included the struggle for influence in shaping international space governance and regulations. Because space achievements are used to demonstrate national prestige, power and ideological superiority. This space cold war has

important implications for global politics, security and the future of space exploration. As these three countries are developing their space capabilities. The competition is likely to be tougher and faster with the results that will be obtained for the pursuit of international relations and space-based interests.

#### **The Early 1950s:**

October 4, 1957 The USSR launched the first satellite. It was released into Earth's orbit on November 3, 1957. For the first time, a living dog named Lika was sent into space. On January 31, 1958, the United States successfully launched its first American satellite, Explorer 1. The National Aeronautics and Space Administration (NASA) was established in the United States on October 1, 1958.

#### **Moon Race 1960:**

On January 2, 1959, the USSR's Luna 1 mission became the first spacecraft to fly to the Moon. On September 14, 1959, the USSR's Luna 2 became the first spacecraft to touch the surface of the Moon. On April 12, 1961, the USSR sent the first man Yuri Gagarin into space through Stoke One. On May 5, 1961, the American citizen Alan Shepard was sent into space by Mercury Redstone 3. Alan Shepard became the first American astronaut to go into space. On August 11, 1962, the USSR sent Pavel Povitch into space via Vostok 4 to communicate with Gagarin. On June 16, 1963, the USSR launched the first female cosmonaut, Valentina Tereshkova, into space with Vostok 6. Sent On March 18, 1965, the United States launched Apollo 11, which successfully landed Neil Armstrong and Edwin "Buzz" Aldrin on the surface of the moon, becoming the first humans to walk on the surface of the moon.

#### **Other important events:**

On October 12, 1960, the USSR launched Corbel Sputnik 1, carrying dogs Belka and Strelka, who became the first animals to orbit and return safely On May 5, 1961, the United States launched Mercury Redstone 3. By sending Alan Shepard into space, Alan Shepard became the first American in space. On August 27, 1962, the United States launched Mariner 2, which became the first spacecraft to fly by Venus. On June 3, 1965, the United States launched Gemini. 4 sent into space with American astronaut Advt. Edward is the first American astronaut to walk in space. On March 16, 1966, the United States

launched Gemini 8, which made the first docking in space.

### **Space Race Propaganda and Impact:**

The US, Russia and China use their space achievements for political and ideological propaganda. The space race fuels technological innovation. Space propaganda refers to the creation and dispersion of information, ideas, opinions and stations on space exploration trip or space related motifs. Frequently impacting public opinion or shaping public programs can involve creating a sense of public pride or identity linked to and associated with space achievements. Space propaganda can take numerous forms. Exemplifications include visual trades, media, collaboration, political rhetoric, social media, online content, education and outreach. The ethics of space propaganda can vary extensively depending on the individualities and associations involved. But common pretensions for space programs and policies include erecting public support, fostering a sense of public pride or identity associated with space achievements, and encouraging interest and engagement. Creating enthusiasm and a sense of pride about space exploration in STEM sectors influences decision-making on space-related topics and public policies. Although the term propaganda may have a negative connotation. But most space propaganda aims simply to educate and promote a sense of space exploration excitement.

Space propaganda between America, Russia and China is a complex and multi-faceted situation. In which each country uses different tactics to promote its space programs and achievements as well as contend with the narratives of its competitors. America has always played the part of a leader in space research. It has used its space program as a symbol of public pride and technological prowess. NASA's achievements are delicate to quantify and assess. But NASA celebrates its successes with hype. NASA's achievements similar as Apollo, the moon wharf and the International Space Station were celebrated with massive hype.

Still, in recent years, the United States is facing adding competition from Russia and China. Who have made significant progress in their space programs. Russia is advancing its space program to demonstrate its prevalence in innovative capabilities and military control. Russia is pressing its achievements in areas similar as launch vehicles,

spacecraft design and space disquisition. Russia is also using its space program to promote its public identity and challenge US dominance in space.

On the other hand, China has quickly progressed its space program. He has achieved significant achievements in the fields of moon exploration fly station and satellite technology. China's space program is seen as an important aspect of its national development strategy. This country is promoting its efforts and achievements to showcase its technological capabilities and growing global influence.

In terms of space propaganda, the three countries of America, Russia and China have been engaged in various forms of public relations marketing and information warfare. It uses social media, state-controlled media outlets and other channels to publicize its space programs and achievements. For example, it has been accused of using disinformation and propaganda to undermine the US space program and promote its achievements. Likewise, China has been accused of using its state-controlled media to promote its space program and downplay the achievements of other countries.

In general, the space purposeful publicity between the US, Russia and China reflects the complicated geopolitical flow in the space domain. As the space programs evolve and progress against these countries, propaganda efforts are likely to intensify. This will highlight the importance of space as a domain of competition and cooperation in the 21<sup>st</sup> century.

**Affects generations:** It is a symbol of their national pride. The space race also increases military spending and the nuclear arms race. The space race led to international collaborations such as the Apollo Saves Test Project in 1975.

### **Conclusion:**

In the end, this space race between the US, Russia and China is a reflection of their personal goals, geopolitical tensions, global influence, technological advancements and superiority in resource exploration. Despite facing countless challenges, sacrifices and failures, every country has achieved significant and countless successes in this space research race. The United States has a long history of space exploration, beginning with Project Mercury in 1959. After that, the Gemini and Apollo programs began, which not only successfully landed

astronaut Neil Armstrong and his two colleagues on the surface of the moon, but the world saw him step and walk on the moon.

Russia has achieved commendable achievements, including the launch of the first satellite, Sputnik, and the first man Yuri Gagarin into space. China has made rapid progress in space research, which began in the 1970s. After that, in 2003, he made his first human space flight and established his own space station, Tiantong. Winning the current space race is not just about space exploration, but it is also about demonstrating military capabilities, economic power and national prestige. The development of space-based technologies has also yielded significant economic benefits. It includes establishment of new industries, creation and employment opportunities. International and diplomatic relations and mutual understanding between nations are fostered by this space exploration race.

As the space race continues. It is very important that we remember the sacrifices of astronauts, engineers and scientists who contributed their lives to the advancement of space exploration. Their heroic determination and enthusiasm paved the way for future generations to peer into the vastness of space and to discover and understand new things in them. This space race is not only a competition between nations but also a symbol of human curiosity and the pursuit of knowledge. Because the fruits of space research are not only limited to these three countries but it will be beneficial for the people of the whole world.

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