

GREAT DECISIONS

1918 • FOREIGN POLICY ASSOCIATION

HIGH SCHOOL

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TEACHERS:
CHECK OUT
THE BACK PAGE

THE NEW SPACE RACE

HUMANS HAVE ALWAYS BEEN FASCINATED WITH WHAT LIES BEYOND OUR PLANET. WHAT'S NEXT IN THE AGE OF SPACE EXPLORATION?

TO THE MOON
AND BACK

BILLIONAIRES
IN SPACE

EXPLORATION...
AT WHAT
COST?

THE FUTURE OF
SPACE
TRAVEL



BY SANDY ONG



TO THE MOON

Astronaut Buzz Aldrin walks on the moon in 1969. This photo was taken by Neil Armstrong, who became the first person to set foot on the moon, just before Aldrin.

On the night of October 4, 1957, an object entered Earth's orbit, forever changing the course of history. Weighing 184 pounds and roughly the size of a beach ball, the polished metal sphere's unassuming appearance belied its true significance. Sputnik 1, built by the Soviet Union (U.S.S.R), marked the world's first **satellite** built by humans. It also heralded

the beginning of the space race.

Relations between the U.S.S.R. and the U.S. were fraught. The rival superpowers had been flexing their technological, economic, and military might in a bid to prove which ideological system—**communist** or **capitalist**—was the superior one. Sputnik pushed this battle, which was known as the **Cold War**, into a new arena: space.

Over the next decade, the two nations raced to be the first to reach new milestones in space exploration. The U.S., initially caught off guard by Sputnik's launch, quickly took several steps to boost its spaceflight capabilities. The National Aeronautics and Space Administration (NASA), for instance, was set up just a year later.

A Timeline of the Space Race

1950

Oct 4, 1957

The space race begins when the U.S.S.R. launches Sputnik 1, the first artificial satellite to orbit Earth.

Nov 3, 1957

Laika, a Soviet dog, is the first animal in space.

Jul 29, 1958

NASA is founded.



1960

Apr 12, 1961

Soviet cosmonaut Yuri Gagarin becomes the first human in space.

1961

The U.S. begins the Apollo program to send humans to the moon.

A GIANT LEAP

For the first half of the space race, the U.S.S.R. was considered to be in the lead. It accomplished many firsts, including putting the first man and woman into space, as well as conducting the first spacewalk. But a major turning point occurred in May 1961, when U.S. President John F. Kennedy announced to Congress the goal of “landing a man on the moon and returning him safely to Earth” within a decade. This raised the stakes of the space race.

Kennedy’s vision was realized on July 20, 1969, when astronaut Neil Armstrong became the first man to walk upon the lunar surface, famously declaring: “That’s one small step for man, one giant leap for mankind.” The event—watched by an estimated 650 million people across the planet—marked the climax of space exploration. It was also widely considered the end of the space race.

A MORE CROWDED SPACE

Today, space exploration has come a long way from earlier times. For a start, the Cold War adversaries are no longer the only players involved. More than 70 countries—including Brazil, [India](#) , Japan, Mexico, and the United Arab Emirates (UAE)—now boast space programs.

[China](#) has emerged as a [front-runner](#)  in the new space race. In the past three years, it has successfully landed a probe on the far side of the moon (a world first); brought back lunar rock and soil samples (the first to do so since the Soviets in 1976); and put a rover on Mars.

China is currently in the midst of constructing its own space station, called Tiangong, “Heavenly Palace,” which is due to be completed later this year.

PRIVATE PLAYERS

Today, space exploration isn’t just limited to countries. Since the early 2000s, many private companies have also entered the fray. There are now startups in every sector

of the space industry, developing technology ranging from satellite communications to life-support systems, deep space photography to plasma-thrusters.

But creating such technology doesn’t come cheap. Many startups receive government funding, especially in their initial stages. A report by the investment firm Space Angels revealed that the U.S. government invested \$7.2 billion in 67 space companies between 2000 and 2018. A majority of that funding went to companies trying to launch rockets.

Many startups also receive funding from venture capital firms and wealthy individuals. These include the three most prominent

THE DEBATE

SHOULD A COUNTRY OWN THE PLACES ITS SPACECRAFT LAND?

YES

- ✓ They spent a lot of time, energy, and resources getting there, and therefore have a right to claim it.
- ✓ There are more than enough planets, moons, and asteroids to go around.
- ✓ The Outer Space Treaty, which was implemented in 1967, is outdated.

NO

- ✗ Space belongs to all of humanity and should remain neutral territory.
- ✗ Only rich nations will be able to afford to make claims on space, since they are the ones that can afford to support space research and travel.
- ✗ The Outer Space Treaty, an international law, states that no nation can “own” space, the moon, or any other body.



Jun 16, 1963

Valentina Tereshkova (above) becomes the first woman and civilian in space.

1970

Jul 20, 1969

The U.S. becomes the first country to land humans on the moon.

1980

Jul 15, 1975

The symbolic end to the space race occurs when the first cooperative Apollo-Soyuz mission launches.

1990

1998

The United States and Russia begin working together to build the International Space Station.





Clockwise: Facundo Arrizabalaga/EPA/Shutterstock; Paul Hennessy/SOPA Images/LightRocket/Getty Images; Joe Raedle/Getty Images

Jeff Bezos (bottom left), Richard Branson (top), and Elon Musk (bottom right) were all billionaires from other business ventures before launching their space exploration efforts.

firms: SpaceX (headed by business magnate and Tesla CEO Elon Musk); Blue Origin (led by Amazon tycoon Jeff Bezos); and Virgin Galactic (founded by British entrepreneur Richard Branson).

Each of these companies and founders has a slightly different goal. Musk wants to use SpaceX to colonize Mars and make humanity an interplanetary species. Bezos states that he founded Blue Origin because “humanity will need to expand, explore, find new energy and material resources, and move industries that stress Earth into space.” Meanwhile, Branson wants to make space tourism a reality. He

has said “I really hope that there will be millions of kids all over the world who will be captivated and inspired about the possibility of them going to space one day.”

Private players like these have helped pushed the envelope further on space flight and technology. All three companies, for instance, have developed **reusable rockets** and launch systems—resulting in drastic cost savings.

SpaceX is also helping to support NASA missions. Since 2020, its rockets have been used to ferry astronauts and supplies to and from the International Space Station (ISS). And as part

of NASA’s Artemis program, the firm is now working to develop a human lander that will take the first woman and person of color to the moon by 2025.

SPACE TOURISM

The entry of private companies into the space arena has spurred another major change: space tourism. Since July 2021, Blue Origin has operated short flights carrying paying passengers past the **Kármán line**, the internationally recognized boundary of space. SpaceX followed suit in September, launching four tourists on a three-day journey through Earth’s orbit, in what was the world’s first all-civilian spaceflight. In December, it flew Japanese tycoon Yusaku Maezawa and his assistant to the ISS for a 12-day stay.

For now, tickets to space remain out of reach for all but the very wealthy. SpaceX, for instance, is taking three passengers to the ISS this year for a price of \$55 million each. Virgin Galactic, which will begin commercial flights in early 2023, charges \$450,000 for a trip to the edge of space and back. Nevertheless, demand is high, with more than 700 tickets already snapped up.

Some have argued that this kind of space travel is wasteful. In

Elon Musk wants to use SpaceX to colonize Mars and make humanity an interplanetary species.



Courtesy Virgin Galactic

Designed for tourism rather than advanced space exploration, Virgin Galactic’s “spaceplanes” are able to take off and land like standard airplanes while also traveling into space.

July 2021, Democratic Representative Earl Blumenauer of Oregon proposed a tax on commercial space travel. “Space exploration isn’t a tax-free holiday for the wealthy,” he said. “Just as normal Americans pay taxes when they buy airline tickets, billionaires who fly into space to produce nothing of scientific value should do the same, and then some.”

ENVIRONMENTAL IMPACT

The new flurry of space activity is exciting, but it comes with a downside. With each launch, rockets emit a variety of harmful substances. Burning carbon-based fuels such as kerosene or methane, for instance, releases soot into the upper atmosphere. Once there, this soot absorbs solar radiation and blocks sunlight from reaching Earth. Solid rocket motors also spew out shiny alumina particles that reflect sunlight back into space, further exacerbating the phenomenon.

Additionally, rocket fuels produce water vapor and nitrogen

oxide, harmful byproducts that can deplete the ozone layer. “While we do obviously need space launches and satellites, when it comes to things like space tourism, you start thinking about the environmental impact,” says Ian Whittaker, a lecturer in space physics at Nottingham Trent University in the U.K.

Although there are currently far less space launches than com-

mercial plane flights, the former’s impact on the environment is significantly higher. For example, the carbon footprint of enjoying a few minutes of weightlessness equals that of flying across the Atlantic. But current laws restrict the U.S. government from regulating space travel until 2023.

TO MARS AND BEYOND

It has been more than 60 years since the space race kicked off, and the nature of the game has changed tremendously since then. While returning humans to the moon and setting up a lunar base remains the target of many countries—including the U.S., [China](#), [Russia](#) , and the UAE—there are also plans to go much further into space.

All four countries have announced intentions to send astronauts to Mars in the 2030s. Lunar bases will serve as a stepping-stone in this ambitious

THE DEBATE

DO THE BENEFITS OF SPACE EXPLORATION OUTWEIGH THE COSTS?

YES

- ✓ There are vastly more commercial plane flights than space launches.
- ✓ Space explorations offers us a plan B against the devastating effects of climate change.
- ✓ There is no guarantee that money cut from space exploration would be diverted to dealing with social, economic, and environmental issues.

NO

- ✗ The carbon footprint of space travel is much higher than flying by plane.
- ✗ We should try and repair this planet before finding somewhere else to live.
- ✗ The money could be better spent improving lives on Earth.



19 Studio/Shutterstock



Courtesy Blue Origin

Blue Origin's New Shepard spacecraft is named for Alan Shepard, who in 1961 became the first American to travel to outer space.

intergalactic leapfrogging. Private companies such as SpaceX also have ambitions of making it to Mars.

Apart from sending humans into space, governments and private firms are exploring other

parts of the universe. For example, when NASA's probe Lucy arrives at the Trojans, a set of asteroids near Jupiter, in 2027, astronomers hope it will help unlock secrets of the early solar system.

The hunt for extraterrestrial

life also persists. To that end, NASA is sending a space probe to Saturn's largest moon, Titan, to search for life—past or present. Another ongoing project is that funded by Israeli-Russian billionaire Yuri Milner, who hopes to send tiny devices bearing cameras and transmitters to Alpha Centauri, the star system closest to Earth.

WHAT CAN YOU DO?

Space exploration can be beneficial to humanity in many ways, but it can have some harmful consequences. Here are some steps you can take:

- **Read** reliable news sources to learn about how governments and companies are exploring space.
- **Investigate** companies to see why they are keen to invest their money in the field. This way you can make well-informed decisions about whether to support them or not.
- **Study** STEM topics if you are interested in working for NASA or a private space company. NASA also offers a number of educational programs for young people interested in space travel.
- **Write** or **call your elected officials** to let them know what you think about space exploration and its surrounding issues.
- **Vote**, when you are old enough. With few exceptions, you can't vote until you're 18. But in many states, you can register at 16 or 17, which means you'll be all set when 18 rolls around.

THE DEBATE

SHOULD SPACE EXPLORATION BE PRIVATIZED?

YES

- ✓ Private companies' efforts can lead to increased innovation, which will benefit everyone.
- ✓ It will accelerate the rate of progress and discovery.
- ✓ It opens up the possibility of space tourism and makes space more accessible to civilians.



NO

- ✗ There are no checks limiting the actions of private companies.
- ✗ Unlike governments, private entities are looking to maximize profits.
- ✗ Certain aspects of science exploration, such as landing on an asteroid or building a telescope, may not get funded if they aren't deemed profitable.

Harun Ozmen/Shutterstock

TEEN TRAILBLAZERS

Oliver Daeman

Dutch teenager Oliver Daeman, 18, has been “fascinated by space, the moon, and rockets” since he was a child. In July 2020, he became the youngest person to travel into space. Daeman was on board Blue Origin’s first human spaceflight, after his father, the CEO of a private equity firm, secured a seat by paying an undisclosed sum. After his journey, Daeman said: “Let’s hope many more people can do this, because it’s so amazing.”



Oliver Daeman

Courtesy Blue Origin

Kartik Pingle and Jasmine Wright

One way to discover **exoplanets**—those that orbit stars outside the solar system—involves examining how the brightness of a star changes with time. “The idea being that if the planet transits the star, or passes in front of it, it would [periodically] cover up the star and decrease its brightness,” explains 16-year-old Kartik Pingle. He learned how to apply the technique to satellite data



Jasmine Wright



Kartik Pingle

Courtesy Jasmine Wright and Kartik Pingle

while participating in a year-long research program at the Center for Astrophysics, Harvard & Smithsonian, in Massachusetts. He and fellow teen Jasmine Wright, 18, discovered four new exoplanets—three resembling Neptune and one similar to Earth—orbiting a bright star roughly 200 light-years away. In 2021, they published an [article](#) describing their findings.

Adia Bulawa and Sarina Kopf

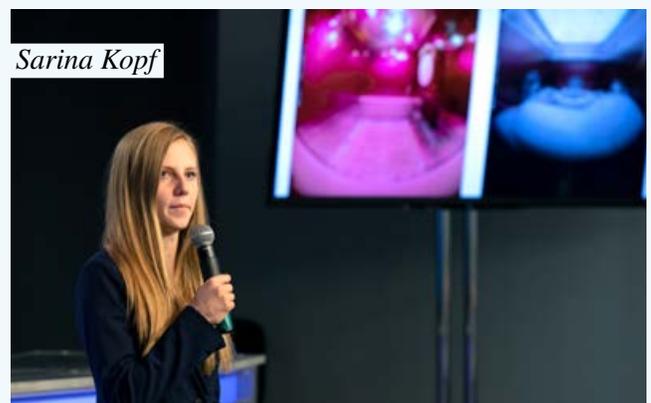
In 2018, the ISS U.S. Laboratory hosted its inaugural Guardians of the Galaxy Space Station Challenge, a competition aimed at inspiring teens to design experiments that can be conducted in **microgravity**. The 18-year-old winners, Adia Bulawa and

Sarina Kopf, had their projects performed by astronauts aboard the ISS. Bulawa’s project, inspired by her dentist, involved investigating what happens when dental glue is exposed to UV light in space. On Earth, the glue usually hardens over a filling or a broken tooth. Kopf, together with four teammates, wanted to study how to grow food aboard a spacecraft. They designed a special watering device that would help plant roots absorb water from mist—an alternative to watering plants in the absence of gravity or soil.



Adia Bulawa

NASA



Sarina Kopf

NASA



David Gomberg/CartoonStock

"I'M THINKING THIS MIGHT BE A GOOD AREA TO SET UP BASE CAMP."

MONEY ON THE MOON

1. What is this cartoon trying to say about the new space race? Do you agree? Why or why not?
2. What are the potential upsides and downsides of allowing companies to do business in outer space?
3. How soon, if ever, do you think it will be possible for the average person to travel into space on vacation?

NOW IT'S YOUR TURN TO MAKE GREAT DECISIONS

1. What do you think are the most important potential benefits of space travel and exploration?
2. What, if anything, should the U.S. government be doing differently with its space program today?
3. **YOUR STORY:** Would you travel into outer space if you had the chance? Why or why not?

KEY WORDS & TERMS

capitalist
Cold War
communist

exoplanets
Kármán line
microgravity

reusable rockets
satellite



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