



DELEGATE BACKGROUND GUIDE

# THE HUMANITY BEYOND MARS 2050

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## Director's Letter

Dear Delegates,

It is with great pleasure and excitement that I welcome you to TMUN 2023! My name is Yuqing Zhou, and I am ecstatic to be serving as your director for *The Humanity Beyond – Mars 2050* crisis committee. I am currently a secondary 4 student living in Montreal, Quebec. I have been involved with Model UN since 2020 and after attending various conferences, I can say that MUN is one of my biggest passions and has been a significant part of my life for the past few years.

Here, I am joined by Arhant Karthikeyan who will be serving as the chair of this committee. He is studying in grade 10 at Alexander Mackenzie High School. Further, I also present to all of you the amazing crisis staffers, Emily Luo and Andy Zhang. Emily is a grade 12 student, also at Alexander Mackenzie High School. Andy is a grade 11 student at Abbey Park High School. We are all excited to see you in the committee room!

Our committee will focus on two topics which are key in the quest for a successful Mars Colonization in 2050: firstly, preparations and planning prior to colonization and secondly, reconstruction of foundations once arrived on Mars. Since this is a futuristic crisis committee, you are encouraged to pass creative directives during the conference. We can't wait to see all the crisis arcs you will run throughout the conference!

We hope that this backgrounder will serve as a resourceful guide for all of you. As its name suggests, it's just a guide! Therefore, we expect you to conduct your own research. Moreover, ensure that you are familiar with the crisis roles of procedure (ROP)!  
I wish you the best of luck in your preparations, and I look forward to watching this conference come to life! Should you have any questions, please don't hesitate to reach out to me!

Best Wishes,

Yuqing Zhou (she/her)

Director of *The Humanity Beyond – Mars 2050*, TMUN 2023

## Committee Overview

Welcome to the Mars Crisis committee! Being a futuristic crisis committee, we, your dais, would encourage all delegates to use creativity throughout the conference while still keeping realism and logical reasoning in mind.

As delegates, multiple factors should be taken into consideration: a balance between the interests of their government, space agencies, and citizens must be found. The description for each country is under the section “Country List” at the end of this background guide. Collaboration is key!

We would like to remind all delegates that we expect all countries to be included. We acknowledge that although certain countries may have more advanced spatial technologies than others, delegates should remember that every country plays a significant role in this committee, and we strongly suggest all countries to collaborate together to render the colonization of Mars successful.

Being a crisis committee, delegates will use the crisis rules of procedure. We highly encourage delegates to write crisis notes, joint personal directives, and public directives. To enrich the crisis arc, we will begin providing multiple crisis updates throughout the conference.

## Topic A: Escape Route

### Topic Overview

The year is 2049, the location is Earth. No longer is it the beautiful planet that we used to know. The blue sky has turned a polluted gray and fresh air is scarce. Temperatures have increased by 2.3 degrees Celsius (36.1 Fahrenheit) since 2022; far more than what we have expected. Although this slight rise may not seem significant, it is deadly for low-income countries in which citizens live in natural disaster risk locations. Floods, a major natural disaster prevalent in these zones, will be amplified as a result and the citizens will be left even more destitute. Delegates will enter a world where pollution is severe enough to cause serious respiratory problems. Deforestation is intensified, driven by the human consumption of natural resources and wildfires. Disaster is an understatement.

Despite the climate catastrophe, technology has made strides since the 2020s. Scientists have concluded that the harm imposed on the Earth is irreversible. As a result, space missions have been carried out in the hopes of identifying another planet on which we could possibly establish and sustain a colony. As of now, the only viable option is Mars.

In Topic A – Escape Route, leaders from countries across the world will focus primarily on the preparations that must be done before heading to Mars, including planning out details to accomplish the Earth-Mars voyage. Delegates are expected to have a good understanding of Mars, including the temperature, overall geographic features, distribution of useful resources on Martian lands, and other basic information. Delegates must also take into consideration the social problems prevalent in current society such as wealth inequalities and institutional oppression.

These factors will play a role when it comes to selecting the individuals that would be designated to go on the colonization mission. Delegates have the choice to bring all 9.7 billion inhabitants to Mars or only take a fraction of the total population.

## Important Information About Mars

Mars is the fourth planet from the Sun in the solar system. It is known for its red color, a result of the oxidation of iron present in the dust which covers the surface of Mars. It is about half the size of the Earth and is situated 1.5 astronomical units (AU) away from the Sun (1.5 times the distance between the Sun and the Earth). Mars' rotation period is 24.6 hours, similar to the one on Earth; a year on Mars is the equivalent of 687 Earth days. The orbit of Mars is elliptical, therefore, the four seasons on Mars have different lengths: in the northern hemisphere, Spring lasts for 199 Earth days, Summer is 183 Earth days, Autumn has a length of 147 Earth days, and Winter is 158 Earth days.

Although Mars shares certain similarities with Earth, its atmosphere differs a lot from the one we have on Earth. It is composed of 95% carbon dioxide, 3% nitrogen, 1.6% argon, and traces of oxygen, water, methane, carbon monoxide, and other gases, along with a lot of dust which is formed by the weathering of rocks. Mars does not have an ozone layer to shield the planet from solar radiation. Delegates should keep this in mind and find a realistic solution to protect humans from harmful radiation. In addition to dust storms, the concentration of CO<sub>2</sub> in the atmosphere also differs from season to season on Mars due to the cold southern polar winter causing CO<sub>2</sub> to freeze onto the south polar cap.

The geological structure of Mars includes a central core (made of iron, nickel, and sulfur), a rocky mantle, and a solid crust composed of iron, magnesium, aluminum, calcium, and potassium.

Mars has two moons; Phobos and Deimos. Phobos, the larger moon, is closer to Mars in comparison to Deimos.

## Past Actions

Note: the past actions listed in this section only include what has happened outside the committee (meaning actual history up until December 2022).

Throughout history, Mars has fascinated humans. It is one of the most explored bodies in our solar system. So far, it is the only planet on which we have sent rovers to explore its territorial landscape and geographical properties.

In this section, delegates will find information about the past missions that various space agencies have carried out to learn more about the red planet.

### National Aeronautics and Space Administration (NASA) – United States

#### Mariner

Between 1962 and late 1973, NASA designed and launched 10 interplanetary probes to explore planets in the inner solar system – including Mercury, Venus, and Mars. This was designated as the Mariner missions. Mariner 4, 6, and 7 were flybys that collected pictures of Mars. Mariner 4 showed us pictures of lunar-type impact craters on the surface of Mars, some with frost due to the low temperature during Martian evenings. Mariner 6 and 7 flew over the cratered regions on Mars and recorded hundreds of pictures. Mariner 9 became the first ever spacecraft to orbit around Mars in 1971, bringing back high-quality images of the surface of Mars, and its two moons, Phobos and Deimos.

The Mariner missions revealed details of the Mars surface (craters, volcanoes, valleys, etc.) and allowed scientists to learn more about the atmosphere of Mars.

#### Viking

Viking 1 and 2 successfully landed on Mars (at Chryse Planitia – “Golden Plain”) in 1976. They returned more than 50,000 images, wealths of data on the atmosphere of Mars, and conducted soil experiments.

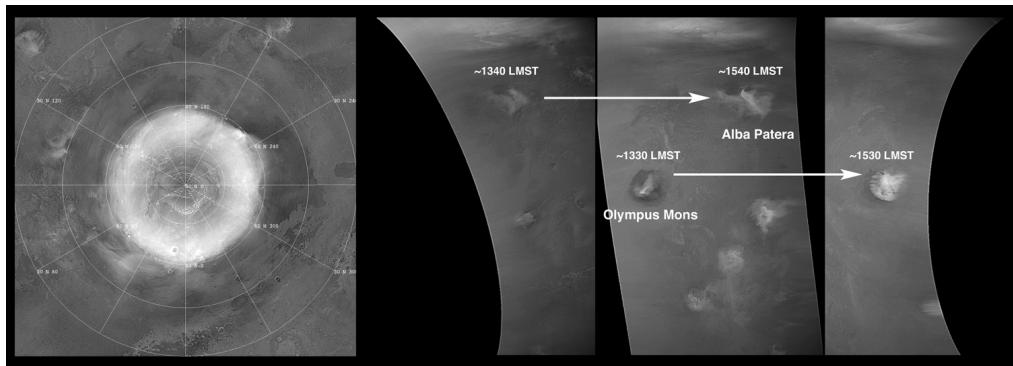
#### Mars Pathfinder

Mars Pathfinder landed on Mars’ Ares Vallis in 1997. A large amount of analysis on the Martian atmosphere, climate, geology, composition of soil and rock was conducted. It returned data suggesting that Mars was at one time (in its past) wet and warm, including liquid water.

#### Mars Global Surveyor

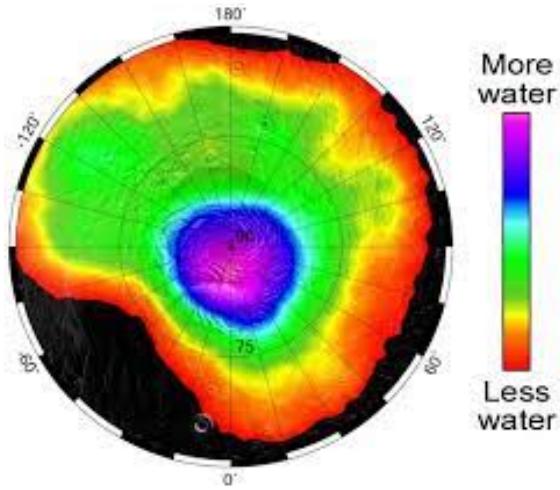
Mars Global Surveyor, launched in 1996, orbited around Mars at a low altitude to observe the planet. It studied the entire Martian surface, atmosphere, and interior. It noted that Mars has a very repeatable weather pattern, including some dust storms that occur cyclically at the same location. Through its

documented observations, scientists deduced that liquid water was present at the surface of Mars at some point in the past. It also took pictures of the ice caps at the poles of Mars.



### 2001 Mars Odyssey

The 2001 Mars Odyssey is a Mars orbiter that allows scientists to carry out much research to this day. Thanks to this mission, scientists created the first global map of minerals and chemical elements' distribution on Mars. It helped scientists to identify the regions with buried ice (shown in the image below) and to discover that radiation in low-Mars orbit is twice that in low-Earth orbit (due to the lack of protection provided by the magnetic field of Mars)



### Mars Exploration Rovers

This mission launched in 2003 included two rovers: "Spirit" and "Opportunity". They used more advanced technological instruments to explore the geographic landscape of Mars and its atmosphere to search for clues of past water activities on Mars. Spirit landed at Gusev Crater, where there was a

possible lake formed in the crater. Opportunity landed at Meridiani Planum, a site where it discovered that the mineral deposits there suggest that Mars has a wet history. Both Spirit and Opportunity found evidence that past wet conditions supported possible microbial life.

#### Mars Phoenix

Now that scientists knew about the existence of water and the warm past of Mars, the Phoenix Mission continued to explore the habitability of Mars. It landed at Vastitas Borealis, the arctic plains of Mars (northern polar region) due to the presence of ice there.

#### Mars Science Laboratory (“Curiosity”)

Curiosity is a rover that landed on Mars that's part of the Mars Science Laboratory mission. It climbed over obstacles and travelled an unimaginable distance on Mars to seek the answer to the question we've been asking ourselves: Did Mars ever have the right environmental condition to support small life forms (microbes)? The rover collected samples and analyzed the composition of rocks to unveil their history and their past interaction with water.

#### Mars Atmosphere and Volatile Evolution (MAVEN)

MAVEN is an orbiter that has the mission to uncover the drastic climate changes on Mars by studying Mars' atmosphere. Long ago, Mars had a thicker atmosphere which allowed water to exist in a liquid state on its surface. At that time, living organisms may have existed. However, due to the changed climate on Mars, most parts of the atmosphere were lost in space, making it thinner and therefore destroying the existence of liquid water on its surface.

### SpaceX

SpaceX is a private company that is known for its goal and long-term plans to establish a human settlement on Mars. SpaceX founder, CEO, and chief engineer, Elon Musk, said that his goal is to have humans on Mars by 2029 and to establish a self-sustaining “colony”, distinct from Earth and with a population of one million people.

SpaceX has launched multiple rockets that could be the solution to achieving more sustainable voyages to Mars. The Starship spacecraft and Super Heavy rocket will together create a reusable

transportation system in which refuelling would be done in orbit as well as on Mars (using its natural H<sub>2</sub>O and CO<sub>2</sub> resources), which is at the same time sustainable and requires low costs.

### European Space Agency (ESA)

In the past years, the European Space Agency (ESA) has carried out missions on Mars. ExoMars, in particular, is a program that will address the question of the possible past existence of life on Mars.

The first mission in the ExoMars program is the Trace Gas Orbiter (TGO). In this mission, ESA partnered with Russia's Federal Space Agency (Roscosmos), with the participation of NASA. TGO studies the Martian atmosphere to look for the small-concentration presence of methane and other gases.

The second mission of ExoMars is delayed due to multiple reasons, including the COVID-19 pandemic and the invasion of Ukraine by Russia. ESA expects that a restart of the mission would be launched after 2028.

### Roscosmos (successor to the Soviet space program)

#### Mars 3

Mars 3's lander is the first ever launch that landed safely on Mars (1971). Although little data was successfully returned to Earth due to technical issues, the mission was a massive step towards landing more technologically advanced rovers on Mars.

#### Collaboration with ESA

Russia had been collaborating with the European Space Agency. However, the partnership of Roscosmos and ESA has changed due to the Russo-Ukrainian War.

### The Indian Space Research Organisation (ISRO)

#### Mars Orbiter Mission (MOM)

The Mars Orbiter Mission, or MOM, is the first interplanetary mission launched by India in November 2013. MOM carries multiple payloads which allow the probe to realize its mission of exploring the

Martian surface features and its atmosphere. Thanks to MOM, we have more than a thousand images of Mars that allowed us to publish a Mars Atlas. It also helped publish more than 35 research papers on the new discoveries of the Martian atmosphere and its temperature variations throughout the day.

### The United Arab Emirates Space Agency (UAESA)

Hope Orbiter

In 2020, UAESA launched Hope Orbiter to study the Martian atmosphere. The probe has the mission of observing and studying the weather changes during one Martian year (687 Earth days).

### China National Space Administration (CNSA)

Tianwen-1 and Zhurong

Tianwen-1 is an orbiter that China National Space Administration sent to Mars in 2021, along with Zhurong the rover. The latter landed successfully on Mars. Using its radar, the rover searches for pockets of water on Mars from the ground to explore the possible existence of life underground.

Before the launch of Tianwen-1 and Zhurong by China (CNSA), the US (NASA) had been the only country to successfully operate a Mars spacecraft that successfully collected and returned data. With the great debut of this mission carried out by CNSA, it may signify that more countries would join in the race for Mars exploration, which would possibly lead to global collaboration.



## Other Private Companies

There are other private companies (primarily in the US) that have been competing with bigger corporations such as SpaceX and NASA by launching commercial missions to Mars. Relativity Space and Impulse Space, for instance, two startup space companies in California, US, announced in the summer of 2022 that they would be collaborating to launch the first commercial mission to Mars as soon as 2024, years before the planned trip to Mars established by SpaceX.

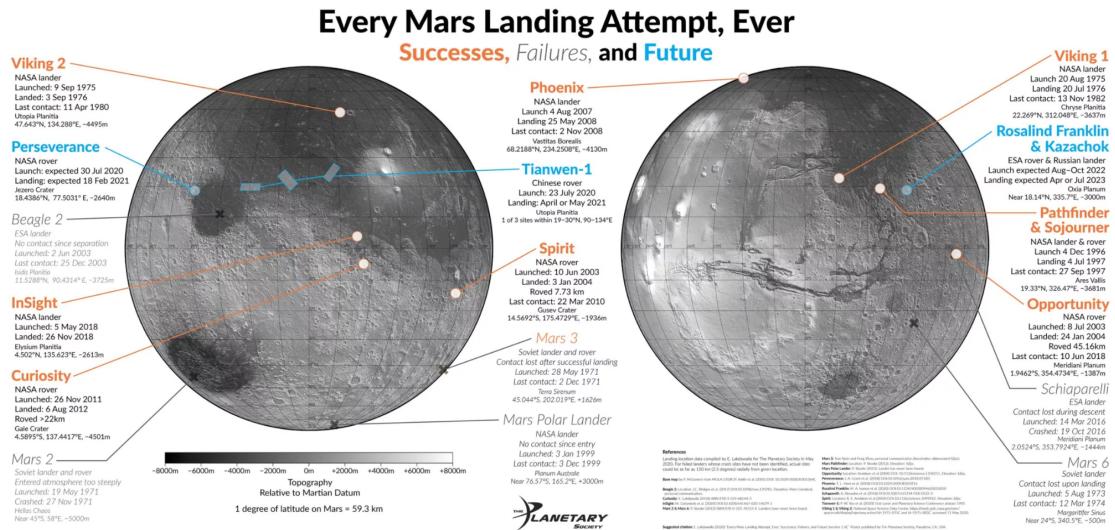


Image summarizing every Mars landing attempt as of June 2020

## Guiding Questions

1. Most Martian ice exists underground because if it was exposed at its surface, the heat of the Sun would cause sublimation – meaning transforming the ice (solid) directly to vapor (gas) without passing the liquid state. Only the poles of Mars are cold enough to conserve exposed water in the form of ice. Together, delegates need to find a way to have suppleable water, either transporting water from Earth, finding a method to use the existing ice on Mars, or getting water supplies in another way.
2. How will countries come together to support and finance Mars colonization to allow developing countries to also have a spot in the Mars colonization mission?
3. Who will we send to Mars? (People from which countries? At what age?) How do we avoid discrimination and reduce social inequality in a situation where money seems to be the ticket to Mars?
4. What would be a sustainable way to travel to Mars given the limited resources on Earth (considering the excessive exploitation of the planet by humans in the previous decades)?
5. How do we envision a long term stay on Mars?
6. Is Mars only going to be an alternative for a few years?
7. How exactly will colonization on Mars be gradually done? What are the steps of the different stages?
8. What are the ways to ensure Earth-Mars communication?
9. How to deal with the discontentment of people left on Earth during the first few stages of colonization?

## Topic B: Rebuilding Foundations

### Topic Overview

This topic begins briefly after the first few stages of the settlement of colonists on Mars. Delegates must now plan out the construction of infrastructure indispensable to our everyday life. Delegates are highly encouraged to draft and pass policies applicable on Mars. In this section, the dais proposes a few aspects that delegates could explore and discuss during the conference.

### Social Services

Social services are present to help a community, especially to aid disadvantaged or vulnerable individuals. It consists of facilities such as education, health care, etc.

The education system is essential in the long-term colonization effort. Delegates must consider how to construct basic structures necessary for education, such as schools and all the required materials and supplies needed in schools. Keeping in mind the Martian environment and the resources available on Mars, there will be huge differences between the educational system that the delegates envision and the one we have on Earth.

The health care system must also be established on Mars. Before the first stages of colonization, delegates should already plan in advance the resources and equipment to bring to Mars for health care. How many doctors should come to Mars for each stage of colonization to ensure a minimal doctor-to-population ratio on Mars? What are the necessary machines and equipment that are being transported to Mars? How would a hospital be built regarding the differences between Mars and Earth? Once more people have arrived, would a health insurance system like the one already existent on Earth also be established on Mars or is this branch of social service going to take place in a completely different form?

Security is also an important factor to consider when it comes to constructing a society. Security can be considered in many forms, such as cybersecurity (protection of computer systems, networks, and

sensitive information from digital attacks), public security (safety in public areas), or even social security (social welfare and access to basic human needs). On Earth, there is a complex system where countless governments and organizations work together to put such a system in place to ensure the security of each individual. However, who would be in charge of making sure that all the legislation and efforts we have made on Earth would perpetuate and be preserved on Mars? How do we ensure security in different sectors?

### Infrastructure (Housing & Transportation)

Infrastructure is a huge building block for Mars colonization. This includes housing, transportation, water circulation systems, and other buildings. Finding a good place on Mars to build houses will require delegates to consider multiple factors such as the altitude of the chosen spot, its position to the Sun (which directly impacts the temperature of that specific place and the amount of solar radiation it receives), the presence of natural resources in its surroundings, etc. Moreover, housing doesn't only involve building the structures, it also implies having other internal systems in the house, such as water circulation systems, warming systems, etc. How will the low gravity of Mars impact construction? Will colonies utilize geographic features? How? Delegates will also have to come up with a document that will serve as a bill on Mars on territorial division and land distribution.

In addition to housing, another important aspect of building infrastructure is transportation. Delegates are encouraged to use their creativity whilst relying on a factual basis to come up with an effective way to displace themselves on Mars. An efficient and convenient transportation system is imperative in many ways, such as responding to the basic needs of the habitants; but it could also serve the purpose of exploring the planet and better knowing its properties, which leads us to our next aspect in this section — the research that would be carried out on Mars.

### Scientific Research

Scientific research carried out in space is not uncommon. Since the beginning of space travelling, research and experimentations on a wide range of subjects have been done in space. As delegates colonize Mars, opportunities may arise to continue space research and expand our understanding of

the universe by doing more experiments on Mars; it may offer us more insights and a different perspective.

## Earth-Mars Communication

While building a great variety of basic structures, effective communication between Earth and Mars is crucial. Such communication can engage in multiple ways. To receive information on Earth, for example, the NASA Deep Space Network (DSN) could be useful. It is situated in Spain, Australia, and the US so that it could constantly receive messages despite the fact that Earth rotates on its own axis. Another way of capturing signals sent from the surface of Mars is to have orbiters around Mars to obtain the information. How will colonies communicate with Earth? Why would colonies want to maintain communications? Delegates should also keep in mind that many factors could complicate the situation. Depending on the timing, for instance, the location of Mars relative to Earth may make communication difficult by taking far longer.

## Guiding Questions

1. Will there be different countries on Mars? How will we establish boundaries?
2. How will people on Mars communicate with each other regarding the fact that they come from different countries on Earth and speak different languages and share different values and beliefs?
3. How can colonies obtain the equipment and the human resources that are necessary for building social services and infrastructures on Mars?
4. What are the possible approaches to extracting/obtaining water on Mars?
5. How can colonies maintain effective communication between Earth and Mars?

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## Country List

### **Arabia**

In response to the formation of the rising power of New Persia, the king of Saudi Arabia made the decision to completely unify the Arabian subcontinent in 2031 with the support of the United States of America. Be it through military force or through diplomatic negotiations, Saudi Arabia was able to unify the subcontinent in order to create a country which could rival New Persia. However, due to powerful countries deciding to protect the United Arab Emirates, the UAE was able to remain independent of Arabia. However, the countries of Yemen, Oman, Bahrain, Qatar and Jordan have been unified into the country of Arabia.

The climate crisis has caused many issues for the country of Arabia, with many countries making a shift to greener forms of energy. However, they are still able to sustain themselves through their luxury goods and tourism industry, as well as by exporting oil to countries which still rely on oil to survive.

The Arabian Space Program is extremely well-funded, but many of the engineers are foreign experts, being from Europe and North America. Arabia is home to many of the world's leading space tourism organizations, having made many advancements in the speed of their spacecraft. The country has a bright future, but it must remove foreign influence from its space program and contend with the threat of New Persia at the same time.

### **Brazil**

Due to heavy deforestation, 63% of agricultural land in Brazil has become climatically nonoptimal. As a result, food production has decreased significantly since the early 2000s and is expected to drop even further in the future.

Home to the Brazilian Space Agency (Agência Espacial Brasileira, AEB), Brazil has operated a series of sounding rockets throughout the years. In 2021, Brazil signed the Artemis Accords with the U.S. and other international partners for explorations of the Moon and Mars in 2024 and the 2030s. Since then, Brazil has been working in cooperation with these international partners to develop space robots for further exploration.

### **Canada**

Canada has made significant contributions to space exploration. The Canadian Space Agency aims to “advance the knowledge of space through science and ensure that space science and technology provide social and economic benefits for Canadians”. As creators of Canadarm and Canadarm2, Canada has continued to work on a variety of inventions for the evolution of space exploration. Although Canada has almost reached their goal of net-zero carbon emissions by 2050, the Earth’s overall climate continues to take a turn for the worst. Today, Canadians still suffer from strong winter blizzards and extreme summer heat throughout the year.

### **Chile**

Chile’s Paranal Observatory hosts the world’s most powerful telescopes. The European Southern Observatory (ESO), established in 1962, is supported by 16 Member States (Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Poland,

Portugal, Spain, Sweden, Switzerland and the United Kingdom), other strategic partners, and Chile, its host country. The ESO works to build the best telescopes, serve the community and benefit society. To date, Chile remains one of the most prosperous and established nations of South America.

### **China**

Since the 2020s, China's global influence has increased greatly. After a boom of semiconductor manufacturing in 2028, China's economy grew rapidly. Thus, China began to invest more heavily in space exploration. By 2040, samples from Mars were returned to Earth due to the success of the Tianwen-1 mission. However, China has not yet publicly revealed the results of the Mars samples to the world. They have only teased that their discoveries have been "revolutionary".

### **East African Federation**

Formed by the states of the African Great Lakes Region, the East African Federation was officially created in 2025. Despite Kenya's participation during discussions to create the federation, they ultimately did not join it. The six sovereign states who have united politically are Burundi, the Democratic Republic of the Congo, Rwanda, South Sudan, Tanzania and Uganda. However, the supposed "unity" is not as it seems. As a result of political corruption and the merging of multiple government powers, the over 250 million residents of the country are facing a humanitarian crisis.

The East African Federation has been able to develop a small space agency since its formation, but due to the humanitarian crisis in the country, space exploration is not high on the government's list of priorities.

**Egypt**

The Egyptian Space Agency (EGSA) aims to promote the peaceful use of space and development of a sustainable space system. Unfortunately, due to changes in climate, heat waves and dust storms frequent the EGSA's headquarters, making it more difficult for residents of Egypt to further expand their research. Extreme weather events have resulted in many casualties.

**France**

In 2050, the population of France would reach around 70 million. Due to declined fertility rates and increased life expectancy, one third of the French population would be composed of people who are more than 60 years old. France has many institutions and organizations that contribute to space research. Centre National D'Études Spatiales (The National Centre for Space Studies), or CNES, a governmental organization founded in 1961, would continue carrying out missions to Mars and would contribute greatly to the understanding of Mars' characteristics.

**Germany**

Germany has had a long history of involvement in space exploration and has made significant contributions to the field. The German Aerospace Center (DLR) is a leading research organization in the field and has played a key role in the development of satellite technology and spacecraft. Germany has also been involved in a number of international space missions, including the European Space Agency's (ESA) Rosetta mission, which sent a spacecraft to study a comet, and the ExoMars mission, which is exploring the potential for life on Mars. In recent years, Germany has also been investing in developing its own space industry, focusing on small satellites and space-based

technology. Overall, Germany is a strong player in the field of space exploration and is committed to continuing its contributions to the advancement of space travel.

### **Greater Mexico**

After the climate catastrophes of the 21st century created a huge migrant crisis from South America, the government of Mexico made the decision to take over the rest of Central America in order to stem the flow of refugees. This moved their border up to the Panama Canal, with the other side of Panama being annexed by Columbia. Since then, Mexico has changed their name to "Greater Mexico" in order to represent the country's rise in power.

Greater Mexico is a country that has a long history of scientific research and space exploration. While they have not yet sent a mission to Mars, the country's space agency, AEM, has been involved in a number of cooperative space projects with other countries and international space agencies. Mexico has been working on the development of new technologies and building the capabilities necessary to undertake a mission to Mars, such as testing and launching satellites, developing new rocket propulsion systems, and collaborating with other countries such as NASA, Russia and China.

### **India**

India is a country located in South Asia, known for its diverse culture and large population. It is the second most populous country in the world, with a population of over 1.67 billion people. In recent years, India has made significant economic and technological progress and is now one of the fastest-growing economies in the world. It is also a leader in the field of information technology and has a growing space industry. The Indian Space Research Organisation (ISRO) is the country's

national space agency and has been responsible for a number of successful space missions, including the Mars Orbiter Mission, which made India the first Asian country to reach Mars. Despite its successes, India still faces challenges such as poverty, pollution, and overpopulation. However, the country is working to address these challenges and is focused on building a bright future for its citizens.

### **Italy**

Italy has a long history of involvement in space exploration and has made significant contributions to the field. The Italian Space Agency (ASI) is the national space agency of Italy and is responsible for coordinating and promoting space research and activities in the country. ASI has played a key role in a number of international space missions, including the European Space Agency's (ESA) Rosetta mission, which sent a spacecraft to study a comet, and the ExoMars mission, which is exploring the potential for life on Mars. Italy is also a major contributor to the International Space Station (ISS) and has provided many of the modules that make up the ISS, including the Columbus Laboratory and the Leonardo Permanent Multipurpose Module. Overall, Italy is a strong player in the field of space exploration and is committed to continuing its contributions to the advancement of space travel.

### **Japan**

In recent years, the number of natural disasters affecting Japan has significantly increased. However, unlike other countries, Japan was able to modernize its cities by using technology in order to prevent any earthquakes, tsunamis, or cyclones from affecting them too much. Although this technology is effective, it is extremely expensive for Japan to maintain this infrastructure, and

they were only able to disaster-proof their cities due to the country's high economic development before the climate crisis fully hit the world.

The Japan Aerospace Exploration Agency (JAXA) is the national space agency of Japan and is responsible for coordinating and promoting space research and activities in the country. JAXA has been involved in a number of successful space missions, including the Hayabusa mission, which sent a spacecraft to study an asteroid, and the Kaguya mission, which studied the Moon. In recent years, Japan has also been exploring the possibility of sending missions to Mars. Japan is also collaborating with other space agencies around the world on the ExoMars mission, which is exploring the potential for life on Mars. Overall, Japan is a strong player in the field of space exploration and is committed to continuing its contributions to the advancement of space travel.

### **Kenya**

Because of multiple reasons, Kenya isn't part of the East African Federation when it was formed. One of the reasons is that when the confederation was being discussed by the states of the African Great Lakes Region, Kenya's economic and political development was already on the right track and was advancing rapidly. For example, some elections in the 2020s have given Kenya a new beginning, and the country has since made significant economic and political reforms that have contributed to social development, sustained economic growth, and government stability. Even though it didn't carry out a lot of space missions in the past, Kenya has been investing in space technology and exploration and has been launching more satellites in the last decades. The Kenya Space Agency (KSA) has most notably contributed to using space technologies in conjunction with agriculture.

### **New Persia**

United by an Islamic prophet, New Persia is made up of the nations surrounding the Persian Gulf, notably Iran, Iraq, and Kuwait. While they have very nascent space travel and exploration institutions, they are resource-wealthy nations that have access to many resources. Being a region that is constantly under threats of violence and instability, there are many conflicting incentives for this region. As of now, one of New Persia's top priorities is taking down the government of Arabia.

### **Oceanic Union**

Australia, New Zealand, as well as the 24 nations and territories that make up Polynesia, Micronesia, and Melanesia in the Pacific are included in the Oceania Union. Regions part of this Oceanic Union such as New Zealand and Pacific islands are at major risk of flooding due to increasing sea levels. Though these states part of the Union are well developed, the presence of a well established space agency is not as prevalent as other countries such as that of the United States. The Australian Space Agency has not committed to any major outer world missions, though a \$150 million, unmanned Moon to Mars initiative has been planned. Effects of climate change on the Oceanic Union, mostly in regions such as New Zealand and Australia include average temperatures on land and in the sea rising, altered rainfall patterns, an increase in the risk of wildfires, and rising sea levels despite significant natural variation.

### **Russia**

The Russian Federation's State Space Organization "Roscosmos," is a state corporation in charge of space missions, cosmonautics projects, and aerospace research. By the year 2030, Russia's

economy has started to significantly decrease by over 8%, proceeding the Russia and Ukraine conflict, both countries have suffered major casualties and poverty rates are on the rise. Seventy percent of Russia's land mass will have degraded infrastructure due to permafrost melting. Parts of Russia will become less habitable and economically productive as a result of droughts, floods, and other harsh weather conditions.

### **Spain**

Spain's demand for power, oil, and gas has risen as a result of climate change. The output of hydraulic energy and biomass has declined as the temperature rises and water availability decreases. The Spanish public administration's planned space agency, the Agencia Espacial Espanola, will be in charge of running the country's space programme. The agency began operations in 2023 and was formally announced on May 27, 2021. Spain is also part of the European Space Agency, and has contributed to more than 600 satellites, space probes, and spacecraft for all types of space missions, including telecommunications, navigation, Earth observation, and exploration of the universe.

### **Ukraine**

The Official Space Agency of Ukraine, a major administrative organization set up in 1992, carries out state policy ideas regarding the exploration and peaceful use of space. SSAU is one of the top 5 organizations in the world for launching services. Moreover, Ukraine is becoming more susceptible to droughts, high temperatures, heat waves, heavy rains, mudflows, and floods as a result of climate change effects. Proceeding, the conflict between Russia, large emissions of greenhouse

gasses such as carbon dioxide have been emitted into the atmosphere. The country is still rebuilding and fighting a variety of internal issues such as housing for citizens, and poverty

### **United Arab Emirates**

The government of the United Arab Emirates' space agency, the United Arab Emirates Space Agency, is in charge of growing the nation's space economy. It was established in 2014 and is in charge of establishing and governing the UAE's space industry. When the Emirates Mars Mission "Hope Probe" arrived to the red planet's orbit in 2021, it was the first probe to present a comprehensive image of the Martian atmosphere and its layers. It aided in providing important clarifications regarding the overall Martian atmosphere as well as the escape of hydrogen and oxygen gasses into space over the course of a Martian year.

### **United Kingdom**

Throughout the past dozen years, the United Kingdom Space Agency (UKSA) has contributed greatly to the production of space batteries and monitoring equipment. Unlike other space agencies around the world, the UKSA has not launched many missions. Instead, more time and effort has been put into innovating new launch technology for the future.

Due to rising sea levels, the UK has experienced a mass increase in floods, causing huge damage to coastal cities. Other severe weather events such as droughts and heat waves have also increased in frequency.

### **United Korea**

With the calamities of the world and the death of their leader, the North Korean regime fell in 2028.

Although some within the North Korean government attempted to continue the regime, due to a widespread mutiny among the North Korean Army as well as a withdrawal of Chinese support, the government was forced to unite with South Korea. Alongside Japan, Korea was able to build up their cities to be resistant to natural disasters, but this program was only implemented in the south, as well as in Pyongyang. This has led to a mass exodus from the north of Korea, and many North Koreans face discrimination in Korea.

It is home to many leading global corporations and is a major player in the fields of electronics, automotive manufacturing, and robotics. In recent years, Korea has also been making significant progress in the field of space exploration. The Korea Aerospace Research Institute (KARI) is the national space agency of South Korea combined with the National Aerospace Development Administration (NADA). It has been involved in a number of successful space missions, including the STSAT-2C satellite, which was launched in 2013, and the ARIRANG-5 satellite, which was launched in 2017. South Korea is also a member of the International Space Station (ISS) program and has sent several astronauts to the ISS to conduct research and experiments.

### **United States of America**

The U.S has failed to maintain the target of 1.5 degrees Celsius which has resulted in more extreme weather conditions, including heat waves, floods, storms, wildfires, and droughts. It has also slowly started to significantly worsen the world's food insecurity, encourage global migration, and act as a

crisis multiplier, posing serious threats to national security. The U.S is one of the leading innovators and leaders in space travel in exploration, being one of the biggest participants of sending humanity to Mars. The U.S. federal government's autonomous National Aeronautics and Space Administration is in charge of the civil space programme, aeronautics research, and space research. NASA has an extensive, resourceful Mars Exploration Program which will prove to be useful during the process of colonizing Mars. In the past, a variety of Mars rovers and satellites have been sent to the red planet to gather information.