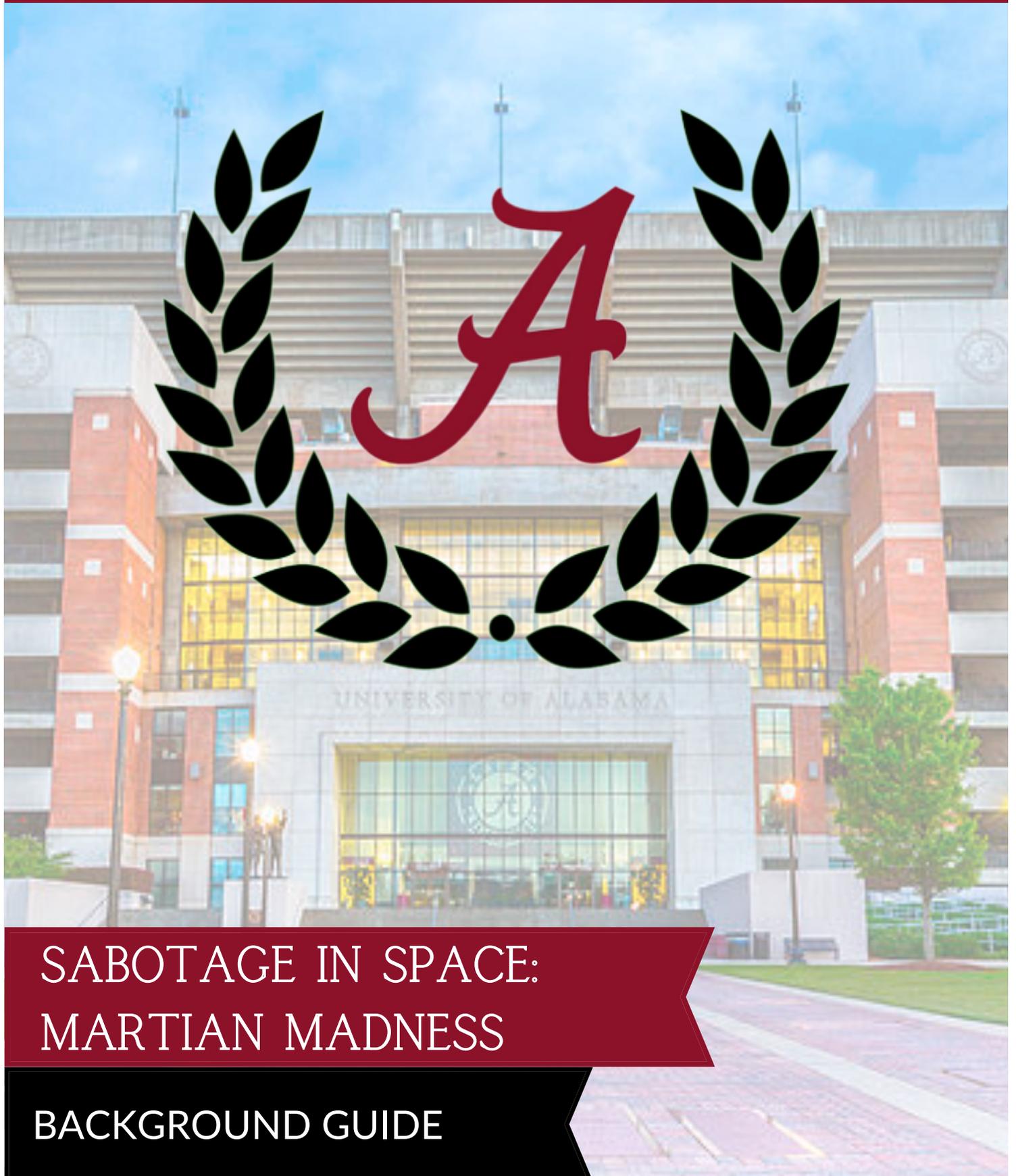


FOURTEENTH ANNUAL
ALABAMA MODEL UNITED NATIONS



SABOTAGE IN SPACE:
MARTIAN MADNESS

BACKGROUND GUIDE

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LETTER FROM THE DIRECTOR-GENERAL

Esteemed Faculty and Delegates,

Welcome to **ALMUN XIV**. My name is Catharine del Carmen, and I am serving as the Director-General. I am in my fourth year at the University of Alabama's Bachelor of Social Work (BSW) Program. Even after COVID-19 forced us to rain-check last year's conference, I am so excited that you chose to attend one of the Southeast's premier Model United Nations conferences for high school students! We are pleased to offer a diverse array of committees ranging from traditional General Assemblies to the International Court of Justices to a crisis committee based off a viral online video game with everything else in-between. I'm proud to announce that ALMUN XIV will also be implementing its first Plenary Session for the General Assembly during the last committee session on Sunday, February 6th. The fourteenth rendition of ALMUN's secretariat and staff have worked tirelessly to revamp our conference and provide an immersive, engaging, and realistic experience to all delegates who choose to attend.

This is my eighth year participating in ALMUN, and I cannot believe how much time has passed since I was a high school freshman freaking out over debating international policy in a room full of people. Model United Nations has become a passion of mine, and I enjoy joking about the irony of my previous statement with my friends and family. If you asked me eight years ago if MUN would be a key player in my college experience, I would laugh in your face, but it truly has shaped me into the young adult and aspiring professional I am today. The University of Alabama has paid for me to travel to Boston, Chicago, Washington, D.C., and even Montreal, Canada. My heart and mind are with international politics, advocacy, and diplomacy, and I do not believe I could confidently say so if it weren't for my experience as a Model United Nations delegate, staffer, and secretariat member all these years.

I hope you all obtain the same amount of passion, wisdom, and joy that I have from competing in MUN conferences, and I encourage you to take this past high school. My email will be listed below if you have any questions about the conference, your

committee, or just Model U.N. in general. I wish you the best of luck in your research and preparation, and Roll Tide!

Best,

Catharine del Carmen

Director-General

almun.dg@gmail.com

Parliamentary Procedures

This committee will function as a crisis committee, resulting in its structure differing from General Assembly Committees. The proceedings and events are rooted in science, despite being works of fiction. We look favorably upon creative ideas that are based on modern world STEM principles and how that could develop in the future. The committee purpose is to simulate the responses to the course of events throughout the committee sessions. Delegates will take on the role of various scientists, engineers, and other individuals with connections to the exploration of Mars throughout committee sessions. The dais will serve as correspondents from Earth. Delegates will work as a committee to discover the events that led to the failed First Colony of Mars, attempt to maintain survival, and try to expand the research of the red planet in the year 2077. Time will progress at the discretion of the dais.

Points & Motions

Point of Inquiry: A point of Inquiry is used to ask a question about the procedure of the committee.

Point of Personal Privilege: A point of personal privilege is used when a delegate's ability to participate in the committee is hindered due to a physical reason and can be used to modify the physical accommodations of the room.

Point of Order: A point of order is used when a delegate feels that either a delegate or the dais has not properly followed the procedure of committee.

Point of Information: A Point of Information is used to add or ask additional information regarding the committee's topic.

Right of Reply: If a delegate feels as if they have been personally offended, they may ask for a right of reply, which will be granted at the discretion of the chair. This does not extend to the character of the delegate being offended.

Motion to Open Debate: The initial motion of a conference that must be stated in order for debate to begin.

Motion for a Moderated Caucus: This motion is used to introduce a moderated caucus with a set time limit and speaking time for a specific topic.

Motion for an Unmoderated Caucus: This motion is used to introduce an unmoderated caucus for a set period of time, in which the rules of debate are suspended.

Motion to Introduce Documents: This motion is used to have documents recognized by the chair for committee discussion. You can give the documents unique titles to help them stand out.

Motion for a Q & A Session: This motion is used to start a question and answer session with the sponsors of the document for a specified amount of time.

Motion to Enter Voting Procedure: This motion suspends debate in order to vote on introduced documents, or specified documents. Delegates may not enter the room, leave the room, talk, pass notes, or communicate in any other form during voting procedures.

Motion to Suspend Debate: This motion is used to end a committee session, after which another planned committee session will follow (after lunch or for the following day).

Motion to Adjourn Debate: This motion is used to conclude the meeting of the committee for further sessions.

Documents

Directives: Directives outline actions to be taken by the committee or sponsors of the document.

E.g.:

Directive:

Sponsor(s):

Signatories:

Communique: Communiques are used to contact figures or organizations not represented by the delegates in the committee.

Personal Directive (Crisis Note): Personal Directives are notes written to further the crisis arc of the delegate. These should detail what the delegate wishes to accomplish, why they wish to complete the task(s), how they plan to do so, and who will be accomplishing the task.

Press Release: A Press Release is a statement by the committee or delegates to address the public to influence the public opinion.

For more guidance on the structure of crisis committees, please reference the ALMUN XIV delegate handbook.

Letter from the Crisis Director

Greetings Astronauts,

Welcome aboard to Sabotage in Space: Martian Madness! I'm Alexander Kagan, your Crisis Director for this committee. As your Crisis Director, I should let you know that I am a Sophomore Marketing student here at the University of Alabama, and in case of any emergencies, please raise your placards in an orderly fashion. I was first introduced to Model UN in eighth grade, and I have enjoyed it ever since. This is my second year as a member of the Alabama International Relations Club and I'm looking forward to creating more fun committees for all of you. Outside of MUN, I work as the Business Director for the Black Warrior Film Festival, managing finances and directing all business operations of the festival, and enjoy playing Dungeons & Dragons and other board games in my free time.

From the great minds at ALMUN, introducing Sabotage in Space: Martian Madness! This out-of-this-world adventure has delegates exploring the red planet in a semi-realistic sci-fi committee! I have always enjoyed reading novels about life in space and wondered how hectic delegates would be if thrown onto the vast red expanse of Mars. While the news of today speaks of missions in space being planned for the future, we have the luxury of fast-forwarding in time and creating our own future. However, while the times may have changed, so has the political climate of the world. With megacorporations seeking investment opportunities beyond earth and nations trying to explore the habitability of Mars, what will these brave researchers find?

While each of you may have your own characters, with different allegiances and motives, I am looking forward to each of your creative twists on the characters. Frankly, my favorite part of Model United Nations is reading through the Crisis Notes you submit. I love seeing the innovative plans delegates come up with, but you must remember to set up your ideas, not just rush them in a single crisis note. Remember, be as creative as you want, but you have to have a semi-realistic basis on your ideas.

Overall, I am immensely excited for this committee. I look forward to the twists and turns you create and look forward to seeing all of you in February!

Sincerely,

Alexander Kagan

Crisis Director

ankagan@crimson.ua.edu

Letter from the Assistant Crisis Director

Greetings Martians,

Welcome to Sabotage in Space: Martian Madness! My name is Crystal Nichols, and I am excited to serve as your Assistant Crisis Director for this incredible committee. I am a sophomore majoring in Interior Design pursuing a minor in International Studies along with being on the CREATE/STEM Path to MBA. I'm going into my second year as a member of UA's International Relations Club, however I have participated in MUN conferences since my freshman year of high school. Outside of MUN, I work with University Programs as an Event Programmer Team Lead, planning events for the UA student body. I also enjoy reading fantasy novels and listening to musical soundtracks on repeat.

For this iteration of ALMUN, we've decided to create an entirely new world of possibilities - the exploration of Mars. The committee is a conglomeration of varying parts of actual science and science-fiction, to depict what could possibly be in line for the future of space exploration. Sci-fi has the ability to explore the consequences of future technologies with a reliance on scientific facts, theories and principles while expanding a worldview and developing a new narrative. Some sci-fi works I would highly recommend binging are *The 100*, *Black Mirror*, *Maze Runner*, *Men in Black*, *Ender's Game*, and *I am Legend*. They could provide research in grounding elements along with unique development of ideas for future use.

All of you will be representing individuals of varying backgrounds and connections to the exploration of Mars, and will be in search of what serves your best interests. We developed the characters' backgrounds, but encourage you to implement your spin on the characters. What will be their driving beliefs and motivations? How will you reconcile differences among your peers? How will you establish yourself among the team?

In recognizing that the creation of a new world can be very vast and complex, feel free to reach out if you have any questions about the committee. I am excited to see what you will accomplish in committee and I look forward to meeting you all!

Signing off,

Crystal Nichols

Assistant Crisis Director

cenichols1@crimson.ua.edu

Letter from the Chair

Houston, we've got a crisis,

Welcome to Sabotage in Space: Martian Madness! My name is Jordan Gulledge, and I will be serving as the Chair for our martian crisis. I am a freshman here at the University of Alabama and I am majoring in Political Science. I have a double minor in public policy and philosophy as well! Much like you all, I did Model United Nations all through middle school and high school. I had a similar crisis to this my freshman year, and I simply cannot wait to see the innovation you create. When I am not in western business attire, I tend to spend my time weight-lifting and listening to true crime podcasts. I also spend my time at the university involved in student government, freshman forum, and the local leading women of tomorrow chapter here.

I chose this committee because of the creativity it bestows upon delegates to navigate its twists and turns. Don't get me wrong, every committee here at ALMUN will be very interesting, but the Sci-Fi elements of this one really drew me in. I absolutely adore science fiction and loved Doctor Who growing up. Whether or not that was for Matt Smith, you all can decide. There are a multitude of different movies, books, etc that I could suggest, but what better way to immerse yourself into Sci-Fi than by doing research for this conference? I think you all will enjoy this committee immensely. You have the world at your fingertips, just remember its Mars, and who knows what could possibly happen?

I am eternally grateful for being able to serve as your Chair for this committee, and along with my other staffers, I plan on making this a great experience for you all! I hope to encourage you to have thoughtful conversation and debate, and to attack each challenge that may come your way with confidence. Through this committee, I want to foster creativity and innovation. I hope to see each of you truly embody the roles you are given, and push your abilities to the limit. With the help of my Co-Chair, it is my goal to ensure fairness and cooperation throughout the committee, and to keep moderated and unmoderated caucuses flowing smoothly. I hope each and every one of you takes home a sense of accomplishment and a smile on your faces!

Over and out,
Jordan Gulledge

Chair

jlgulledge@crimson.ua.edu

Letter from Staff

Hi,

My name is Andrew Post, and I am serving a staffer on the Martian Madness Committee for ALMUN XIV. I am a junior Political Science and History major with a minor in Liberal Arts through the Blount Scholars Program, and I first came to be involved in MUN during my freshman year at UA. Although my high school did not have a Model UN program, I participated in Model Congress during my time there, which is conceptually similar to MUN. As a freshman, I was looking for ways to get involved in activities that were related to my field of study, and I came across MUN as a way to do that. I ended up becoming a staffer for the Business Plot Committee for ALMUN XII in February of 2020, and it was something I really liked and I hope to have another experience like that for ALMUN XIV. Outside of MUN, I partake in activities such as playing basketball and baseball, reading books, and working out, and I am a member of organizations such as the Zeta Beta Tau fraternity, Bama NAMI, and the Greek Programming Board. I am most looking forward to meeting all of you and serving as a staffer again for ALMUN XIV, as I found it to be highly rewarding to see how enjoyable the conference was for my committee's delegates and aim to facilitate that again this year.

Andrew Post
Staffer

Committee Premise

In 2066, the first permanent outer space colony was successfully established on the Great Red planet. The compound consisted of experts from 12 Nations around the globe: Australia, Brazil, Canada, China, France, India, Japan, Russia, South Africa, United Kingdom, United States, and Venezuela. The establishment came after the discovery of liquid water, the chemical elements necessary for life, and the presence of hydrothermal pools on the planet's surface; recruits were tasked with furthering research and expanding our purview of the planet's innerworkings. Research included experiments to better understand health problems on Earth; data collection on climate change and measuring pollution; improving the quality of weather forecasts and intermundia communication; along with developing systems to better predict natural disasters; and increasing global cooperation.¹ The First Martian Colony remained successful for about seven years, with the completion of substantial construction projects, valuable research milestones, and the first native Martians of Earthen descent being born. Communication, however, began to diminish shortly after. Prior to the termination of contact, it was reported that there were ongoing intercolonial disputes, deterioration of equipment, and quickly dwindling resources. Due to the loss of contact, the 12 aforementioned nations have created a reconnaissance team to investigate the occurrences on Mars. Delegates will serve in varying capacities as members of this team. Will delegates adhere to their initial duties, remain in close affiliation with their home nations, or create space between their original identities?



Fig. 1: General Topography of Mars

¹ CSA. (2020, December 11)

A Martian World

Geography around the Colony

The Valles Marineris system extends approximately 2500 miles long, with widths up to 400 miles.² The system would be able to encapsulate much of the entire continental United States, if placed on Earth. The colony was built in the Melas region of the Valles Marineris System to protect against solar radiation and the erosive nature of the Martian environment. During their stay, researchers and scientists would send their findings back to Earth detailing the environmental capacities of primarily the Melas, Candor and Ophir regions. Within the Candor and Ophir region, research showed the presence of lake systems that include flood channels, lake basins, and lake spillover into the surrounding environment. Very little was documented for Earth correspondents about the remainder of the Valles Marineris system. However, the previous space program, Viking, helped create a general cartography overview of the area resulting in the aerial view and maps below³.

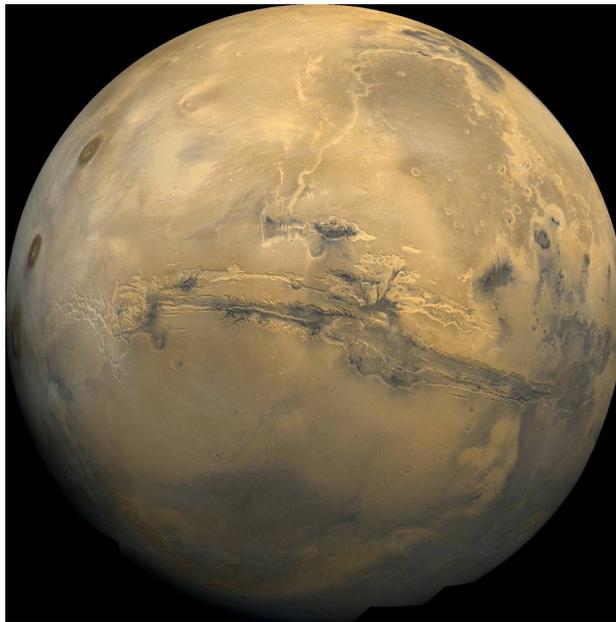


Fig. 2: Valles Marineris aerial view, credit to the NASA Viking Space Program⁴

² NASA. (2008, March 23)

³ USGS. (n.d.)

⁴ USGS. (n.d.)



Fig. 3: Physiographic provinces of the Valles Marineris Region⁵

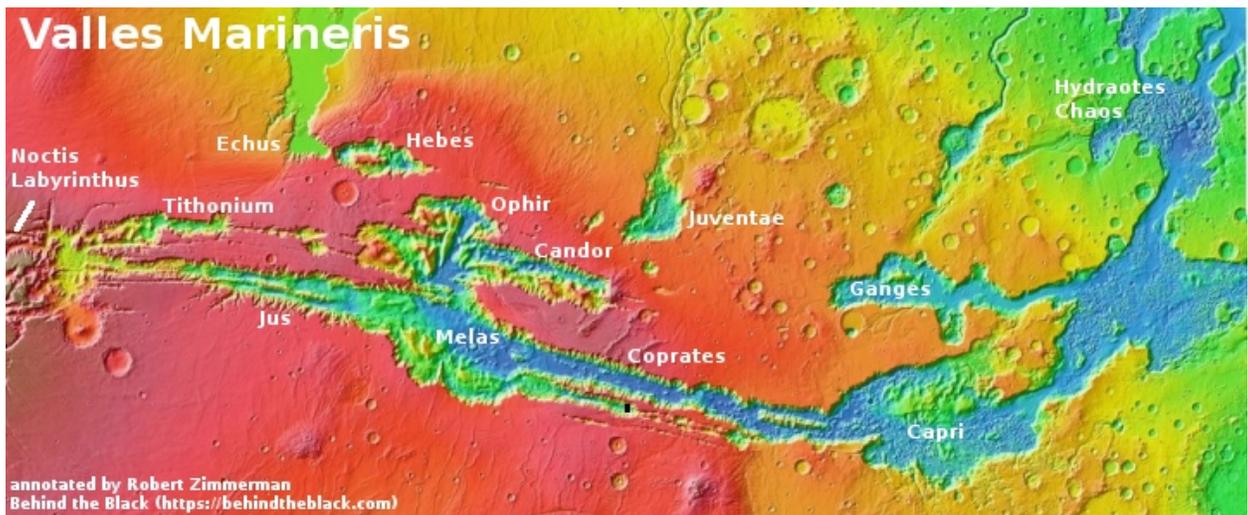


Fig. 4: Geography of Valles Marineris⁶

Colony Structure

The colony was created with the principles of safety, self support, economical sustainability, equal possibilities and rights for all colonists, and social solidarity at its forefront.⁷ The compound contains pressurized living and working spaces throughout along with the use of artificial gravity. On the planet, the initial researchers constructed expansive modules that included the Government and Science Bay, Medical Wing, Farm Station, Resident Quarters, Factory Station, and Hydra Station. It is important to note the vitality of the systems within the different sectors for the survival of the Second Martian Base, although the operational status of these systems is unknown. The various sectors have their specialties, and respective duties that are housed within:

⁵ Witbeck, N. E., Tanaka, K. L., & Scott, D. H. (1991)

⁶ Zimmerman, R. (2019, December 23)

⁷ Demidov, O., Mercedes, R., Morozov, A., Pashkin, V., Denisov, M., Volkova, N., Nosova, A., Schaga, T., Karacharskova, K., Inocente, D., Bouthot, C., & Satinsky, D. (2019)

Government and Science Bay (Go-Sci)

This serves as the point location and the central heart of the colony. It is where the key commander is housed and the primary location of most operations. It houses the incredibly reliable artificial gravity mechanisms for the colony. The mechanism for creating artificial gravity utilizes centripetal force by rotating rings around the expanse of modules.⁸

Go-Sci houses the systems for the accumulation of solar power, wind turbines, and nuclear reactors that power all of the modules, and equipment inside. The energy specialists will be responsible for the functioning of the machinery, and the allocation of the energy produced.

There is also the satellite technology and imaging systems, for communication between Earth and Mars. Despite little exploration of the region, transpondence from the First Martian Colony satellite technologists reported sightings of unidentified aerial phenomenon (UAP). It is unclear what classification should be given to the UAP as of now. Classifications could include airborne clutter, natural atmospheric phenomena, foreign adversary systems, and a catchall 'other' bin.⁹ The satellite technologists and astrologists experts may be able to decode the unexplainable further.

Additionally Go-Sci is the site of the Life Support System and the Oxygen Banks. Most of the Colony's oxygen is produced in a process called electrolysis, in which energy in the form of electricity is used from the solar panels to split water molecules into hydrogen gas and oxygen gas.¹⁰ The hydrogens are then used to make sugars and the oxygen is released into the atmosphere of the modules. Extra oxygen is stored in canisters for future use and is released when needed. Life support also removes carbon dioxide, ammonia, acetone, and other vaporous chemicals from the atmosphere.

Medical Wing (Med-Bay)

Med-Bay is where the sick and injured are nursed back to health and can be isolated from the rest of the colony. Furnished with hospital supplies and staffed by the crew medical specialist. Vitals signs including body temperature, oxygen levels, radiation exposure along with other bodily functions are monitored in this area. Colonists are sent for regular checkups to ensure health is optimal and that equipment is performing at top standards. It was circulated that the medical experts would often hoard supplies and disguise its location in order to better serve their interests. The report suggested that the stockpile in Med-Bay was used for unauthorized experimentation, though little evidence was found confirming either narrative.

Resident Quarters (Arkadia)

Arkadia serves as a relatively safe bunkard and resting place for the crew members during their off-duty shifts. Occupants are able to lock themselves away for

⁸ Brookshire, B. (2021, May 4)

⁹ Office of the Director of National Intelligence for the United States. (2021, June 25)

¹⁰ NASA. (2000, November 12)

much needed rest and recuperation. The rooms resemble the military sleeping areas or barracks – with rows of rooms containing a pair of beds, wardrobe storage, and a safe. As the population expanded, families were afforded the more spacious rooms, to allow for familial privacy.



Figure 5: Arkadia Barrack Room

Factory Station (The Yard)

The Yard is the moneymaker of Mars. It serves as the central operations for the production of materials used by the base, processing of precious Martian mineral ores and deuterium. The ubiquitous isotope of deuterium is abundant on Mars, yet very rare on Earth. Deuterium is key for the functioning of the nuclear power industry. The isotope averages about ten thousand U.S. dollars per kilogram. The materials were transported back to Earth for a substantial profit to aid in the economic stability of the colony.

Farm Station (Agro Bay)

The atmosphere on Mars is thick enough to protect crops grown on the surface from solar flare. Therefore, only thin-walled inflatable plastic greenhouses protected by unpressurized UV-resistant hard-plastic shield domes are needed to create greenhouse spaces that rely on hydroponic growing practices. The strong greenhouse effect created by the domes produces a temperate climate inside. The 50-meter domes were light enough to be transported from Earth initially, and later on were manufactured on Mars out of indigenous materials. Because all the resources to make plastics exist on Mars, networks of the domes are able to be rapidly manufactured and deployed, opening up large areas of the surface to human habitation and agriculture. Grown within the walls of the domes is the food consumed by the colony and the ingredients for medicines created in Med-Bay.

Hydra Station (Hydra)

The unglamorous and underappreciated work of the Hydra Station include the duties of water purification and waste management. Without clean drinking water, the base would become susceptible to waterborne pathogens and other possible diseases. NASA developed a series of excavator devices called Regolith Advanced Surface Systems Operations Robots (RASSORs) designed to mine water, ice and fuel from planetary soil. The technology has the versatility to be re-engineered and utilized for other mining practices.

Colony Map

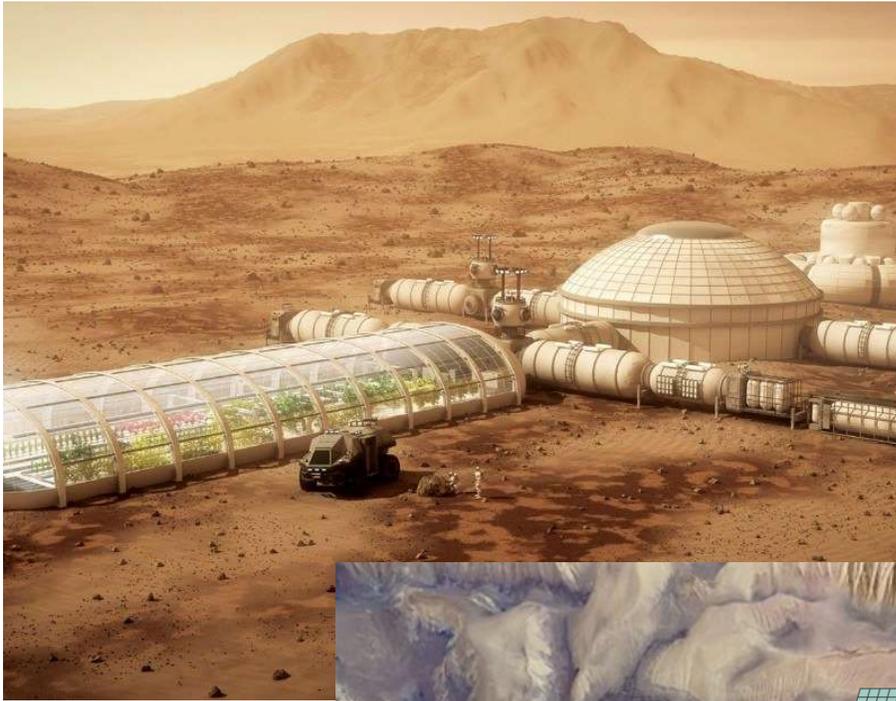
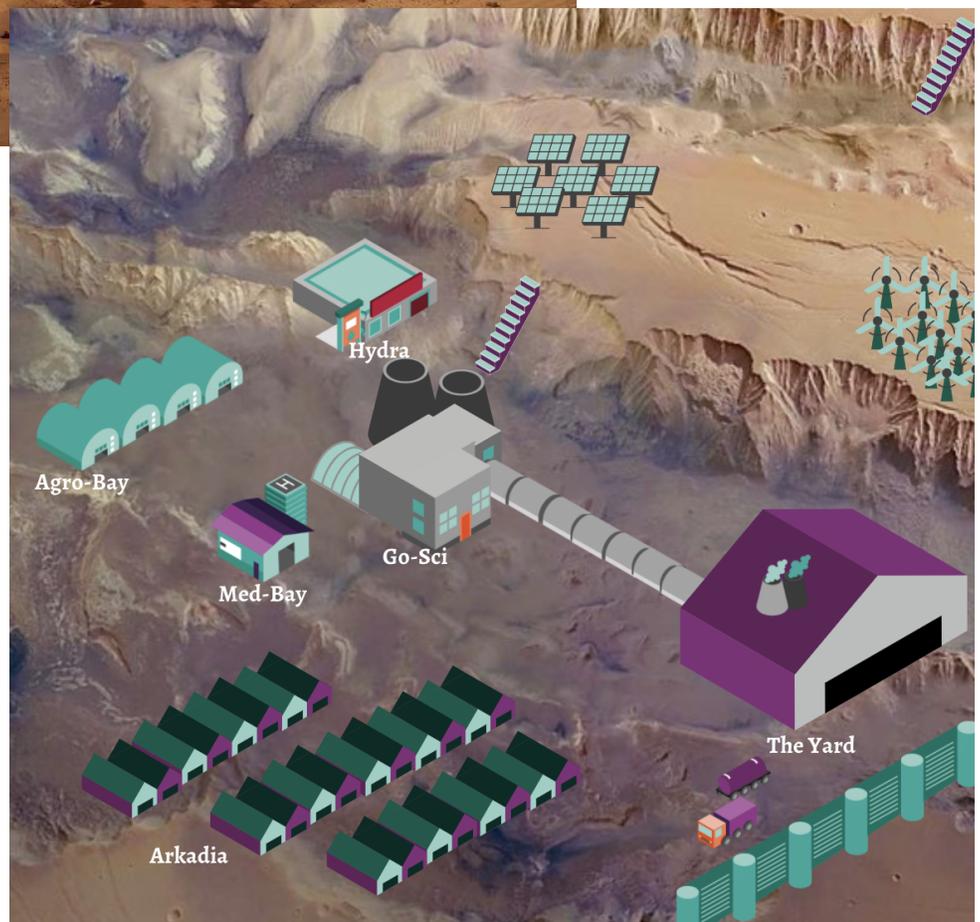


Fig 5 & 6: Map and Design of the Colony



Universal Truths

Breakthroughs in Space Exploration

Space exploration has been able to progress at a rapid rate over the past several decades, due mainly to the monetary endorsements of the Commercial Spaceflight Federation (CSF). After 2024, there was an extension of the International Space Station (ISS) to accommodate for the commercial expansion to maximize the success of nation-promoted space programs and have better returns on investments.

Investments aside from the First Martian Colony have included the establishment of temporary colonies on the moon, the exploration of asteroids in the Main Asteroid Belt, the microbial life forms on Mars, and the discovery of vast economic potential on Mars. The abundance of valuable precious materials include gold, jadeite, and deuterium. Before the deployment of the First Martian Colony, there was the confirmed presence of life sustaining elements in the Martian atmosphere, the presence of liquid water, and the authorization for the use of revolutionary technology. Engineers and scientists have accomplished the creation of artificial gravity mechanisms, expeditious space aeronautics, large scale Life Support Systems and Oxygen Banks, and prompt interplanetary communication. Still yet to be confirmed, however, is the existence of sentient life. Documentation of UAP sightings have increased on Earth and in the Martian atmosphere. Analysis from experts has presented little information on the cause of these events, and the public awareness on Earth is limited.

Notable Figures of the First Martian Colony

Luhan Afumba

Luhan Afumba often asks “What are the physical and chemical limits of life?” Coming from South Africa molecular biologist Afumba studies extremophiles. These are organisms that live in what we consider to be very unusual conditions, such as extreme heat or cold, environments that are very dry, are highly acidic, or are subject to massive amounts of radiation. Extreme environments on Earth might be normal environments on Mars, so Afumba was recruited to study the existing life forms there. By studying the coping mechanisms of life that can survive in such hostile habitats, he transfers his studies to the existence of extraterrestrial civilizations. His work was beginning to record the explanation for the UAP sightings around the First Martian Colony, however the complete documentation was not relayed to Earth correspondents.

Juliette Dubois

Juliette Dubois is the Vice President of Government Relations for Blue Origin, a privately owned space company. Dubois leads the company’s engagement with government entities in the interest of Blue Origin’s public policy priorities: civil, national security and commercial space transportation. Before joining Blue, Dubois worked with the Joint Committee on Space Astronomy under the Canadian Astronomical Society (CSA). Dubois studied at the International Space University Summer Studies Program in Strasburg, France and worked with the FAA Aircraft Certification Office in Anchorage, Alaska. Previous to that Dubois was a Project Engineer for Lockheed Martin where she was responsible for work in the layered defense program. Ultimately her work at Blue Origin is motivated to expand, explore, find new energy and material resources, and transition industries into extending from Earth into space.

Oliver Wilson

Oliver Wilson is a beloved public figure with a charismatic and magnetic personality. After becoming a graduate of the BRIT School for Performing Arts and Technology in London, he began his acting career on the London stage in the West End theatre. His worldwide fame, however, is due to him starring in multiple feature films of a renowned superhero franchise. His easily relatable and down-to-earth personality has convinced his fanbase that he genuinely cares for them. His favorable public opinion earned him a ticket in order to increase media coverage of the Martian exploration trips. While living in the First Martian Colony, public opinion for Wilson grew on Earth and

he began to create a following of other colonists in the colony. Though rumors began that his opinions were becoming increasingly worrisome, some suggested that his followers helped create a separate faction within the base that was hoarding supplies.

Houston, We Have A Problem

Downfall of the First Martian Colony

As the years passed, the population of the Mars colony grew, and the Martian mineral ore industry thrived. In efforts to become more self-sustaining, export trips were initially undertaken quite frequently – every four months. Due to the drastic market increase the First Martian Colonists were able to broaden the base’s structural layout, and allow new additions to the colony from Earth. Newcomers included wealthy business investors, families that had grown tired of Earth’s monotony, and many blue collar laborers in need of work.

With increased economic gain, there is also the parallel of increased vulnerability to corruption. The additional colonists created more contention amongst the group, and thus the development of factions within the base. Divisions were based around the continued pursuit of economic exploitation of resources found on Mars. Further evidence was beginning to direct towards the existence of other life forms, including persistent occurrences of UAP. The existence of such life forms would alter the morality of the way some colonists would view continued occupation of the planet. Differences in judgement began to affect the way resources were allocated. As a result, documentation from multiple Martian correspondents recorded the appearance of intercolonial disputes based around the inequitable allocation of resources. Mismanagement of resources included medical supplies and energy. The short supply was exhausted further due to the drastic increase in the population size. As intercolonial dissent continued, the exports of the precious Martian minerals slowed. In the past two years, 2075-2077, export trips ceased to be undertaken, resulting in a loss of outside resources for colonists.

Alleged mismanagement also led to the decline in function of the water purification mechanisms in Hydra and the decline in the production of oxygen from the Life Support Systems. It is believed that the colony extended beyond its environmental carrying capacity, and ineffectively maintained the necessary systems for their survival.¹¹ In 2076, satellite transmittance recorded a message from Juliette Dubois that stated that the oxygen system of the modules was failing, before all communication was terminated. The population as of the last communication notice, was estimated to be approximately 400 people.

¹¹ Carnegie Mellon University. (n.d.)

Establishment of the Second Martian Base

One year after the loss of communication in 2077, a reconnaissance team was created by the initial 12 nations and sent to investigate the demise of the First Martian Colony. After spending four months in their space shuttle, recruits have landed near the Melas Region. With some unexpected stowaways, Earth's Second Martian Base is in the process of establishing Mars as their new temporary home. The fresh recruits are tasked with investigating the recent dilapidation of the First Martian Colony, while braving the ever-decreasing supply of food, water, and oxygen. Additionally, the team is settling on a mostly unexplored planet. Experts should continue to explore the expansive red planet in pursuit of science and economic gain. Though the occurrence of anomalies is inevitable, there should be attention to being observant and thorough in the way knowledge is pursued. While each individual tries to make new discoveries in the name of science, ties to the old world could become entangled leaving each astronaut altering the trajectory of their own agenda.

Challenges When Living on Mars

The main concerns in the pursuit of the habitability of Mars pertains to access to basic human needs: access to food, safe water, and shelter. The distance between Earth and Mars limits the reliance that can be designated for restocking trips, so the Martian colony must be self-sufficient. The harsh environment requires the maintenance of the life-providing systems to be of the utmost importance.¹² For example, liquid water is available on the surface of Mars, but must be purified in order to ensure pathogens are not being consumed. Subsequently human vitals should be maintained to ensure proper health. Improper care could lead to recruits having improper brain coordination, genetic changes, and being more susceptible to diseases.

There is also the possibility of other life forms to contend with. Due to the nature of the mining industry on Mars, it could be disrupting other beings' way of living. If such life forms exist, the Second Martian Colonists will have to determine how they will continue in tangent. More general matters include individual exposure to radiation, the harsh climate with severe occasional dust storms, and bitter temperatures. Many protections against the elements have been incorporated into the First Martian Colony, however the maintenance of these safeguards is unknown. As a result systems must be inspected and maintained by the proper experts to ensure the success of the Second Martian Base.

Politics on Earth

¹² AIAA, Kumar Biswal M, M., & Naidu Annavarapu, R. (2021, January 4)

Corporate Corruption

Corporations have snuck their ways into every civilian's life and the influence of several megacorporations rival those of large nations. While no major nation will outright admit the power of these entities, the tight grip of their monopolies have nearly every nation suffering. Even so, a few nations have resisted these opportunistic companies. The megacorporations have admittedly struggled in the Brazilian, Canadian, Chinese, South African, and Venezuelan markets due to increased government interference in their economic markets.

However, those corporations in pursuit of economic gain have infiltrated the scientific exploration of space. The CSF is working closely with industry experts and representatives from a variety of government agencies to promote modernization of Export Control Policy and procedures in regards to the commercial space industry. Martian exports interests have included gold, jadeite, and deuterium in hope of sustaining a power-rich economy based around resource exploitation. Companies involved in the CSF have the goal to remain competitive leaders in the global market and to advance innovation and technology overall. The reconnaissance team will foreseeably have to account for the business interests of these companies.

Other trade organizations have launched ventures to compete with the CSF. Two notable accords include the Distinct Rupture for Interplanetary Value Exchange (DRIVE) and Planetary Opulence Waged for Expansive Reach (POWER). DRIVE has been promoting interplanetary trade amongst the nations of Americas including Canada, Brazil and Venezuela. POWER predominantly focused amongst the African union. Both trade groups denounced the First Martian Colony for not allowing trade imports to their respective nations so discontent has been growing.

The Rising Tides

After the Paris Agreement in 2015, several nations devoted their efforts to combat Earth's climate change, avoiding a worst-case-scenario of global flooding. However, due to not all nations meeting their goals, several world-renowned scientists have published an egregious report that island nations, including Australia, Japan, and the United Kingdom are at extreme risk of being submerged, along with coastlines worldwide rising in the next few years. These nations are critically invested in the possibility of life on Mars as a way to preserve their populace, but the idea of national claims in space is an often whispered but taboo topic.

Nations should recognize the International Space Treaty: "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including

the Moon and Other Celestial Bodies”.¹³ With this legislation nations are expected to adhere to peaceful space exploration. The research and use of outer space is meant to be carried out for the benefit and interests of all countries. States will be responsible for national space activities whether carried out by governmental or non-governmental entities. Though it should be noted that legislation often should change in accordance with the proceedings of current events. During the initial ratification, there was not the presence of corporate space organizations or the severity of climate change effects.

¹³ Union of Soviet Socialist Republics. (1966, June)

Questions to Consider

1. In the time of scarce resources, how will you ensure equitable distribution, responsible consumption, and the production of the necessary materials?
2. Recognizing that life on Mars is viable, how will you ensure the sovereign nature of the entities that could inhabit the planet? How would the colony live alongside those that called Mars their home first? How would you prevent exploitation of these individuals?
3. What can be done to ensure the safety and health of the second martian colony, despite some of the unknowns of the modules' mechanisms and the martian atmosphere?
4. Taking in the various representative entities, private companies and government agencies, involved in the initial Martian colony and the second Martian colony; how will you ensure that outer space remains a domain for all?

Character Bios

Charlotte Allens, Canada

Charlotte Allens always had a knack for energy engineering and learned the value of the discipline at a young age. After graduating college, they spent several years working at nuclear reactors across the greater Canadian territory, developing solutions for improving energy consumption and use. Through research, design, documentation, and construction they implemented green solutions, cutting down environmental impact and cost. Recognizing their talent, they were recruited for the mission to make sure that the crew's power is maintained at a stable level and to help with repairs in case of an emergency. They saw Mars as their next big adventure and gladly signed up to expand their knowledge on green energy to the red planet.

Patricia Davis, United States

After graduating from UC Berkeley, Patricia Davis joined the Space X, aerospace company and gradually rose through the ranks to become a high ranking Commercial Scientist and a CSF Officer for the company. The company wants Davis to scout Mars and report back about its economic potentiality. She has been promised a big promotion if she relays sufficient information for the company to get their hands on a potential Martian colony. As a CSF Officer, she is a member of the Export Control Committee. The committee aims to assist American companies to remain competitive leaders in the global market and to advance innovation and technology overall.

Jacques Dupont, France

Jacques Dupont was appointed as Chief of Staff of the French Air Force in April 2075 after joining the French Air Force Academy in Salon-de-Provence. He graduated as a fighter pilot and began serving in operating units as an Air Defense pilot, with more than 2800 flying hours, and 56 combat missions. Now he has been appointed as the Astronaut Pilot, in charge of assisting the Commander in the maneuvering of the shuttle for the Second Martian Bse mission. Though, due to his high-ranking background there is some animosity that he was not appointed as the Astronaut Commander for the mission.

Harper Evans, United Kingdom

Harper Evans risks her life experimenting with new anti-radiation suits of her own fashion, earning her the nickname of the "Modern Marie Curie." Evan's studies in the United Kingdom on the effects of radiation on the human body have led to her receiving the Nobel Prize in Medicine for her innovations in highly effective anti-radiation tablets. With only minimal side effects, she astonished the judges when she exposed herself to a

near-lethal amount of radiation. Evan's continuous efforts to both design new spacesuits for serviceability and create new medicines to deal with radiation made her a prime candidate for the Second Martian Base mission.

Polina Ivanov, Russia

Polina Ivanov was born in the freezing depths of Siberia, home to picturesque sights and frequent subzero temperatures. Her home in the Sakha Republic region is one of the world's major sources of diamonds from the Mirny Diamond Mine. After decades of no use, the mine had allegedly reopened during Ivanov's early adult years, and she was tasked with safeguarding it from the outside world. Much of her past has been classified, however, she has been documented to be working with the Federal Guard Service of the Russian Federation. Ivanov has been tasked with safeguarding the Russian Federation's interests on Mars and the general safety of the other members of the Second Martian Base.

Rudra Kapoor, India

There is only one truth to Rudra Kapoor — the numbers don't lie. Kapoor was designated as "Gifted" in mathematics as a child, and their passions for statistics and natural talent in computer programming led them to become a data scientist. After working in retail for a decade, Kapoor became bored of gathering consumer shopping data and instead turned their sights toward the sky. After a few months of training, Kapoor renewed their passion for data analytics, interpreting data from space stations, rovers, and the annoying habits of their coworkers. With such a talented data scientist on board, Kapoor can kiss those sorry improbabilities away!

Dhruv Kumar, India

A perfectionist in all interactions, Dr. Dhruv Kumar is known for his cold and calculating medical procedures, with a near-perfect record. Kumar was honored to be nominated as the Head of Astronaut Safety Assurance and examine the vitals of his fellow astronauts along their journey. Before he left, his mentor, Sharad Dalavi, posed a question: "Are humans truly able to live in space, or are we too grounded on our Earth to explore the cosmos?" However, certain rumors have spread around claiming he tends to become "experimental" on some patients, but rumors are just rumors, right?

Esme Saint-Laurent, France

Being a serial entrepreneur means always looking for the next opportunity, even if you're currently busy with one. In efforts to distinguish herself from her family, Mrs. Saint-Laurent understands this concept very well. After enduring an altercation with her advisors, the distant heir to the Saint-Laurent family fortune, had the majority of her

wealth invested into the Second Martian Base mission. The advisors claimed the entrepreneur was deemed ‘unable’ to continue to manage her own finances, and that the investment was for the good of humanity. To keep her quiet, they’ve sent her packing on the trip with the public opinion of no longer being known as the “Forgotten Daughter of the Yves Saint Laurent Family,” but rather a new pioneer for the ages.

Bolin Li, China

World-renowned archaeologist Bolin-Li is the former Qinghai Minister of Antiquities and Director of Excavations for the Qinghai-Tibetan Plateau. Known for his charisma and ability to reach out to the public, for more than thirty years he has been raising awareness of archaeology and the preservation of Qinghai’s precious heritage. Though loved by many, he’s hated by others for some of his controversial archeological findings of extraterrestrial relics in the Dulan area. Certain critics denounce him for “spreading conspiracy theories,” his fans however are constantly refreshing his website for new updates about “alien relics” from his excavation sites. While he was one of the more disputed picks for this mission, his experience in archeology could prove useful for determining if there are any sentient signs of life on Mars, a question his fans are eagerly awaiting the answer to.

Luis Martinez, Brazil

Dr. Luis Martinez is a Brazilian born inventor and microbiologist. They have dedicated their time to conducting research on mosquito breeding conditions, which resulted in their discovery of highly successful arbovirus antivirals. They patented the various antivirals and was awarded the Charles Thom and Early Career Award from SIMB. Recently, they have begun to become overly captivated by their time in the limelight and wanted to work on more distinguished projects. They turned toward the Brazilian Space Agency (AEB) to try and fill this void and began researching the effects of antigravity and waterborne mycobacteria. It resulted in Martinez understanding the development of water pathogens and the ability to flawlessly replicate the pathogens.

Kaya Nkosi, South Africa

Out of hundreds of acclaimed architects from around the world that applied, Kaya Nkosi won the opportunity to design the First Martian Colony structure. After a myriad of seminars and courses from the South African National Space Agency (SANSA), Nkosi became an official member of the First Martian Colony mission. She helped to construct a habitable environment in the harsh conditions of Mars, developing the structural integrity and locating the compound in a prime location. Once her work was completed, Nkosi was shuttled home, and hailed as a national treasure for South Africa. In spite of her excellent work, when the First Martian Colony began to report decline, other nations

and corporations began looking for individuals to take the blame. In an effort to save her and her country's reputation, Nkosi volunteered to be a member of the Second Martian Base mission.

Mikhail Petrov, Russia

Mikhail Petrov is a Russian computer programmer, video game developer, and aerospace engineer. After dropping out of college, he co-founded the video game company Metavselennaya and was the lead programmer for many of the companies most popular games. After earning his fortune in video game development, Petrov wanted to become more involved in rocketry. He returned to school to major in aerospace engineering and learn about the production, design, and related systems to flight technology. He later became employed by the Lockheed Martin Engineering and Sciences Company located in Moscow. He began combining his two fields of interests to streamline the technology for flight and VR combat simulators. His contributions are being utilized by ROSCOSMOS, the Russian Space Agency, and are being scouted for military use from multiple nations.

Juliana Santos, Venezuela

Fascinated by the ever evolving field of robotics, Juliana Santos has spent her early years attempting to reverse engineer some of the best artificial intelligence software - Google Assistant and Amazon Alexa. At the age of 13, she successfully hacked into the satellite that is shared by CNSA and the ABAE. Agents appeared at her home the following day, but Santos agreed to detail the satellite's vulnerabilities in exchange for not getting in trouble. After her run in with the law, she decided to attend school for mechanical engineering and computer software design. She has since created a computer services team that dabbles in designing nearly sentient servant robots. The group has also been contracted by the Venezuelan government to design software that delivers supplies and weaponry, reinstates communication towers, and safeguards the nation's internet infrastructure.

Olivia Smith, Australia

Environmental scientist Dr. Olivia Smith is expanding their repertoire to include environmental aspects of Planetary Protection. Australia wishes to send them as their representative due to their extensive scientific knowledge and their quest to discover life beyond Earth. They joined the Search for Extraterrestrial Intelligence (SETI) institute in 2064, and focused on the potential habitability aspects of surface environments. Their broad experience in environmental science has its foundation in their doctoral degree in Geological, Marine, and Environmental Science from the Australian National University. In more recent years, they have worked with the Australian Museum to

understand the impacts of humans on the biodiversity of Australia, and long-term water cycle monitoring experiments in Death Valley, California along with in the Great Dividing Range of Australia. Their experiments have helped them develop survival skills for the very extreme environments.

Aiko Tanaka, Japan

Born in Tokyo, Japan, Aiko Tanaka knew from a young age that she wanted to be in the media spotlight. Her career began in elementary school as a model for catalogs and commercial ads. During this time, her parents also placed a heavy emphasis on her learning multiple languages: Japanese, English, Spanish, French, Arabic, and Russian. Wanting to pursue her career, Tanaka studied theater and public relations during college. To continue to honor her parents wishes, in her free time she could be found trying to learn new languages, including the controversial astrolinguistics. More recently, she has ventured into representing other talents and has helped establish some major actors and songwriters in both Japan and the United States, by continuing to keep their names at the forefront of the news.

Jacob Taylor, United Kingdom

Astronaut pilot Jacob Taylor always dreamed of becoming an astronaut, ever since he was a young child. As soon as he was old enough, he interned at the United Kingdom Space Agency and volunteered for any assignments. While his applications to visit low-orbit were rejected due to his low tolerance of g-forces, he continued training and persisting until he finally got his shot. After his first experience of spacewalking, he continued to work on consecutive missions, slowly learning the responsibilities and leadership skills that would help him in the future. After serving on twelve space missions and being awarded the Sir Arthur Clarke award for risking his life to save two crew members from floating away from the ISS, he proudly accepted the new opportunity as the Astronaut Commander for the Second Martian Base mission. He intends to put forth his best efforts in leading his crewmates to investigate the mysterious loss of contact on Mars.

Liam Tremblay, Canada

If there is one thing Liam Tremblay, former Prime Minister of Canada, has learned throughout his political career, it would be that money talks. The title of “Representative of the Earth” was a brilliant move by his Public Relations team, and he would be hailed as a hero on his return trip home. Now, if aliens actually do exist, good for them. If there are any encounters with these “little green men,” Liam gets the opportunity to speak first, being the “model citizen embellishing the best qualities of every Earthling.” He’ll have to remember to give a bonus to whoever from his team came up with that line.

James Williams, United States

Based out of the mainly uninhabited Nevada area, James Williams is fully convinced that the Earth is flat. Other geophysicists ignore his nearly two decades of experience studying the shape of the Earth, its reaction to forces, and its magnetic and gravitational fields. Throughout his career, he has worked to develop a significant following for his blog by posting weekly videos, recent experiment findings and attending flat earth conventions in the United States, Brazil, Italy, and Great Britain. He discovered the launch plans for the Second Martian Base, from a friend that charted the flight trajectory. He secretly launched with the rest of the crew before being discovered when the shuttle was too far beyond the Earth's atmosphere.

Haru Yoshida, Japan

Everyone Haru Yoshida knew always told him not to go into agricultural science. He, however, decided to follow his own path. Due to the drastic effects of climate change on the agricultural industry, his career has become more important than before. Yoshida would experiment day in and day out with the different conditions of how specific types of plants grow in order to improve food quantity and quality. When searching for academic grants, he spotted the offer to study growing plants in space and immediately gravitated towards the opportunity. Yoshida made sure to bring all kinds of seeds from different forms of vegetation on Earth for his experiments, but not even he knows how the Martian environment will affect the flora.

Bao Zhang, China

A rising star of the China National Space Administration, Bao Zhang's innovations on recent satellite projects has helped create smaller and less costly satellite imagery technology. While rockets and human exploration get most of the attention, a quiet and often overlooked avenue is the area of satellite technologist. The result is an explosion of data and imagery from orbit. Their sister was a part of the First Martian Colony crew, and they became extremely worried when communications were abruptly cut, considering they were the one who approved of its final design. While Zhang assisted mission control during the year of radio silence from the First Martian Colony, there was the constant worry of what may have happened to their sister. This led Zhang to volunteer for the Second Martian Base renaissance team.

Glossary

ABAE - An abbreviation for the Bolivarian Agency for Space Activities, under the country of Venezuela.

Aerospace - A research field devoted to the study of Earth's atmosphere and the space beyond or to aircraft that travel in the atmosphere and space.

AEB - An abbreviation for the Brazilian Space Agency.

ASA - An abbreviation for the Australian Space Agency.

AIAA - An abbreviation for the American Institute of Aeronautics and Astronautics.

Centripetal Force - a force that acts on a body moving in a circular path and is directed toward the center around which the body is moving.

CNES - An abbreviation for the Space program of France, National Centre for Space Studies.

CNSA - An abbreviation for the China National Space Administration.

CSA - An abbreviation for the Canadian Space Agency, also known as ASC

CSF - An abbreviation for the Commercial Spaceflight Federation. The CSF is a privately owned spaceflight industry group, incorporated as an industry association for the purposes of establishing ever higher levels of safety for the commercial human spaceflight industry, sharing best practices and expertise, and promoting the growth of the industry worldwide.

Electrolysis - A technique that uses a direct electric current to drive an otherwise non-spontaneous chemical reaction.

Engineer - A person who uses science to solve problems. As a verb, to engineer means to design a device, material or process that will solve some problem or unmet need. (v.) To perform these tasks, or the name for a person who performs such tasks.

Environmental Carrying Capacity - an ecological concept defined generally as the population of organisms that can be sustained at a steady state considering the resources available in the ecosystem in which they reside.

Force - Some outside influence that can change the motion of a body, hold bodies close to one another, or produce motion or stress in a stationary body.

Fundamental States of Matter - There are four natural states of matter: solids, liquids, gases, and plasma.

Hydrothermal Pools - “hot spring”, that is produced by the emergence of geothermally heated groundwater onto the surface of the planet.

ISS: An abbreviation for the International Space Station. An artificial satellite that orbits Earth. Run by the United States and Russia, this station provides a research laboratory from which scientists can conduct experiments in biology, physics and astronomy – and make observations of Earth. The ISS comprises members from Canada, Japan, the Russian Federation, the United States, and eleven Member States of the European Space Agency (Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom).

ISRO - An abbreviation for the Indian Space Research Organisation.

JAXA - An abbreviation for the Japan Aerospace Exploration Agency.

Magnetic Field - A place in space near a magnet or an electric current where a physical field is created from a moving electric charge that creates force on another moving electric charge.

NASA - An abbreviation for the National Aeronautics and Space Administration, a part of the United States Government.

Physics - The scientific study of the nature and properties of matter and energy. Classical physics is an explanation of the nature and properties of matter and energy that relies on descriptions such as Newton’s laws of motion. Quantum physics, a field of study that emerged later, is a more accurate way of explaining the motions and behavior of matter.

Plasma - One of the four fundamental states of matter that consist of a gas of ions. This is the most abundant form of ordinary matter in the universe and is mostly found in the stars.

Propulsion - The act or process of driving something forward, using a force. For instance, jet engines are one source of propulsion used for keeping airplanes aloft.

ROSCOSMOS - An abbreviation for the Russian Federal Space Agency.

SANSA - An abbreviation for the South African National Space Agency.

SETI - An abbreviation for Search for Extraterrestrial Intelligence, meaning life on other worlds.

Thrust - The force that moves an aircraft through the air.

UAP - An abbreviation for unidentified aerial phenomenon. It can be a phenomenon or object in the atmosphere, observed from the ground or the air, whose nature or cause remains unexplained even after subsequent scientific analysis.

UKSA - An abbreviation for the United Kingdom Space Agency

USGS - An abbreviation for United States Geological Survey, a science bureau within the United States Department of the Interior

Variable Specific Impulse Magnetoplasma Rocket - (VASIMR), An engine type that relies on a plasma-based propulsion system. An electric power source is used to ionize fuel into plasma. The electric fields heat and accelerate the plasma, while magnetic fields direct the plasma into the proper direction as it is ejected from the engine. This creates thrust for the spacecraft. The technology is still in the experimental phase.

References

- AIAA, Kumar Biswal M, M., & Naidu Annavarapu, R. (2021, January 4). *Mission Architectures: Studies, Analysis, and Operational Scenarios for Human Exploration*. <https://arc.aiaa.org/doi/abs/10.2514/6.2021-0628>. Retrieved November 6, 2021, from <https://arc.aiaa.org/doi/abs/10.2514/6.2021-0628>
- Brookshire, B. (2021, May 4). *Staying grounded in space requires artificial gravity*. <https://www.sciencenewsforstudents.org/article/staying-grounded-in-space-requires-artificial-gravity>. Retrieved November 6, 2021, from <https://www.sciencenewsforstudents.org/article/staying-grounded-in-space-requires-artificial-gravity>
- Carnegie Mellon University. (n.d.). *US Environmental Carrying Capacity*. <https://www.cmu.edu/steinbrenner/programs/fellows/index.html#:~:text=Environmental%20carrying%20capacity%20is%20an,Ecosystem%20in%20which%20they%20reside>. Retrieved November 6, 2021, from <https://www.cmu.edu/steinbrenner/programs/fellows/index.html#:~:text=Environmental%20carrying%20capacity%20is%20an,Ecosystem%20in%20which%20they%20reside>
- CSA. (2020, December 11). *Everyday Benefits of Space Exploration*. <https://www.asc-csa.gc.ca/eng/about/Everyday-Benefits-of-Space-Exploration/Default.Asp>. Retrieved November 6, 2021, from <https://www.asc-csa.gc.ca/eng/about/Everyday-Benefits-of-Space-Exploration/Default.Asp>

Demidov, O., Mercedes, R., Morozov, A., Pashkin, V., Denisov, M., Volkova, N., Nosova, A., Schaga, T., Karacharskova, K., Inocente, D., Bouthot, C., & Satinsky, D.

(2019). *New Mir Colony*. <https://www.youtube.com/watch?v=Yw23pIjbMVk>.

Retrieved November 6, 2021, from

<https://www.youtube.com/watch?v=Yw23pIjbMVk>

NASA. (2000, November 12). *Breathing Easy on the Space Station*.

https://science.nasa.gov/science-news/science-at-nasa/2000/ast13nov_1.

Retrieved November 6, 2021, from

https://science.nasa.gov/science-news/science-at-nasa/2000/ast13nov_1

NASA. (n.d.). *Cruise*.

[https://mars.nasa.gov/mars2020/timeline/cruise/#:~:Text=The%20cruise%20ophase%20begins%20after,Miles%20\(480%20million%20kilometers\)](https://mars.nasa.gov/mars2020/timeline/cruise/#:~:Text=The%20cruise%20ophase%20begins%20after,Miles%20(480%20million%20kilometers)). Retrieved

November 6, 2021, from

[https://mars.nasa.gov/mars2020/timeline/cruise/#:~:Text=The%20cruise%20ophase%20begins%20after,miles%20\(480%20million%20kilometers\)](https://mars.nasa.gov/mars2020/timeline/cruise/#:~:Text=The%20cruise%20ophase%20begins%20after,miles%20(480%20million%20kilometers))

NASA. (2008, March 23). *Valles Marineris: The Grand Canyon of Mars*.

https://www.nasa.gov/multimedia/imagegallery/image_feature_83.html.

Retrieved November 6, 2021, from

https://www.nasa.gov/multimedia/imagegallery/image_feature_83.html

Office of the Director of National Intelligence for the United States. (2021, June 25).

Preliminary Assessment: Unidentified Aerial Phenomena. Director of National

Intelligence. Retrieved December 10, 2021, from

<https://www.dni.gov/files/ODNI/documents/assessments/Preliminary-Assessment-UAP-20210625.pdf>

Union of Soviet Socialist Republics. (1966, June). *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*. U.S. Department of State Archives. Retrieved December 11, 2021, from <https://2009-2017.state.gov/t/isn/5181.htm>

USGS. (n.d.). *Valles Marineris - The Grand Canyon of Mars*.

https://www.usgs.gov/centers/astrogeology-science-center/science/valles-marineris-grand-canyon-mars?qt-science_center_objects=0#qt-science_center_objects. Retrieved November 6, 2021, from https://www.usgs.gov/centers/astrogeology-science-center/science/valles-marineris-grand-canyon-mars?qt-science_center_objects=0#qt-science_center_objects

Witbeck, N. E., Tanaka, K. L., & Scott, D. H. (1991). *Geologic map of the Valles Marineris region, Mars*. <https://pubs.er.usgs.gov/publication/i2010>. Retrieved November 6, 2021, from <https://pubs.er.usgs.gov/publication/i2010>

Zimmerman, R. (2019, December 23). *A Deep Dive into Valles Marineris*.

<https://behindtheblack.com/behind-the-black/essays-and-commentaries/a-deep-dive-into-valles-marineris/>. Retrieved November 6, 2021, from <https://behindtheblack.com/behind-the-black/essays-and-commentaries/a-deep-dive-into-valles-marineris/>

