ONETROY
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UNOOSA:SPACE COOPERATION

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TROY HIGH SCHOOL & ATHENS HIGH SCHOOL
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Letter from the Chair

Dear Delegates,

It is both a pleasure and a privilege to welcome you to the 2022 OneTroy conference as a delegate to UNOOSA.

With other committee members, working towards a solution through debate, consensus building and mutual support, you will probe and work to resolve topics to ensure a better future.

Through this background guide (and sources page), you will gain a basic understanding of the topic and we encourage you to use this as a base for your research.

We look forward to the thoughtful and innovative work we will do together.

Good luck with your research and if you have any questions at all, please email us at any of the following emails.

Best Regards,

Your Chairs

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About UNOOSA

The United Nations Office for Outer Space Affairs (UNOOSA) woorks to help all countries, especially developing countries, access and leverage the benefits of space to accelerate sustainable development. UNOOSA works toward this goal through a variety of activities that cover all aspects related to space, from space law to space applications.

Goal of Committee

The main goal of this committee is to improve and further international space cooperation. We look to see plans for collaboration, space corporatization/privatization, space debris, extraterrestrial exploration, and exploring habitable planets. Keep in mind that the ISS will be decommissioned in 2031. This may impact some of your ideas and proposals that you may want to make, as nations previously participating in the ISS may now have new funds to allocate to new international space projects on the rise, presented by you. We can't wait to see what amazing ideas you will bring to committee!

Introduction of the Topic

As technology and engineering in space rapidly improve, mankind is able to achieve greater feats and further explore and understand the vast depths of space. Space agencies and private corporations work around the globe to solve problems involving space, and have done so for over 25 years. The key to this success has been due in large part to international cooperation regarding space, particularly international programs such as the ISS. Moving forward, there will be substantial changes in this department, as new technology enables nations to work either independently or cooperate with other space agencies to solve these problems. The decommissioning of the ISS is one such example, which will change the landscape of space cooperation in the near future and affect the outcome of these ideas and proposals.

Topic: Space Cooperation

SUBTOPIC 1 : SPACE PRIVATIZATION/CORPORATION

PUBLIC SPACE TRAVEL

History and Current Standing

Public space travel has been an alluring opportunity for space agencies and corporations since the start of space exploration during the Cold-War-era space race. Museums and businesses alike capitalized on the allure of space by offering space exhibits, space-related media, and space-related products; this practice is still ongoing today through mediums such as social media content pertaining to space, space newsletters from agencies such as NASA, and science fiction movies depicting space in many different lights.

The 2020s have seen massive leaps and developments in the emerging field of public space tourism, alluring the public eye with the promise of experiencing the stunning views of the cosmos in the surprisingly near future. The year 2021 saw SpaceX launching four amateur astronauts into Earth's orbit for the first in history, and a film crew from Russia spending 12 days on the ISS shooting the first ever "in-space" movie. Such events are now proving to corporations that public space travel is not only feasible, but also a viable and profitable source of income with incredibly high demand. 49% of Americans want to travel to space, and there is a significant amount of Americans (28% of men and Generation Z) would rather travel to space than be debt-free; such demand is only on the rise, incentivizing corporations and space agencies to conduct massive amounts of research and development into space tourism. Currently, space tourism is exorbitantly expensive yet still thriving for such a young industry, with more and more multi-millionaires and billionaires spending hundreds of thousands to tens of millions of dollars on "space vacations" offered by various venues; such spending will be able to keep companies afloat while they develop cheaper sources of space travel, further proving the viability of space tourism as a business. There are only a few main vendors of space tourism options at the moment - consisting mainly of SpaceX, Virgin Galactic, and Blue Origin, Axiom Space, and Space Perspective - which makes for some massive diversification opportunities in the market.

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SUBTOPIC 1: SPACE PRIVATIZATION/CORPORATION

Current and Proposed Methods

There are several existing modes of space tourism available on the market for wealthy individuals to partake in, ranging balloon-powered stratosphere trips (~$125,000), to orbital rides aboard shuttles (~$450,000), to 10-day long stays aboard the ISS (~$55 million). These trips provide a rudimentary experience of space travel, as they are either incredibly low-duration (sometimes as low as just an hour long) or they are incredibly cumbersome (no accommodations, no usual food, no real comfort); the space tourism experience is a niche within a niche.

There are certainly limitations to these current methodologies, such as training the amateur astronauts for the journey, the immense costs, the lack of gravity, and the lack of accommodations. These limitations make space tourism unappealing or unapproachable to average consumers and even wealthy consumers who simply do not want to experience the discomfort of space or do not want to spend extreme costs on short-lived or uncomfortable trips. However, there have been many proposed solutions for the limitations of space tourism, with most currently in testing.

Zero Gravity

One of the biggest limitations of modern space tourism is the biological hindrance of the human body; humans did not evolve to experience zero-gravity or micro-gravity, making space travel uncomfortable or even dangerous to withstand. The effects of zero-gravity on humans have been studied extensively by space agencies during the research of the ISS. Short-term zero-gravity exposure can cause immense nausea, dizziness, high blood pressure, and loss of spatial perception; such effects can cause immense discomfort, harm, or even death in an individual if not properly controlled.

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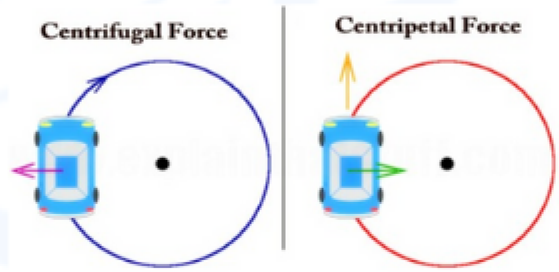
SUBTOPIC 1: SPACE PRIVATIZATION/CORPORATION

Zero Gravity-Continuation

Long-term zero-gravity exposure can lead to muscle atrophy, bone deterioration, heart strain, and redistribution of blood; such effects can be extremely dangerous and crippling over time, and may even lead to difficulty with landing back on Earth. There are have been fixes designed for most of these problems: nausea can be avoided through medication which suppresses the response, high blood pressure and blood redistribution can be remedied through pressurized suits or chambers, and muscle atrophy and bone loss can be remedied through intense exercise in space or rehabilitation back on Earth. Such solutions are great for professional astronauts and shuttle pilots conducting research in space, but are certainly cumbersome for tourists, which is a massive hurdle for space tourism to overcome.

There have been a plethora of proposed commodity solutions for the problem of zero-gravity since the 1990s which are now being extensively researched, with the two main candidates being short-term centrifuge models as well as spinning habits for long-term stays. The first model uses centrifugal force to simulate a sense of gravity in very small environments, such as observation pods and sleeping pods; centrifugal force is the principle that an object moving along a circular path will experience a pull away from the center of rotation, which is the same type of force seen when spinned around a bucket of water, causing the water to move to the bottom of the bucket and not spill. This is quite the expensive solution to implement in the short term as it requires immense power and mass for the centrifugal pod, and it is also quite impractical for full tourism as it cannot be implemented on a large scale. The more promising solution is in fact large centripetal spinning habitats. Centripetal force is the opposite of centrifugal force, stating that an object will move towards its center of rotation when moving along a straight path constantly changing directions; this force would allow for a simulation of Earth-like gravity in space. Spinning habits can be in the form of medium-sized space shuttles or massive space hotels, as their basic properties are identical regardless of size; the technology to construct such structures is technically currently available, but is impractical and astronomically expensive to implement without further innovation to lessen the costs and increase the safety of the mechanisms.



Topic: Space Cooperation

SUBTOPIC 1: SPACE PRIVATIZATION/CORPORATION

Accommodations

Space travel will require effort on the part of both producer and consumer to make it feasible. It is more fitting to think of space tourism - at least in its current and near-future doable form - as a form of adventure rather than a form of leisure tourism; a kayaking trip instead of a relaxing stay at the beach. Such adventure needs sacrifices from its consumers, with the biggest one being initial preparation. Thorough passenger preparation is absolutely necessary for space travel and will most likely continue to be, with such preparation likely including specialized training for handling the effects of microgravity on the body and getting to know the systems on board shuttles and residential facilities. Such training may need to be transformed from a burden on the consumer into a part of the space tourism experience, possibly even becoming a publicly sought-after form of training on Earth used to transition into a large-scale boom of space tourism and exploration.

Food has been a major setback for modern space tourism, as current astronaut meals may be seen as unsuitable for regular consumers due to their "unnatural" texture and composition used to make them more compact and efficient to transport; therefore there will need to be immense innovations as to make nourishment not only viable, but enjoyable for travelers. Such innovation can be seen in hydroponic farming, which is a technique of farming not involving soil; space hydroponic farming has been a new field of research in the modern era of space travel, as it mostly pertains for longer stays requiring much nourishment for crew and passengers. Aquaponic farms are also an incredibly useful innovation for nourishment in space, as they allow for the coupling of farms and fisheries into one efficient and compact habitat; aquaponic farms work through the process of waste conversion: as the fish in the fishery tank produce waste, it gets consumed by microbes which convert it into fertilizer for plants growing above the fishery, which then filter water returning to the fish, restarting the cycle anew. Coupling hydroponic and aquaponic farming could make for an incredibly stable, efficient, and varied diet of plants and seafood for consumers while also lowering the cost for venues.

Environmental Impact

Public space travel's main technological hurdles come from its lack of efficiency rather than its lack of feasibility. It currently costs $10,000 to transport a pound of payload into Low-Earth Orbit (LEO), which makes transportation of resources and people an immense task to tackle for space agencies and corporations alike; most of this cost comes from the lack of efficiency of space travel in general. Rockets are incredibly inefficient methods of transportation, as they are counterintuitive by nature; most of a rocket's weight is composed of the fuel and oxygen which it requires to lift off and move its very low-weight cargo into space, with said increasing fuel and oxygen weight requiring even more fuel and oxygen to push, leading to a delicate balancing act of figuring out the optimum ratio of cargo to fuel/oxygen. Rockets are also multi staged, meaning that once a reservoir of fuel and oxygen runs out, that component of the rocket must be detached as to get rid of the "dead weight", which is incredibly harmful for the environment as the detached rocket sections either get burnt in the atmosphere, crashing back onto Earth, or floating in space. The only way to lessen the costs and environmental impacts of space travel as a whole is to make rockets and shuttles more efficient to operate. This is currently being done by using reusable rocket boosters, first used by SpaceX's Falcon 9-R in 2013; this technology is now being improved by making the boosters autonomously landing, which SpaceX first did successfully in 2015 and has since replicated more than eight times. Reusable rocket engines would allow for a great decrease in costs for both producers and consumers of space travel, with the technology only continuing to grow.

The environmental impact of space travel is also rightfully concerning for many, as launching people and cargo into space requires an immense amount of fuel which contributes to global climate change; making space travel an accessible commodity would only cause its environmental impact to skyrocket, leading to even more accelerated global warming during a time during which it must be slowed. Currently, a single SpaceX rocket launch emits 112 tonnes of refined kerosene, totalling 336 tonnes of carbon dioxide released into the atmosphere; rocket engines also release chlorine, soot particles, and aluminum oxide, which all corrode the ozone layer. Reusable rockets are able to lessen the impact of rocket launches, but the main component of the problem is still the fuel itself.

Environmental Impact- Continuation

Research is being conducted into a few fuel alternatives for rockets, most notably hydrogen-oxygen boosters as well as hydrazine-free fuels. Hydrogen-oxygen boosters utilize liquid hydrogen in conjunction with oxygen gas to create extremely efficient and environmentally friendly propulsion, making it a great potential alternative for normal fossil-fuel based rocket fuel; it is currently inefficient to produce such immense amount of liquid hydrogen, so research is needed for the viability of attaining it. Another possibility can also be seen in fusion reactors for propulsion, as they are incredibly efficient and would produce nearly zero waste. Fusion propulsion relies on magnetically launching a fusion-based propellant at incredibly high speeds - launching a rocket through that propulsion with incredible efficiency as the propellant itself is extremely compact and produces almost no waste byproducts. Such technology and resources are not currently at hand, but may soon be within reach as it gets further research and development.

Topic: Space Cooperation

SUBTOPIC 2: AUTOMATION

AUTOMATION

As space programs around the world are taking great strides in the advancements of their technology, robotics and automation are slowly becoming the new norm in regard to space travel, and many countries find this to be a better alternative to manned missions. Autonomous systems are operated independently of other management and control systems, though may include human operators (i.e., crew) as part of the operation. These new breakthroughs in automation allow space agencies and countries to repair and maintain satellites, transport resources, and launch various other space projects. Additionally, this technology can be used in conjunction with automated missions, as the implementation of AI (artificial intelligence) allows decisions regarding the system operations to be handled autonomously, allowing astronauts to perform other necessary duties easily. Several private companies such as SpaceX and Blue Origin have begun using autonomous spacecrafts in their launches, and the national space agencies NASA and ESA have used these systems for the past 5 years.

Furthermore, the advent of autonomous spacecraft systems allows for deeper exploration of space, into uncharted territories unsafe for man. Autonomous probes and rovers can be sent into the far reaches of space and on the surface of remote planets to observe and research. NASA has unveiled plans over the next decade to create such probes, which negate the need for automated systems by man and lower the risks astronauts take during their missions.

However, several countries take issue with the practice of using autonomous systems, especially concerning matters within Earth's orbit. Countries such as China and Russia openly express their trepidations with the technology, as repairing satellites and other spacecrafts that allow foreign countries to easily spy on other nations under the guise of repair. Additionally, these autonomous repairs can easily hide new features added to the satellites, which many countries have felt concern over. Autonomous spacecrafts and systems are a wonderful tool, as they allow for new possibilities in space humans could not achieve on their own. On the other hand, certain possibilities of this technology are frightening and can potentially sow discord between nations due to secrecy and deception.

Topic: Space Cooperation

SUBTOPIC 3: SATELLITLE NETWORKS

SUBTOPIC 4: ASTEROID MINING

SATELLITLE NETWORKS

Satellite networks have been and continue to be a crucial asset to our communication, entertainment, and everyday lives. However, with the creation of large monopolies such as Comsat Corp., a United States corporation that wields an enormous amount of power over U.S. phones and transmissions that go through both INTELSAT's and Imarsat's systems, it is hard to decide whether or not these systems are cost effective and provide equal benefit nationally.

In addition, this monopoly by Cosmat Corp. has increased dependence of other nations on INTELSAT and Imarsat's networks than that of the United States. While these systems still carry the title of "global networks", many foreign nations are unhappy with the dependence and high costs of these networks outside of the United States. For example, the privatization of INTELSAT systems in July 2001, aimed to cut down telephone and video costs for U.S. consumers by $3 billion over the next decade.

Along with the privatization of global networks, the Open Market Reorganization for the Betterment of International Telecommunications (ORBIT) Act, passed in 2000, received extreme backlash and had to be amended. The act's anti-merger provisions intended to preserve the new status quo as a way to ensure continued competition in satellite services globally.

ASTEROID MINING

Asteroid mining is the exploitation of materials in outer space, whether that's in planets or meteorites. Long term, this is a viable solution as many minerals such as iron, nickel, iridium, palladium, platinum, gold, and magnesium can all be found in asteroids. As the earth is continually getting exploited and natural resources are drained, asteroid mining is becoming more and more applicable as it not only replenishes and sustains the resources on earth, but also maintains human presence in space. This is also extremely profitable. According to NASA, it costs 2.6 billion dollars to mine asteroids.

ASTEROID MINING- CONTINUATION

The returns are sky high. The economically valuable materials present on the asteroid Ryugu have a total estimated value of 82.76 billion U.S. dollars, and are estimated to have a profit of **30.08 billion U.S. dollars** once the costs of mining are taken into consideration.
Nevertheless, it's important to acknowledge various difficulties such as transportation of material back to Earth as well as safety.
There very well could be elements that could be discovered from exploring outer space and asteroid mining. However, there are many concerns regarding this topic. For one, loosely-regulated space mining could result in the destruction of deposits that could hold invaluable scientific information. It could also kick up dangerous amounts of lunar dust that can cause serious damage to space vehicles, increase the amount of space debris, or in a worst-case scenario, create meteorites that could threaten satellites or even impact Earth. This is an area that requires laws and regulations.

Topic: Space Cooperation

SUBTOPIC 5: COLONIZATION

COLONIZATION

Access to water, food, space, people, construction materials, energy, transportation, communications, life support, simulated gravity, radiation protection, and investment are just a few of the criteria that scientists generally consider when addressing colonization. Mars and Venus are the most probable causes for settlement in the solar system. Other planets that can be inhabited also include the Moon and perhaps Mercury. It is even claimed that mankind would settle Mars by the year 2050. However, colonizing planets is incredibly expensive. Survival on Mars will necessitate the use of advanced life support equipment in constructed dwellings. Difficulties and dangers, radiation exposure on the ground, hazardous soil, low gravity, the isolation that comes with Mars' distance from Earth, a lack of water, and frigid temperatures are just a few of the ongoing issues. There's also the possibility that humans may starve, freeze, run out of air, or be exposed to lethal radiation dosages. Dust storms are also a significant problem on Mars.

Mars habitats are currently proposed to be extremely harsh to inhabit, as they mainly consist of pressurized, closed tubes intended to keep astronauts shielded from radiation and lack of oxygen in Mars' extremely thin atmosphere. Such habitats would have much physical and mental strain on colonists, as there would be no natural light as well as a strong lack of gravity; colonists would need to have strong mental capabilities to survive the conditions as well as do immense physical activity as to preserve their muscles and bones from atrophying in the low gravity environment. Hydroponic and aquaponic farming could also be used in these habitats as sources of nourishment, but would have to be much further researched as to work in the Mars habitats. Finally, there is an ongoing research debate regarding the levels of automation required for such large scale levels of colonization as well as the methods of transportation of cargo and passengers; research is currently in progress regarding technologies such as magnetic launch devices (a substitute for rockets for launching cargo from moons or planets to other celestial bodies, which would require immense investments into infrastructure), mining robots, and a full suite of automated machinery and rockets as discussed in the Automation Section.

Topic: Space Cooperation

SUBTOPIC 6: SPACE DEBRIS

SPACE DEBRIS

Pre-existing debris in space

Over the past 60 years, roughly 5,520 space launches have caused an orbital junkyard consisting of around 23,000 objects large enough to be detected, with a combined weight of over 8,000 tons on Earth. The current issue surrounding space debris poses a dangerous threat to not just future space exploration and missions, but also satellites that are currently in orbit. These satellites are of great importance to many countries, and serve many uses such as communication in disaster areas, obtaining information about weather for use in agriculture/fishing and sharing medical information; currently, however, the copious amounts of space trash exhibit a trend in which they collide with said satellite, rendering them incapable of serving their purposes. Not to mention this constant collision creates even more space debris. It is predicted by scientists that one day all the space debris will render the Earth's orbit unstable .

Environmental Dillema

As previously discussed, the shooting of waste into space is a great way to get it off terrestrial soil, but it raises a high amount of concern regarding the environmental impact of said methodology on the upper atmosphere as well as the space in Low Earth Orbit. Shooting any sort of debris into space makes future launches exponentially more difficult, as spacecraft would now have to not only be accurate in their trajectories regarding gravity and velocity but also their avoidance of space debris (which may be traveling at over 15,000 mph and could cause immense damage to the hull of any spacecraft); such difficulty is a major point of contention when it comes to the launching of debris, so research is ongoing as to how to avoid the crowding of Low Earth Orbit with debris as well as how to clean up existing space debris. There is an economic and environmental balance to be reached by the nations of the world as to how best handle the issue of space debris in regards to terrestrial waste, as an "out of sight, out of mind" approach may prove catastrophic for future space travel while being slightly more convenient in the short run.

Topic: Space Cooperation

SUBTOPIC 6: SPACE DEBRIS

Current situation/problem

As things currently stand in the world, the estimated cost to weight ratio of shooting objects such as waste into space is around $10,000 per pound or $22,000 per kilogram. This wastage of resources and money is just doing more harm than good as of now and if we were to launch all of the United State's daily waste it would cost more than 2.6 quadrillion USD daily. If the waste was instead nuclear, it would cost about 1.6 trillion USD per century when compared to the current nuclear situation costing only a fraction of the cost at just 58 billion USD per century. Along with that, the risk of failure is astronomical if a single space ship detonates.

Shooting waste into space is problematic and adds to the space debris issue. Addressing space debris, the United Nation currently conducts bi-annual reports regarding the amounts of space debris to determine if more dire action needs to be taken, but said action has yet to be taken.

Topic: Space Cooperation

SUBTOPIC 7: RADIOACTIVE WASTE

RADIOACTIVE WASTE

Effect of radioactive waste

Radioactive (or nuclear) waste is a type of man-made waste that contains radioactive material. It is considered hazardous because it emits radioactive particles, which if not properly managed can be a risk to human, animal, and environmental health. It is a result of many activities, including nuclear medicine, nuclear research, nuclear power generation, rare-earth mining, and nuclear weapons processing. The transport of radioactive waste can also release large carbon dioxide emissions. The top 5 nuclear energy generating countries are the U.S, China, France, Russia, South Korea. India, Pakistan, North Korea, and Israel all sell nuclear weapons.

There are two main types of radioactive waste: high-level or low-level waste. High-level waste (HLW) is primarily spent fuel removed from nuclear reactors after producing electricity and takes around 1,000 years to decay to harmless material. Low-level waste (LLW) comes from reactor operations and from medical, academic, industrial and other commercial uses of radioactive materials.

Radioactive waste leakage

Although most waste is well sealed inside huge drums of steel and concrete, sometimes accidents can happen and leaks can occur. The main safety concern has always been the possibility of an uncontrolled release of radioactive material, leading to contamination and consequent radiation exposure off-site. Depending on the dose of radiation, this ranges from skin rashes, vomiting and diarrhea, to coma and death. There is also a risk of long-term health effects; cancer may develop many years after the exposure. Some disastrous nuclear power plant accidents include Chernobyl (1986), Fukushima (2011), and Three Mile Island (1979).

Current Solutions

Many countries are taking major steps to dispose of all types of nuclear and radioactive waste, with more than 80% of all solid radioactive waste volume now in disposal. The provision of funds/financing mechanisms to pay for decommissioning and radioactive waste disposal are well established in most countries. Several projects are underway to dispose of spent fuel and HLW (LLW is easily disposed of safely). Used nuclear fuel can be recycled to make new fuel and byproducts. More than 90% of its potential energy still remains in the fuel, even after five years of operation in a reactor. Currently, HLW is mostly stored at its production facility. In the future, many countries including Finland, France, Japan, United States and Sweden have developed plans for disposal sites in deep geological repositories.

Topic: Space Cooperation

SUBTOPIC 8:SEARCHING FOR EXTRATERRESTRIAL LIFE AND HABITABLE PLANETS

EXTRATERRESTRIAL LIFE AND HABITABLE PLANETS

Globally, there are multiple initiatives to research and investigate the possibility of extraterrestrial life and planets that can support life. Many are long-standing programs with decades of research and experience, such as the Search for Extraterrestrial Intelligence (SETI) Institute in the United States.

Previously, the planetary explorers of the 1960s and 1970s found no trace of life or even any potential life-supporting environments throughout the solar system. The 1976 Mars Viking Lander attempted to search for signs of biological activity in the soil of Mars but only yielded discouraging results. However, in 1998, NASA scientists made the exciting discovery of possibly fossilized ancient Martian bacteria that was found in a meteorite. This rock appeared to have been blasted from the surface of Mars due to a substantial cosmic impact, and it floated in space for millions of years until crashing on Earth in Antarctica. This discovery provided the fuel for scientists to continue their research into other forms of life in space.

There have been increasing calls for renewed, strengthened efforts to conduct further research into this area of study. For example, the European Space Agency has made new plans for Europa missions dedicated to the investigation into extraterrestrial signs of life. Additionally, a group of NASA scientists, headed by the former chief scientist James Green, recently published an article urging the creation of a framework to report on the findings of life outside of Earth. They aim to utilize the work and developments made in astrobiology, which is the interdisciplinary study of the origins, evolution, and the future of life in the universe. Also known as exobiology, scientists in this area of study no longer limit their work to just planetary environments. They are increasingly looking towards Comets, space rocks that are rich in organic material and have the capacity to house some form of life.

BLOC Positions

MAIN ISS COUNTRIES

These are primarily Western and European countries who are integral parts of the ISS and have been an essential asset to the planning and commissioning of the ISS. It is worth noting that most of these nations are developed countries with enough economic stability to advance and fund their space endeavors.These countries also have their own space programs along with being a member of the ISS and will have significant contribution to the committee trajectory.

COUNTRIES WITH DEVELOPING SPACE PROGRAM

These are countries that don't have fully developed space programs but are willing to collaborate with other developed nations to further their own space agendas. This includes countries that have already or are currently collaborating on certain projects with foreign nations. Furthermore, keep in mind that some nations with their own space programs may not be totally open to cooperating (i.e. space race), thus it will be up to the other nations to persuade them to do so.

COUNTRIES WITH NO CURRENT SPACE PROGRAM

These countries are developing nations with scarce amounts of resources and are unable to fund space development programs. However, they are willing to partner with and observe future projects to eventually begin their programs when they gather enough resources and economic stability. It is up to other countries to decide on whether to donate funds to allow these nations to start small programs of their own.

Questions to Consider

QUESTIONS IN ORDER

1) How much should the government be involved with the rise of public space travel?
2) Should public space travel be a global effort or national? Why?
3) What failsafes should be implemented to make space travel safer for passengers?
4) How can space travel be incentivized for consumers and producers alike?
5) Should autonomous systems become the norm in spacecraft and satellite repair? Why?
6) How do autonomous systems threaten global peace?
7) Should autonomous systems only be used in conjunction with automated systems?
8) How can satellite systems be changed to be more inclusive to other countries?
9) What can be done to allow other countries to have oversight on satellite networks?
10) What measures should be put in place to prevent the creation of any future monopolies/privatization by large corporations?
11) Is it worth the investment into removing regular waste and/or nuclear waste off this planet?
12) How can the environmental impact be compensated?

Sources:

https://observer.com/2021/11/commercial-space-travel-roundup-spacex-blue-origin-virgin/

https://ntrs.nasa.gov/api/citations/19990032557/downloads/19990032557.pdf

https://www.valuepenguin.com/travel/americans-space-travel

https://www.nature.com/scitable/blog/scibytes/cosmic_travels_inc_the_effect/#:~:text=Without%20the%20downward%20pull%20of,endured%20by%20our%20skeletal%20system.

https://space.stackexchange.com/questions/22458/why-isnt-a-centrifuge-used-for-astronauts-on-the-space-station
https://www.verticalroots.com/the-what-and-why-of-hydroponic-farming/

https://www.motherearthnews.com/organic-gardening/aquaponic-gardening-growing-fish-vegetables-together/

https://www.nasa.gov/centers/marshall/news/background/facts/astp.html#:~:text=Today%2C%20it%20costs%20%2410%2C000%20to,per%20pound%20within%2040%20years.

https://phys.org/news/2015-11-rocket-sciencewe-space.html#:~:text=Rockets%20are%20inefficient&text=You%20point%20it%20in%20the,they%20need%20to%20burn%20it.

https://www.sciencefocus.com/science/environmentally-friendly-space-travel/

https://www.nasa.gov/topics/technology/hydrogen/hydrogen_fuel_of_choice.html

https://www.nasa.gov/directorates/spacetech/niac/2012_Phase_II_fusion_driven_rocket/

Sources:

https://www.statista.com/statistics/656590/cost-effective-asteroid-mining-value-and-profit-estimates/

https://singularityhub.com/2020/10/12/the-us-is-trying-to-hijack-space-mining-and-there-could-be-disastrous-consequences/

https://talk.economistfoundation.org/projects/space-exploration/the-discussion/asteroid-mining-can-we-do-it/

https://www.generalkinematics.com/blog/mining-in-space/#:~:text=More%20Than%20Metals,magnesium%20to%20name%20a%20few.

https://www.seti.org/

https://www.nasa.gov/feature/are-we-alone-in-the-universe-nasa-calls-for-new-framework

https://www.nature.com/articles/s41586-021-03804-9.epdf?sharing_token=aMvAzNSKTDpeQ_Lx50lBO9RgN0jAjWel9jnR3ZoTv0OiHZ7kRMaxJS4ikXfsEfuhWNXQC4W7SsC52JCjUDnSSqLC5BhXbWxxUcFJQ3KnlmY6LAuQF02dgmfPAEQqFuQhHT7iq8uOqnhGqUWJGAFWKU9xwVrg8ofZtBSQm0hNMoQ%3D

https://www.scientificamerican.com/article/how-scientists-could-tell-the-world-if-they-find-alien-life/

https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Exploration/Extraterrestrial_life

https://ntrs.nasa.gov/citations/19820021469

https://www.universetoday.com/25431/why-cant-we-launch-garbage-into-space/

https://spacenews.com/amend-orbit-act/

https://www.latimes.com/archives/la-xpm-1998-mar-23-fi-31810-story.html

https://www.unoosa.org/oosa/en/ourwork/psa/satellite-communications.html

Sources:

https://web.archive.org/web/20220201194349id_/https://repositum.tuwien.at/bitstream/20.500.12708/6650/2/Brkovic%20Boris%20-%202016%20-%20CubeSats%20and%20space%20diplomacy%20accelerating%20development%20by...pdf

https://www.energy.gov/ne/articles/advantages-and-challenges-nuclear-energy

https://www.unoosa.org/oosa/en/aboutus/roles-responsibilities.html

https://www.washingtonpost.com/science/2022/02/03/nasa-international-space-station-decommission-2031-ocean/

https://www.sciencefocus.com/news/why-is-the-iss-being-retired-and-what-will-happen-to-it/