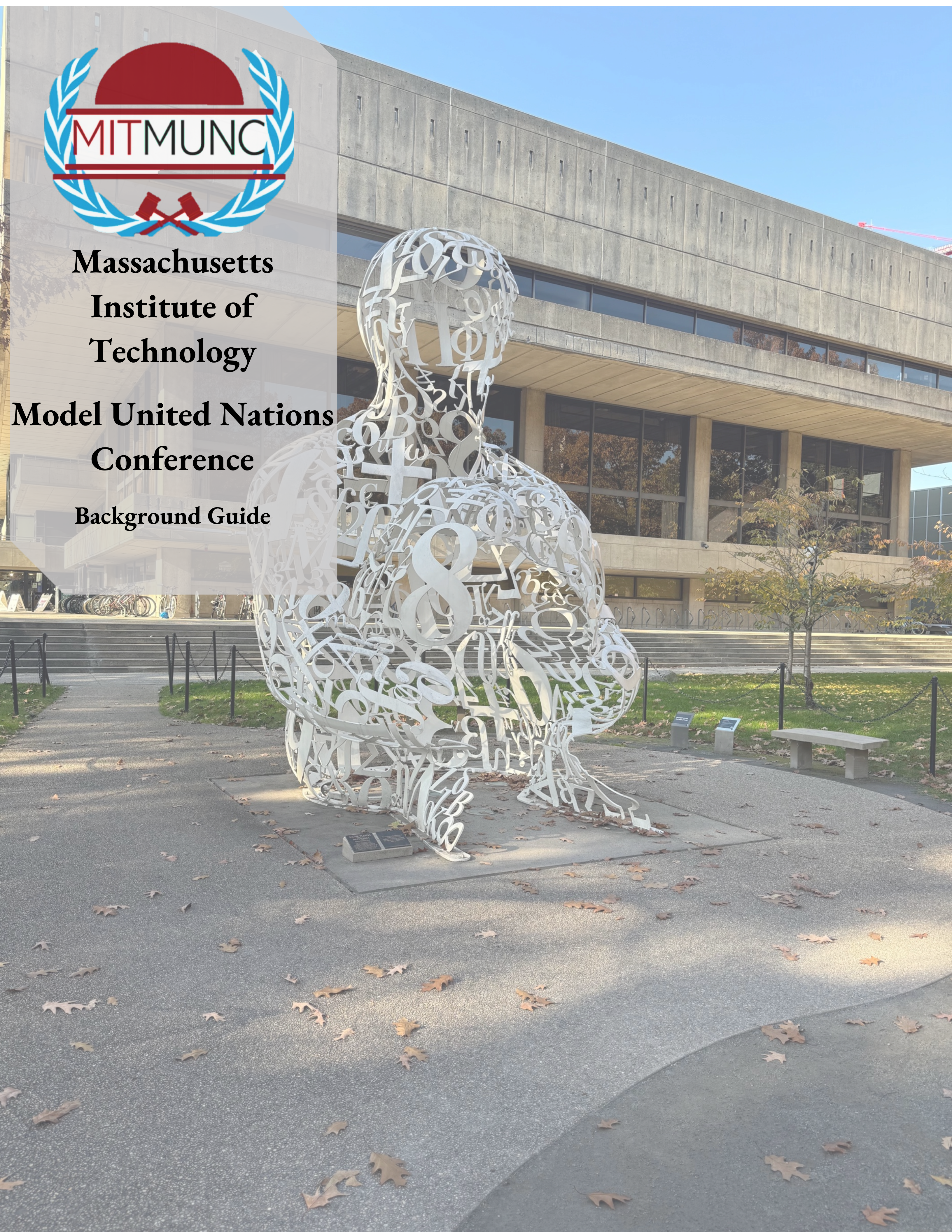
Massachusetts Institute of Technology

Model United Nations Conference

Background Guide



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Letter from the Secretary Generals

Dear Delegates,

It is with great pride and excitement that we formally invite you to the Massachusetts Institute of Technology's 16th annual Model United Nations Conference!

MITMUNC is a premier Model UN conference in which students from all over the world come together to solve the most pressing issues facing society today. This year's conference will be held during the weekend of Friday, February 9th through Sunday, February 11th, 2024, in-person.

At its core, MITMUNC is planned, organized, and directed by a passionate and ambitious team of MIT students that collectively form a diverse family of academic backgrounds and experiences. Our chairs and staff coordinate MITMUNC's committees from the ground up, posing questions and controversies that even the most experienced delegates will find challenging. Our dedicated Secretariat members complement the chairs and staff by overseeing all conference preparations, months in advance of the conference in order to ensure that our delegates walk away with one of the greatest experiences of their lives.

In previous years, MITMUNC delegates grappled with complicated human rights, economic, and environmental topics such as the Syrian Refugee crisis, argued the pros and cons of nuclear energy in the International Atomic Energy Agency, and even reacted to a flurry of assassinations witnessed in the Historical Committee! Attendees also enjoyed inspiring keynote addresses by Nazli Choucri, Professor of Political Science at MIT and leading researcher in international relations and cyber politics, as well as Richard B. Freeman, Faculty co-Director of the Labor and Worklife Program at the Harvard Law School. Delegates also enjoyed a well-deserved respite at the Delegate Dance social night.

We pride ourselves in hosting smaller committee sizes. This allows our attendees more freedom to contribute and distinguish themselves in their individual committee sessions. MITMUNC offers its attendees a truly unique opportunity to immerse themselves in a demanding intellectual environment, exposed to the ideas of others and tasked to employ the art of negotiation to pass meaningful resolutions.

Having experienced MITMUNC as chairs, then as Secretariat members and Secretaries-General, we are both humbled and thrilled to guide MITMUNC into its best conference yet. I now invite you to explore our brand new website to learn more about our conference. Do not hesitate in contacting us should you encounter any doubts along the way. Best of luck in the path ahead!

Sincerely,
Your Secretary Generals: Jad Abou Ali and Maya Abiram
For further inquiries, do not hesitate to contact us at sg-mitmunc@mit.edu.
MITMUNC XVI 2024

Letter from the Chairs

Dear Delegates,

Welcome to MITMUNC, and more specifically to our United Nations Office for Outer Space Affairs committee! We can't wait to see the resolutions you all come to about the two emerging space problems we've chosen: limiting space debris and managing permanent bases on planetary bodies. Both are issues which loom large in the coming years and have the potential to breed inequality between space-faring and non-space-faring nations, making them especially important to address now before they fester further. We hope that UNOOSA's existing resources and your excellent diplomacy skills will provide new insights.

My name is Leela, and I'm so incredibly excited to be one of your chairs this year! This is my fifth time chairing for MITMUNC and my eighth time chairing overall; I loved and was very involved with MUN in high school, and since coming to MIT have chaired ICC, Security Council, ASEAN, and WHO committees. I would love to work in international diplomacy in the future (and this past summer actually interned with the real UNOOSA), and MUN has been an amazing opportunity for me to explore that! I'm originally from southern California, but at MIT, I'm a senior double-majoring in Political Science and Physics with a concentration in Philosophy; I'm also a TA for two philosophy classes, have held leadership roles in my sorority, and am very involved with several theater groups and my living community! Outside of school, I enjoy playing water polo, writing poetry and novellas, trying to find decent Mexican food in Boston, making soap, and finding cute new coffee shops.

My name is Anika, and I'm also really excited to be one of your chairs this year! This is my first time chairing for MITMUNC and can't wait to continue in the future. I'm interested in policy, specifically how policy is changing as society and innovation evolves. I'm also apart of AIM Exec, HackMIT and Start Labs. Outside of school, I love music and dance and wouldn't turn down the chance to snuggle in a cute coffee shop with a new historical fiction book.

The following background guide is only meant to provide an introduction to the committee's two topics; additional research is required for background guides and will serve you well during debate. I cannot wait to see each and every one of you in committee, and I very much look forward to a productive and (most importantly) enjoyable MUN experience! If you have any questions, feel free to reach out at any time.

Sincerely,

Your Chairs: Leela Fredlund & Anika Puri

For further inquiries, do not hesitate to contact us at unoosa-mitmunc-2024@mit.edu.

MITMUNC XVI 2024

Committee Introduction

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

One of UNOOSA's many initiatives is the Committee on the Peaceful Uses of Outer Space (COPUOS), a committee which meets yearly to allow all nations a forum for discussing the peaceful and mutually beneficial development of space and planetary bodies. Its mission statement is as follows: "The Committee on the Peaceful Uses of Outer Space (COPUOS) was set up by the General Assembly in 1959 to govern the exploration and use of space for the benefit of all humanity: for peace, security and development. The Committee was tasked with reviewing international cooperation in peaceful uses of outer space, studying space-related activities that could be undertaken by the United Nations, encouraging space research programs, and studying legal problems arising from the exploration of outer space. The Committee was instrumental in the creation of the five treaties and five principles of outer space. International cooperation in space exploration and the use of space technology applications to meet global development goals are discussed in the Committee every year. Owing to rapid advances in space technology, the space agenda is constantly evolving. The Committee therefore provides a unique platform at the global level to monitor and discuss these developments."

As commercial space development accelerates, dual-use technologies emerge, space-based monitoring plays a larger role in the environmental sphere, more nations create space agencies, and the threat of militarization in space looms large, the need for international regulation of space activities becomes increasingly evident. UNOOSA and COPUOS will play a major role in the coming years, and it is up to their constituent nations to ensure that role is a beneficial one.

UNITED NATIONS
Office for Outer Space Affairs

Topic A: Standardizing Policy to Limit Space Debris Accumulation

I. Introduction

Space debris, or man-made material which serves no active function yet remains in space, can be classified in a number of ways. One method is by size; space debris ranges in size from entire rockets to miniscule metal shavings. Another method is by origin; some space debris was planned (decommissioned satellites fall under this category) whereas other space debris arose from unplanned collisions or explosions. A third method is by type; space debris consists of a variety of materials, some (clumps of flammable, solidified fuel) posing different problems than others (paint flecks which can chip equipment). A fourth and final method is by location; most space debris is in low-Earth orbit, but some orbits the Earth at a further distance or is not in orbit at all.

Regardless of type, space debris poses a variety of dangers. One of the most obvious is orbiting space debris' ability to damage functional satellites. Large pieces of space debris can simply crash into and destroy functional equipment, whereas smaller pieces can dent or chip important hardware. Another danger is known as the Kessler Syndrome. Kessler Syndrome puts forth that, as space debris increases, its collisions with other pieces of space debris will lead to exponentially growing space pollution, making it impossible to launch rockets or maintain satellites that do not collide with space debris. This occurs because the rate that new space debris is generated is higher than the rate at which space debris naturally falls out of orbit. While a number of solutions have been proposed to remove existing space debris from orbit, such missions are often expensive and have the potential to be used for militarization (such as by removing functional enemy satellites from orbit alongside debris).

II. History

A. Space Race Era

Sputnik 1 was a masterpiece of engineering, as it became the first man made Earth satellite. It also caused the first piece of space debris, as the rocket used to launch Sputnik 1 remained in orbit (as did Sputnik 1). Less than two months later, the United States Air Force began Space Track, the first mission to track satellites (and their debris) in orbit. While the mission started during the Space Race as a surveillance mission aimed at knowing the whereabouts of friendly and enemy satellites, it remains today with an added focus on space debris prevention.

Four years later, in 1961, a satellite broke up in orbit for the first time, resulting in hundreds of pieces of space debris and demonstrating to the world that unexpected collisions and explosions in orbit could pose problems. Since then, collisions (the first being between a commercial American and Russian government satellite) and explosions have become more commonplace, especially in low-Earth orbit (LEO).

B. Modern Era

Today, estimates on the prevalence of space debris vary widely. According to NASA, 25,000 objects larger than 10 centimeters, 500,000 objects between 1 and 10 centimeters, and over 100 million objects larger than 1 millimeter are currently orbiting Earth, adding up to over 9,000 metric tons of space debris. According to Napper et al. in 2023, meanwhile, there are currently over 100 trillion pieces of space debris in orbit. Regardless of which number is correct (with discrepancies likely arising from different estimates of objects less than 1 millimeter in size), sources agree that the large number of decommissioned satellites and explosion byproducts in orbit pose a real problem to space missions in the coming years.

III. International Actions

A. 1968 Rescue Agreement

Following the ratification of the Outer Space Treaty, member states drafted an additional treaty to expand upon several points, including the rescue and return of astronauts and space equipment which fall to Earth. The result was the 1968 Rescue Agreement, which, among many other guidelines, required that “Each Contracting Party which receives information or discovers that a space object or its component parts has returned to Earth in territory under its jurisdiction or on the high seas or in any other place not under the jurisdiction of any State, shall notify the launching authority and the Secretary-General of the United Nations.” While this was originally intended for spacecraft, large satellites, or other technologically useful pieces of equipment, nothing in its wording precludes it from applying to even tiny pieces of space debris. As a result, UNOOSA maintains a database of recovered space debris to facilitate returns and communication, and member states are bound by the 1968 Rescue Agreement when they lose or find pieces of space debris which have returned to Earth.

B. Space Debris Mitigation Guidelines

In 2007, COPUOS developed a set of Space Debris Mitigation Guidelines which were ratified by the General Assembly. These guidelines followed from a COPUOS technical report on the problem years earlier and recommended various measures, including limiting debris, limiting break-up of equipment, preventing malicious aggression against existing satellites, and further research into space debris developments. While it took significant negotiation and technical input, the agreement itself was relatively vague and left room for individual nations’ separate policies.

UNOOSA also maintains a database with member states’ individual space debris policies for other member states to use as a guide and reference. This “Compendium of space debris mitigation standards adopted by States and international organizations" can be found publicly on UNOOSA's website, and includes UNOOSA, IADC, International Telecommunications Union (ITU), and independent national guidelines.

While not through UNOOSA, another important initiative was the formation of the Inter-Agency Space Debris Coordination Committee (IADC) in 1993. This committee includes representatives from several nations' space agencies (including NASA, ROSCOSMOS, and CNSA) and meets regularly to discuss space debris tracking, removal, and mitigation. It thus brings together individual space agencies' separate space debris programs and allows for a forum where innovations can be shared.

IV. Countries' Positions

A. Nations Included in ESA

ESA, or the European Space Agency, contains 22 member states with varying levels of individual space program development. ESA has a space debris office which advises both its member states and other nations on methods of mitigating space debris and avoiding current space debris. This resource likely shapes how ESA member states perceive the risk and needs of the space debris field going forward, perhaps making them see themselves as a model for other nations or perhaps making them less likely to require international guidance.

B. Other Spacefaring Nations

Other nations with national space agencies, such as China, Russia, the United States, Japan, India, etc., should examine their space agency's initiatives and policies with respect to mitigating and removing space debris. While each nation's policies and programs vary, it is also useful to consider these nations' contributions at COPUOS and IADC meetings (keeping in mind that not all spacefaring nations are IADC members) to determine which international initiatives they may or may not support.

The level of space militarization which these countries support likely also varies based on their geopolitical stances.

C. Emerging Space Powers

Nations which are just beginning to develop space programs, such as Costa Rica, Kenya, and the UAE, find themselves in unique positions with respect to space debris. Most of these nations are not members of the IADC, and many do not yet build satellites (though they may operate satellites). They must balance policies which prevent Kessler syndrome in the coming years (enabling them to build their space capabilities) and which are not so restrictive that they prevent these nations from establishing a presence in space.

D. Non-Spacefaring Nations

Nations which do not yet have space programs are often developing nations with more pressing concerns than building their capabilities in space. Nevertheless, many of these nations especially rely on existing satellites for disaster relief, internet service, or other basic needs. These nations must consider both the possibility of their future involvement in space and their current needs when potentially regulating satellite usage and launches.

V. Projections and Implications

A variety of models currently exist to predict the growth of space debris and model upcoming collisions. One of the premier models is ESA's MASTER model, which is available to both ESA member states and the general public. A paper in Science has predicted that there will be over 60,000 satellites in orbit by 2030, several times the current number, leading to more collisions while the number of explosions remains roughly steady. Each collision adds hundreds, if not more, pieces of space debris, which can then cause further collisions. At the current rate of space debris removal, it is predicted that each week, 50,000 near-collisions will occur in orbit by 2050, an amount which is significantly more difficult to model than today's.

While some organizations, such as ESA, are working to eliminate new space debris by 2030, others are just beginning their space programs and do not yet have the resources to limit space debris. NASA has put forth several proposed methods of removing or redirecting space debris, such as space lasers which "nudge" high-risk debris out of the path of important equipment, but such measures are costly. Finding a method which is feasible, not dual-use, and cheap is essential to begin actually removing space debris.

VI. Conclusion

Space debris is one of the most pressing issues facing the international space community today, especially considering the increasing number of nations with space programs and the increasing number of commercial space sector satellites in orbit. The consequences of space debris can be drastic, costing billions of dollars and potentially lives. In some regards, mitigating space debris poses a prisoner's dilemma; if some nations limit launches and invest time and money into preventing space debris whereas others don't, the nations which take steps to limit space debris will bear the brunt of consequences whereas all nations will benefit. As a result, it is important for nations to work together in order to develop international standards and strategies for limiting space debris.

VII. Questions to be Addressed

a. How can the current need for increased scientific development be balanced with the need for restrictions on launches and satellite missions?
b. How can guidelines prioritize equity (i.e. make it possible for emerging space powers to begin space missions) when potentially limiting space endeavors?
c. How can nations ensure that any technologies which seek to remove space debris are not militarized and used to remove functioning satellites?

d. How can nations balance tracking existing satellites and space debris with privacy concerns?
e. What are each nation's current priorities in space?
f. What should tradeoffs between current space capabilities and future space capabilities look like?
g. How should nations manage returning other nations' fallen space debris (as per the 1968 rescue agreement)? Are new guidelines needed? Are privacy concerns met?

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Topic B: Navigating Permanent Bases on Planetary Bodies

I. Introduction

When considering the concept of navigating permanent bases on planetary bodies, such as the Moon, Mars and other celestial objects, several key factors come into play. Establishing a base on another planetary body will involve international collaboration and agreements regarding its use, research priorities and governance. The selection of a suitable location for a base is also crucial - factors including proximity to resources (water, minerals, etc.), solar exposure (safety, energy), and geological stability must be considered.

II. History

As of yet, no permanent bases on planetary bodies have been established as of yet, however the history of this idea, its development and the mission have laid groundwork for the future bases remain quite interesting. While not a planetary base, the International Space Station serves as a critical analogue for long-duration space habitation.

A. Temporary Habitation

While there have been no permanent bases, numerous robotic missions have been conducting research on the Moon and Mars. Lunar missions, including NASA's Lunar Reconnaissance Orbiter, China's Change landers and rovers and India's Chandrayaaan missions are crucial for gathering the necessary data to support the future human exploration and potential establishment of permanent bases on planetary bodies. They provide insight into the environmental conditions, recourses available and potential challenges that need to be addressed. However technically speaking the only form of habitation on a planetary bodies has been the temporary habitation of lunar landers.

B. International Space Station (1998)

The first piece of the International Space Station was launched in November of 1998. Lessons learned from the ISS about living and working in space are directly applicable to the concept of permanent bases on other planetary bodies. One of the most significant aspects of the ISS is its role as a model for international collaboration in space exploration. The project involves multiple space agencies, including NASA (United States), Roscosmos (Russia), JAXA (Japan), ESA (European Space Agency), and CSA (Canadian Space Agency). This cooperation has not only been a technological and scientific endeavor but also a diplomatic and cultural one, helping to build and maintain peaceful relationships between participating countries. The ISS is crucial for gaining experience in long-duration human spaceflight, which is essential for future missions to more distant destinations like Mars. Living and working in space for extended periods allows researchers to study the effects of long-term microgravity on the human body, including bone density loss, muscle atrophy, and other aspects of space physiology. Both the ISS and planetary bases must have systems to provide and recycle air, water and food and manage waste - systems which are crucial for sustaining human life in environments where these essentials cannot be naturally replenished. Crew members on the ISS experience isolation and confinement, similar to what would be experienced on distant planetary bases. Understanding and managing the psychological and sociological impacts of long-duration space missions is crucial in both scenarios. While the ISS has relatively quick communication with Earth, it still relies on advanced communication systems, similar to what would be required for bases on the Moon or Mars, albeit with longer communication delays due to greater distances. Both the ISS and planetary bases need sophisticated environmental control systems to maintain temperature, humidity, and air quality, and to protect inhabitants from external environmental extremes. Just as the ISS is a product of international cooperation, permanent bases on other planetary bodies are likely to be multinational efforts, pooling resources, expertise, and funding from various countries. the ISS can be seen as a precursor and a learning platform for the development of permanent bases on planetary bodies, offering valuable insights into the challenges and requirements of sustaining human life and activity in space.

III. International Actions

A. Outer Space Treaty of 1967

The Outer Space Treaty, officially known as the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," was adopted by the United Nations in 1967. This treaty forms the basis of international space law and outlines several key principles that govern the activities of states in space exploration. The treaty states that outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, use, occupation, or any other means. This means that while countries or private entities can establish bases for exploration, scientific, and utilitarian purposes, they cannot claim these bodies as their territory. Outer space is to be used exclusively for peaceful purposes. The treaty expressly prohibits the placement of nuclear weapons or any other weapons of mass destruction in orbit around Earth, on celestial bodies, or stationed in space in any other manner. This precludes the establishment of military bases or the use of such outposts for military activities, including testing or deploying weapons. The treaty obligates parties to avoid the harmful contamination of space and celestial bodies. This is particularly relevant for permanent bases, as their construction, operation, and potential dismantling could have environmental impacts on these extraterrestrial environments. The treaty obligates countries to provide assistance to astronauts in distress and to safely return astronauts who end up in a foreign country due to emergency landings or re-entries. It also requires states to avoid harmful contamination of space and celestial bodies. Countries must inform the UN about each space object launched into orbit or beyond, including details about the orbit and general function of the object. The treaty also encourages international cooperation in scientific investigation and exploration of outer space, and promotes the sharing of information and discoveries. As of recently the Outer Space Treaty has been ratified by over 100 countries and remains the fundamental framework for governing the activities of countries in space.

B. Current Collaborative Projects and Agreements

The Lunar Gateway is a planned space station in lunar orbit, part of NASA's Artemis program, involving international partners like ESA (European Space Agency), JAXA (Japan Aerospace Exploration Agency), CSA (Canadian Space Agency), and Roscosmos (Russian space agency). The Gateway is seen as a critical step in establishing a sustainable human presence on the Moon.

Initiated by NASA, the Artemis Accords are a series of bilateral agreements between countries participating in the Artemis program. They aim to establish a practical set of principles to govern the civil exploration and use of outer space, including activities related to lunar bases.

The European Space Agency has been actively involved in projects aiming to establish a presence on the Moon, including collaboration on the Lunar Gateway and developing concepts like the "Moon Village," envisioned as an international collaboration for lunar exploration and utilization.

China, through its Chang'e program, has made significant strides in lunar exploration. Their long-term plans potentially include establishing a lunar research station, and they have expressed interest in international collaboration.

IV. Countries' Positions

A. United States

The U.S. has been actively pursuing the goal of returning astronauts to the Moon through NASA's Artemis program, with the long-term objective of establishing a sustainable human presence there by the late 2020s. This includes the development of the Lunar Gateway, a planned space station in lunar orbit. NASA has a long-term goal of sending humans to Mars, likely in the 2030s, following the successes of robotic missions like the Perseverance rover.

B. Russia

Russia, through Roscosmos, has expressed interest in lunar exploration, including potential plans for a lunar base. However, specific timelines and details have been less defined compared to other countries. Despite geopolitical tensions, Russia has been involved in international projects such as the ISS and initially in the Lunar Gateway project.

C. China

China has been rapidly advancing its capabilities in space exploration, with the Chang'e lunar missions demonstrating significant technological achievements. China has plans to establish a research station on the Moon's surface, potentially in the 2030s. China's successful Tianwen-1 mission to Mars marks its growing interest in Martian exploration, though plans for a permanent base are not as clearly defined as their lunar ambitions.

D. European Union

European Space Agency has proposed a concept called the "Moon Village," which envisions a collaborative effort for lunar exploration and utilization. This concept is more about international cooperation than a specific plan for a base. ESA is also a key partner in NASA's Artemis program, contributing technology and expertise, particularly in the Lunar Gateway project.

V. Projections and Implications

A. Scientific Advancements

A permanent base would enable extensive scientific research in new environments. This includes geology, astrobiology, astronomy, and studies of the planetary body's atmosphere and subsurface. It would also offer a unique laboratory for experiments in reduced gravity conditions. Such a base would also provide valuable insights into the formation and evolution of the planetary body, as well as the solar system at large.

B. Economic Implications

The potential extraction and use of space resources (like water ice, minerals, etc.) could have economic implications, both for space activities and possibly for Earth. The development of permanent bases could spur commercial activities in space, including tourism, manufacturing, and even agriculture in controlled environments.

VI. Conclusion

Having a permanent base on planetary bodies symbolizes the expansion of human presence beyond Earth, opening a new chapter in the exploration and potentially the colonization of space. Such a base would serve as a crucial testbed for long-term human survival in space, an essential step towards further exploration of the solar system. The development of permanent bases could lead to new economic activities in space, including resource extraction and space tourism. These bases could facilitate the utilization of extraterrestrial resources, potentially easing resource constraints on Earth. The establishment of permanent bases would be a tangible step towards what many see as humanity's destiny in space, expanding our habitat beyond our home planet.

VII. Questions to be Addressed

A. Technical Concerns

1. How will life support systems be designed and maintained? This includes air, water, food supply, and waste management.
2. What are the best methods for energy generation and storage? Options might include solar power, nuclear energy, or other innovative technologies.
3. What are the primary scientific goals of the base? This could include geological studies, biological experiments, or astronomical observations.
4. How can the base facilitate ongoing and future scientific research?

B. International Cooperation and Ethical Considerations

1. How do activities align with the Outer Space Treaty and other international space laws?
2. What are the ethical considerations of claiming, using, or altering extraterrestrial environments?
3. What is the framework for international collaboration on the base?
4. How will decisions be made and conflicts resolved between different countries and entities involved?
5. What are the protocols for sharing scientific data and discoveries with the global community?

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