ITU MUN

UNOOSA

STUDY GUIDE

- **Research on space debris, and problems relating to the collision of spacecrafts with space debris**
- **Utilisation and Commercialization of Space Resources**

Onur Çiğdem
President Chair

Saba Madhoun
Deputy Chair

İdil Çimen
Deputy Chair

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1. Letter from SG

Most esteemed participants of ITUMUN24,

I, as the Secretary General of ITUMUN24, welcome you all to the 7th edition of Istanbul Technical University Model United Nations. It is an honour and a pleasure to be able to present to you what we have been preparing for months and dreaming for years. My team has worked tirelessly to bring the best you have ever seen, starting with our organisation to our academics.

Our objective is to facilitate proficient and elevated diplomatic deliberations, fostering valuable and constructive solutions throughout the four-day duration of ITUMUN, enriched by the collective contributions of all participants. As a delegate, your journey begins here, with the study guide prepared by our dedicated members; your most honourable chairboard.

I advise you to read this study guide thoroughly and expand your research on different perspectives; focusing on your allocated country. It is essential to bear in mind that each nation and every perspective holds significance if you are adequately prepared to engage with the agenda at hand.

You have my best wishes for success and enriching discussions during these four days of enjoyment. I eagerly anticipate witnessing the valuable contributions you'll make to our conference.

Best regards,

Zehra Akçay

Secretary General of ITUMUN24

2. Letter from Chairboard

Distinguished delegates, we would like to express our enthusiasm and excitement for being able to chair in United Nations Office for Outer Space Affairs (UNOOSA) committee in ITUMUN. We welcome you all and hope that you'll have a remarkable Model United Nations experience.

We believe that Model United Nations is an amazing platform for self-development and exploration. It will open the doors for you to learn about and discuss contemporary issues from around the globe.

We have put together this short Study Guide, which we hope you will take the time to read. The committee will simulate the General Assembly and discuss 2 Agenda items. The first item will be the Utilisation and Commercialization of Space Resources and the second will be the Regulation on Space debris.

Discussing space issues will get you introduced to a new genre of information, and a new platform of interest. In this committee, you will have the opportunity to discuss what's happening beyond your planet's atmosphere.

We are not expecting you to understand and consider every aspect of both agenda items, but merely to produce an overview of the most important questions that might arise and possible solutions to these situations.

Good luck,

President chair: Onur Çiğdem

Deputy chairs: Saba Al-Madhoun, İdil Çimen

3. Historical background

a. History of space exploration

Utilising space activity became a human quest after the launch of the first artificial satellite

in 1957. Astronauts have travelled to the moon, probes have explored the solar system, and instruments in space have discovered thousands of planets around other stars.[1]

We human beings have been venturing into space since October 4, 1957, when the Union of Soviet Socialist Republics (U.S.S.R.) launched Sputnik, the first artificial satellite to orbit Earth. This happened during the period of political hostility between the Soviet Union and the United States known as the Cold War. For several years, the two superpowers had been competing to develop missiles, called intercontinental ballistic missiles (ICBMs), to carry nuclear weapons between continents. In the U.S.S.R., the rocket designer Sergei Korolev had developed the first ICBM, a rocket called the R7, which would begin the space race.

This competition came to a head with the launch of Sputnik. Carried atop an R7 rocket, the Sputnik satellite was able to send out beeps from a radio transmitter. After reaching space, Sputnik orbited Earth once every 96 minutes. The radio beeps could be detected on the ground as the satellite passed overhead, so people all around the world knew that it was really in orbit. Realising that the U.S.S.R. had capabilities that exceeded U.S. technologies that could endanger Americans, the United States grew worried. Then, a month later, on November 3, 1957, the Soviets achieved an even more impressive space venture. This was Sputnik II, a satellite that carried a living creature, a dog named Laika.

This race endangered the United States of America existentially as a superpower, and its technological development in the race grew bigger. The United States made two failed attempts to launch a satellite into space before succeeding with a rocket that carried a satellite

[1] Wilkinson, F. W. (2023, October 19). The history of space exploration. Education | National Geographic Society. https://education.nationalgeographic.org/resource/history-space-exploration/

called Explorer on January 31, 1958.[2] The Explorer carried several instruments into space for conducting science experiments.

The raised interest in exploring space and dominating the field of technological development in space led the United States to create a new government agency, the National Aeronautics and Space Administration (NASA) In 1958.

The first human in space was the Soviet cosmonaut Yuri Gagarin, who made one orbit around Earth on April 12, 1961, on a flight that lasted 108 minutes. A little more than three weeks later, NASA launched astronaut Alan Shepard into space, not on an orbital flight, but on a suborbital trajectory—a flight that goes into space but does not go all the way around Earth. Shepard's suborbital flight lasted just over 15 minutes. [3]

On May 25, a great step for humanity started forming in the US after President John F. Kennedy declared that the next achievement might be landing on the moon, he stated: "I believe that this nation should commit itself to achieving the goal, before the decade is out, of landing a man on the moon and returning him safely to Earth." The United States of America achieved this goal in 1969 with Apollo 11, and Neil Armstrong became the first human to set foot on the surface of the moon.

This big step for humans didn't only change the space race outcomes and development but the international activity in space as well. Space stations also became the next space objective for both the Soviet Union and the [4]United States. The first space station in Earth orbit was the Soviet Salyut 1 station, which was launched in 1971. This was followed by NASA's Skylab space station, the first orbital laboratory in which astronauts and scientists studied Earth and the effects of spaceflight on the human body. During the 1970s, NASA also carried out Project Viking in which two probes landed on Mars, took numerous photographs, examined the chemistry of the Martian surface environment, and tested the Martian dirt (called regolith) for the presence of microorganisms.

Since the Apollo lunar program ended in 1972, human space exploration has been limited to low-Earth orbit, where many countries participate and conduct research on the International Space Station.

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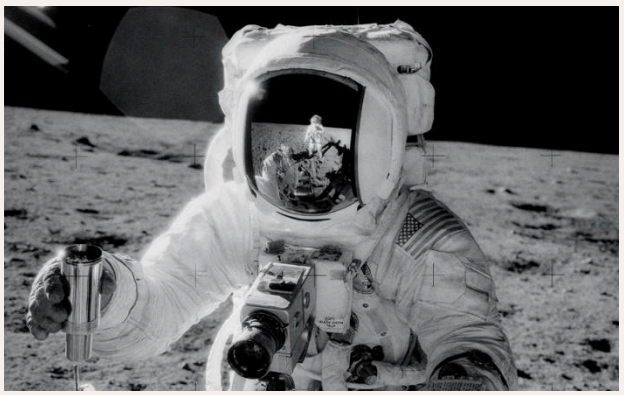
[2] A brief history of space exploration | The aerospace Corporation. (n.d.). Aerospace Corporation. https://aerospace.org/article/brief-history-space-exploration

[3] *A brief history of space exploration | The aerospace Corporation*. (n.d.). Aerospace Corporation.
https://aerospace.org/article/brief-history-space-exploration

[4] *Key dates in history of space exploration*. (2012, August 26). Phys.org - News and Articles on Science and Technology.
https://phys.org/news/2012-08-key-dates-history-space-exploration.html



"That's one small step for man, one giant leap for mankind."

- Neil Alden Armstrong

Landing on the moon: Apollo 12 launches for second moon landing Nov. 14, 1969.

i. Timeline

- **1957**

  October 4 - The Soviet Union launched the first satellite, Sputnik, into space.[5]

  November 3 - The Soviet spacecraft Sputnik 2 was launched with a dog named Laika on board. Laika did not survive the voyage.[6]

- **1958**

  January 31 - Explorer 1 was the first satellite launched by the United States when it was sent into orbit on January 31, 1958. It was designed and built by the Jet Propulsion Laboratory (JPL) of the California Institute of Technology. The satellite was sent aloft from Cape Canaveral in Florida by the Jupiter C rocket that was designed, built, and launched by the Army Ballistic Missile Agency (ABMA) under the direction of Dr. Wernher Von Braun.[7]

- **1960**

  August 19 - The Soviet craft Sputnik 5 was launched, carrying the dogs Strelka and Belka. They became the first living beings to survive a trip into space.[8]

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[5] *Sputnik launched | October 4, 1957 | History*. (2009, November 24). HISTORY. https://www.history.com/this-day-in-history/sputnik-launched

[6] *Soviet Union launches a dog into space | November 3, 1957 | History*. (2010, February 9). HISTORY. https://www.history.com/this-day-in-history/the-soviet-space-dog

[7] *Explorer 1 overview*. (2023, August 21). NASA. https://www.nasa.gov/history/explorer-1-overview/

[8] Reichhardt, T. (2010, August 19). *Remembering Belka and Strelka*. Smithsonian Magazine.

- **1961**

  April 12 - Russian cosmonaut Yuri Gagarin became the first human in space.[9]

  May 5 - Astronaut Alan Shepard became the first American in space.[10]

  May 25 - President Kennedy challenged the country to put a man on the moon by the end of the decade.[11]

- **1962**

  February 20 - Astronaut John Glenn became the first American in orbit.[12]

  June 16 - Valentina Nikolayeva Tereshkova became the first woman in space.[13]

- **1965**

  March 18 - While tethered to his spacecraft, cosmonaut Alexi Leonov became the first man to walk in space.[14]

  June 3 - Astronaut Ed White became the first American to walk in space.[15]

  July 14 - The spacecraft Mariner 4 transmitted the first pictures of Mars.[16]

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https://www.smithsonianmag.com/air-space-magazine/remembering-belka-and-strelka-143143843/

[9] *Soviet cosmonaut Yuri Gagarin becomes the first man in space*. (2010, February 9). HISTORY. https://www.history.com/this-day-in-history/first-man-in-space

[10] *60 years ago: Alan Shepard becomes the first American in space*. (2023, August 28). NASA. https://www.nasa.gov/history/60-years-ago-alan-shepard-becomes-the-first-american-in-space/

[11] *The decision to go to the moon: President John F. Kennedy's May 25, 1961 speech before Congress*. (n.d.). NASA History Division | NASA. https://history.nasa.gov/moondec.html

[12] *60 years ago: John Glenn, the first American to orbit the earth aboard friendship 7*. (2023, September 6). NASA. https://www.nasa.gov/history/60-years-ago-john-glenn-the-first-american-to-orbit-the-earth-aboard-friendship-7/

[13] Lea, R. (2023, September 14). *Valentina Tereshkova: First woman in space*. Space.com. https://www.space.com/21571-valentina-tereshkova.html

[14] All About Space magazine. (2019, October 18). *Heroes of space: Alexei Leonov*. Space.com. https://www.space.com/alexei-leonov-heroes-of-space.html

[15] Childers, T. (2019, July 9). *Ed white: The first American to walk in space*. Space.com. https://www.space.com/ed-white.html

[16] Howell, E. (2012, December 5). *Mariner 4: First spacecraft to Mars*. Space.com. https://www.space.com/18787-mariner-4.html

- **1966**

  February 3 - The Russian spacecraft Luna 9 became the first spacecraft to land on the moon.[17]

  June 2 - Surveyor 1 became the first American spacecraft to land on the moon.

- **1967**

  January 27 - Astronauts Gus Grissom, Ed White, and Roger Chaffee were killed in an accidental fire in a command module on the launch pad.[18]

  April 24 - Cosmonaut Vladimir M. Komarov was killed in a crash when the parachute on his Soyuz 1 spacecraft failed to deploy.[19]

  October 18 - A descent capsule from the Soviet probe Venera 4 collected data about the atmosphere of Venus.[20]

- **1968**

  September 15 - The Soviet spacecraft Zond 5 was launched and later became the first spacecraft to orbit the moon and return to Earth.[21]

  December 21 - Apollo 8 was launched, and later her crewmembers became the first men to orbit the moon.[22]

- **1969**

  July 20 - Neil Armstrong and "Buzz" Aldrin became the first men on the moon.[23]

- **1970**

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[17] Howell, E. (2016, December 22). *Luna 9: 1st soft landing on the moon*. Space.com. https://www.space.com/35116-luna-9.htmll

[18] Evans, B. (2023, November 16). *Apollo 1 tragedy: The fatal fire and its aftermath*. Astronomy Magazine. https://www.astronomy.com/space-exploration/apollo-1-tragedy-the-fatal-fire-and-its-aftermath/

[19] Nast, C. (2007, April 24). *April 24, 1967: Last day in the life of cosmonaut Vladimir Komarov*. WIRED. https://www.wired.com/2007/04/dayintech-0424-3

[20] *Venera*. (1998, July 20). Encyclopedia Britannica. https://www.britannica.com/technology/Venera

[21] *Zond*. (1998, July 20). Encyclopedia Britannica. https://www.britannica.com/technology/Zond

[22] *Apollo 8*. (n.d.). National Air and Space Museum. https://airandspace.si.edu/explore/stories/apollo-missions/apollo-8

[23] *Apollo 11*. (2009, July 15). Encyclopedia Britannica. https://www.britannica.com/topic/Apollo-11

April 11 - Apollo 13 was launched.[24]

September 12 - The Soviet craft Luna 16 was launched and became the first automatic spacecraft to return soil samples of the moon.[25]

November 17 - The Soviet automatic robot Lunokhod 1 landed on the moon with Luna 17.[26]

December 15 - The Soviet Venera 7 became the first probe to land on Venus.[27]

- **1971**

  April 19 - The Soviet space station Salyut 1 was launched.[28]

  July 30 - The moon rover was driven on the moon for the first time.[29]

  November 13 - The Mariner 9 probe became the first craft to orbit another world - Mars.[30]

- **1972**

  December 11 - Eugene Cernan and Harrison "Jack" Schmitt became the last men to walk on the moon.[31]

- **1973**

  May 14 - The U.S. launched its first space station, Skylab.

- **1975**

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[24] *Apollo 13*. (n.d.). NASA. https://www.nasa.gov/mission/apollo-13

[25] NASA - NSSDCA - Master catalog - Errors and messages. (n.d.). Welcome to the NSSDCA. https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=1

[26] APOD: January 13, 1996 - Lunokhod 1: Moon robot. (n.d.). Astronomy Picture of the Day. https://apod.nasa.gov/apod/ap960113.html

[27] *Space probe mission insignias*. (2019, April 27). Spaceopedia. https://www.spaceopedia.com/space-exploration/space-prob

[28] *Salyut*. (1998, July 20). Encyclopedia Britannica. https://www.britannica.com/technology/Salyut

[29] *Nytimes.com*. (2021, July 27). The New York Times - Breaking News, US News, World News and Videos. https://www.nytimes.com/2021/07/27/science/lunar-rover-apol

[30] Admin. (2019, November 13). *This day in space history: Mariner 9 becomes first spacecraft to orbit another planet*. Space Center Houston. https://spacecenter.org/this-day-in-space-history-mariner-9-becomes-first-spacecraft-to-orbit-another-planet

[31] Britannica. (n.d.). Encyclopedia Britannica | Britannica. https://www.britannica.com/video/148909/Eugene-Cernan-

July 17 - The American Apollo 18 and Soviet Soyuz 19 dock in the Apollo-Soyuz Test Project.

- **1976**

  September - The American probe Viking 2 discovered water frost on the Martian surface.[32]

- **1977**

  August and September - Voyagers 1 and 2 were launched. (Voyager 2 was launched before Voyager 1, but Voyager 1 was on a faster trajectory.)[33]

- **1979**

  March and August - Voyagers 1 and 2 began transmitting images of Jupiter and her moons.[34]

  September - The U.S. probe Pioneer 11 reached Saturn and began transmitting images.

- **1980**

  November 13 - Voyager 1 reached Saturn and began transmitting images.[35]

  September 21 - NASA's Galileo mission ended a 14-year exploration of the solar system's largest planet and its moons with the spacecraft crashing by design into Jupiter at 108,000 mph.

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[32] Howell, E. (2012, December 6). *Viking 2: Second landing on Mars*. Space.com. https://www.space.com/18803-viking-2.html

[33] *The voyager missions*. (2021, December 21). The Planetary Society. https://www.planetary.org/space-missions/voyager

[34] *Galleries*. (n.d.). Voyager. https://voyager.jpl.nasa.gov/galleries

[35] *Voyager 1*. (n.d.). NASA Science. https://science.nasa.gov/mission/voyager-1

b. Introduction to the committee (UNOOSA)

The United Nations Office for Outer Space Affairs was initially created as a small expert unit
within the United Nations Secretariat to service the ad hoc Committee on the Peaceful Uses of Outer Space, established by the General Assembly in its resolution 1348 (XIII) of 13 December 1958.

The unit was moved to work under the Department of Political and Security Council Affairs in 1962 and was transformed into the Outer Space Affairs Division of that Department in 1968. In 1992, the Division was transformed into the Office for Outer Space Affairs within the Department for Political Affairs. In 1993, the Office was relocated to the United Nations Office in Vienna.[36]

The United Nations Office for Outer Space Affairs (UNOOSA) works to promote international cooperation for the peaceful use and exploration of space. They also assist member states in the utilization of space science and technology for sustainable economic and social development.

To make space exploration more equitable, UNOOSA assists any United Nations member state in establishing legal and regulatory frameworks to govern space activities and strengthens the capacity of developing countries to use space science technology and applications for development by helping to integrate space capabilities into national development programs.[37] Initially created as a small expert unit within the UN Secretariat, UNOOSA has been monitoring and advancing the UN's mission in space since 1958.[38] UNOOSA continues to serve as a unique platform for maintaining outer space for peaceful purposes at the international level up until this date.

The committee shepherded five United Nations treaties on outer space negotiated between 1967 and 1979.[39] These treaties addressed challenges and risks associated with space exploration, the rescue of astronauts, the liability for and registration of space objects, and the agreement for activities on the Moon and other celestial bodies. The UN Outer Space Treaty,

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[36] Sinead.harvey. (n.d.). History. UNOOSA. https://www.unoosa.org/oosa/en/aboutus/history/index.html

[37] Ibid.

[38] Ibid.

[39] "Our Common Agenda Policy Brief 7: For All Humanity - The Future of Outer Space Governance." Our Common Agenda Policy Brief 7, May 2023. https://www.un.org/sites/un2.un.org/files/our-common-agenda-policy-brief-outer-space-en.pdf

signed in 1967, forms the primary foundation for outer space law.[40] It addresses both arms control issues, the primary focus at the time of its creation, as well as issues about how states operate in outer space.

The Committee on the Peaceful Uses of Outer Space has grown since its founding. The Committee and its two Subcommittees have become unique platforms for States to come together to review the scope of international cooperation in peaceful uses of outer space, encourage continued research and the dissemination of information on outer space matters, and study legal questions arising from the exploration of outer space.

c. Treaties

The Committee on the Peaceful Uses of Outer Space (UNOOSA) is the forum for the development of international space law. The Committee has concluded five international treaties and five sets of principles on space-related activities.[41]

These five treaties deal with issues such as the non-appropriation of outer space by any one country, arms control, the freedom of exploration, liability for damage caused by space objects, the safety and rescue of spacecraft and astronauts, the prevention of harmful interference with space activities and the environment, the notification and registration of space activities, scientific investigation and the exploitation of natural resources in outer space and the settlement of disputes.[42]

- Treaties

The treaties commonly referred to as the "five United Nations treaties on outer space" are:

- **The "Outer Space Treaty"[43]**

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[40] Pellegrino, Massimo, and Gerald Stang. "INTERNATIONAL COOPERATION FOR SPACE SECURITY." Space Security for Europe. European Union Institute for Security Studies (EUISS), 2016. http://www.jstor.org/stable/resrep07091.8

[41] *Galileo*. (n.d.). NASA Science. https://science.nasa.gov/mission/galileo

[42] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

[43] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies

Adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967

The Treaty was largely based on the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, which had been adopted by the General Assembly in its resolution 1962 (XVIII) in 1963, but added a few new provisions. The Treaty was opened for signature by the three depository Governments (the Russian Federation, the United Kingdom, and the United States of America) in January 1967, and it entered into force in October 1967. The Outer Space Treaty provides the basic framework for international space law. [44]

- **The "Rescue Agreement"[45]**

Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space

Adopted by the General Assembly in its resolution 2345 (XXII), opened for signature on 22 April 1968, entered into force on 3 December 1968

The Rescue Agreement was considered and negotiated by the Legal Subcommittee from 1962 to 1967. A consensus agreement was reached in the General Assembly in 1967 (resolution 2345 (XXII)), and the Agreement entered into force in December 1968. The Agreement elaborates on elements of articles 5 and 8 of the Outer Space Treaty which are:[46]

"Article 5: States bear international responsibility for national activities in outer space, whether carried on by governmental agencies or by non-governmental entities and for assuring that national activities are carried on in conformity with the principles outlined in the present Declaration. The activities of non-governmental entities in outer space shall require authorization and continuing supervision by the State concerned. When activities are carried on in outer space by an international organization, responsibility for compliance with the principles outlined in this Declaration shall be borne by the international organization and by the States participating in it." [47]

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[44] Robert.wickramatunga. (n.d.). *The outer space treaty*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html

[45] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

[46] Robert.wickramatunga. (n.d.). *Rescue agreement*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html

[47] Robert.wickramatunga. (n.d.). *Outer space treaty*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html#a5

"Article 8: Each State which launches or procures the launching of an object into outer space, and each State from whose territory or facility an object is launched, is internationally liable for damage to a foreign State or its natural or juridical persons by such object or its parts on the earth, in air space, or outer space."[48]

- **The "Liability Convention"[49]**

Convention on International Liability for Damage Caused by Space Objects

Adopted by the General Assembly in its resolution 2777 (XXVI), opened for signature on 29 March 1972, entered into force on 1 September 1972

The Liability Convention was considered and negotiated by the Legal Subcommittee from 1963 to 1972. Agreement was reached in the General Assembly in 1971 (resolution 2777 (XXVI)), and the Convention entered into force in September 1972. Elaborating on Article 7 of the Outer Space Treaty "The State on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereon, while in outer space. Ownership of objects launched into outer space, and of their parts, is not affected by their passage through outer space or by their return to the earth. Such objects or parts found beyond the limits of the State of registry shall be returned to that State, which shall furnish identifying data upon request before return."[50] The Liability Convention provides that a launching State shall be liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space. The Convention also provides for procedures for the settlement of claims for damages.[51]

- **The "Registration Convention"[52]**

Convention on Registration of Objects Launched into Outer Space

Adopted by the General Assembly in its resolution 3235 (XXIX), opened for signature on 14 January 1975, entered into force on 15 September 1976

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[48] Robert.wickramatunga. (n.d.). Outer space treaty. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html#a8

[49] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

[50] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

[51] Robert.wickramatunga. (n.d.). *Liability convention*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html

[52] Msiget. (n.d.). *Space law treaties and principles*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

It built upon the desire expressed by States in the Outer Space Treaty, the Rescue Agreement, and the Liability Convention to make provision for a mechanism that provided States with a means to assist in the identification of space objects, the Registration Convention expanded the scope of the United Nations Register of Objects Launched into Outer Space that had been established by resolution 1721B (XVI) of December 1961 and addressed issues relating to States Parties responsibilities concerning their space objects. The Secretary-General was, once again, requested to maintain the Register and ensure full and open access to the information provided by States and international intergovernmental organizations.[53]

- **The "Moon Agreement"[54]**

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

Adopted by the General Assembly in its resolution 34/68, opened for signature on 18 December 1979, and entered into force on 11 July 1984.

The Agreement reaffirms and elaborates on many of the provisions of the Outer Space Treaty as applied to the Moon and other celestial bodies, providing that those bodies should be used exclusively for peaceful purposes, that their environments should not be disrupted, that the United Nations should be informed of the location and purpose of any station established on those bodies. In addition, the Agreement provides that the Moon and its natural resources are the common heritage of mankind and that an international regime should be established to govern the exploitation of such resources when such exploitation is about to become feasible.[55]

❖ Principles

The five declarations and legal principles are:

- **The "Declaration of Legal Principles"**

Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space[56]

General Assembly resolution 1962 (XVIII) of 13 December 1963

- **The "Broadcasting Principles"**

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[53] Robert.wickramatunga. (n.d.). *Registration convention*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html

[54] Ibid.

[55] Robert.wickramatunga. (n.d.). *Moon agreement*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html

[56] Ibid.

The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting

General Assembly resolution 37/92 of 10 December 1982[57]

- **The "Remote Sensing Principles"**

The Principles Relating to Remote Sensing of the Earth from Outer Space

General Assembly resolution 41/65 of 3 December 1986[58]

- **The "Nuclear Power Sources" Principles**

The Principles Relevant to the Use of Nuclear Power Sources in Outer Space

General Assembly resolution 47/68 of 14 December 1992[59]

- **The "Benefits Declaration"**

The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries

General Assembly resolution 51/122 of 13 December 1996[60]

Principles[61] emphasize the following:

- the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;
- outer space shall be free for exploration and use by all States;
- outer space is not subject to national appropriation by claim of sovereignty, through use or occupation, or by any other means;
- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- The Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- astronauts shall be regarded as the envoys of mankind;
- States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;
- States shall be liable for damage caused by their space objects; and

[57] Ibid.
[58] Ibid.
[59] Ibid.
[60] Ibid.
[61] Robert.wickramatunga. (n.d.). *The outer space treaty*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html

- States shall avoid harmful contamination of space and celestial bodies.[62]

e. Key Terms and Definitions

- **Space:** is a term that can refer to various phenomena in science, mathematics, and computing and generally encompasses the concept of an area or region. It is often used as a shorthand for outer space.
- **Outer Space:** is the region beyond a planet's atmosphere. where the other planets and stars are situated.
- **Spacecraft:** a vehicle or device designed for travel or operation outside the Earth's atmosphere
- **Satellite:** a body that orbits around another body in space. There are two different types of satellites – natural and man-made. Examples of natural satellites are the Earth and Moon. A man-made satellite is a machine that is launched into space and orbits around a body in space. Examples of man-made satellites include the Hubble Space Telescope
- **Asteroid Mining:** mining is the extraction of minerals and elements of economic interest from the earth's surface. However, asteroid mining is a proposed approach to extract critical elements from asteroids. Some of the raw materials found during asteroid mining include silver, gold, platinum, rhodium, nickel, aluminum, manganese, iron, and cobalt.
- **Space Debris:** is defined as all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional.
- **International Space Law:** the body of law governing space-related activities. Space law, much like general international law, comprises a variety of international agreements, treaties, conventions, and United Nations General Assembly resolutions as well as rules and regulations of international organizations.
- **Commercialization:** the organization of something in a way intended to make a profit
- Space Pollution: harmful waste in space, produced by humans artificially. It is mainly caused due to the increased number of space debris.
- **Contamination in Space:** any site or region that is damaged, harmed, or made unfit for use by the introduction of unwanted substances, particularly microorganisms, chemicals, toxic and radioactive materials, and wastes.
- **Space Traffic:** Space becoming increasingly congested due to rising numbers of on-orbit satellites and debris objects.
- **Space Traffic Management (STM):** it's a system that provides a robust framework for on-orbit coordination of activities to enhance the safety, stability, and sustainability of operations in the space environment.

[62] Ibid.

- **Collision Avoidance:** a system designed to avoid collision with current space debris and, thus, avoid the generation of new space debris.
- **Kessler Syndrome:** is a phenomenon in which the amount of junk in orbit around Earth reaches a point where it just creates more and more space debris, causing big problems for satellites, astronauts, and mission planners.
- **Debris Removal:** the process of removing debris, or waste materials, from a particular area. Removing junk from space would require humans to send space vehicles to capture and 'de-orbit' the junk, using tools such as a net, harpoon or robotic arm
- **End-of-Life (EoL):** the item no longer performs as it used to and should be taken out of service.
- **End-of-Life Disposal:** it is a term used for the disposal of satellites that are no longer in action.

4. Agenda item A: Utilization and Commercialization of Space Resources

a. Introduction

The Foundation of the UNOOSA and its first meeting regarding space regulations resulted in two main ideals. These ideals would change the way that we looked at space as humanity and would unite us. We can simplify them as:

1- Space belongs to everybody; no celestial object can be claimed.
2- Space should be peaceful; no nation is allowed to bring weapons to / or construct weapons in space.

In the last 50 years, these ideals proved themselves adaptable. No country tried to claim the moon or any planet as their own, and neither Russia nor the United States tried to attack each other's space stations/satellites. No nuclear bombs, or weapons of any kind, were brought to space. No material was taken from celestial bodies for anything other than scientific purposes. Of course, it's perfectly reasonable to argue that this was a result of economic unviability or technical difficulties; but it was clear that these ideals would not be challenged during the early period of space expeditions.

But the age we live in right now can be defined as the second era of space expeditions. Each year, more and more nations announce their space program, and the number of states that managed to land a prob to the moon has been rising at a significant pace. Companies that specialize in the "space industry" grow larger, as engineers find new ways to make space missions cheaper and more reliable. Superpowers prepare to re-start their moon missions, as the idea of a moon station gets more realistic every day. Asteroid mining, which was once a subject of science fiction became more and more probable with each technological breakthrough and is expected to become a reality in the second half of the century.

But with each breakthrough and technological advancement, our original space ideals become more and more questionable. If space belongs to everyone, how can a company or a nation mine an asteroid and create profit? What actions should be taken by the UN if a nation's Mars colony uses all the drinkable water in Mars, or pollutes the planet irreversibly? Some countries like the United States have their own answers to this issue; as they already granted property rights to U.S. companies that mine resources in space, but ethical and legal grounds of these rights are debatable since there are no international laws regarding the commercialization of space resources. Delegates of the UNOOSA committee are expected to come up with innovative solutions to these issues and should set an example for humanity's future for the next decades as the human race advances to space.

b. Major parties involved

i. United States of America

The United States has played a major role in space exploration and utilization.

The country has conducted many projects related to space exploration, during the space race era in particular. For example, Project Mercury, the first U.S. program to put humans in space, made 25 flights, six of which carried astronauts between 1961 and 1963. The objectives of the program were: to orbit a human spacecraft around Earth, to investigate a person's ability to function in space, and to recover both the astronaut and spacecraft safely. More than 2 million people from government agencies and the aerospace industry combined their skills, initiative, and experience to make the project possible. Mercury showed that humans could function for periods of up to 34 hours of weightless flight. The Congress and the President of the United States created the National Aeronautics and Space Administration (NASA) on October 1, 1958. NASA's birth has utilized space exploration for many years and will be utilizing it for many years to come.[63]

ii. Russian Federation and China

Recent years have witnessed an increasing interest in human activities in outer space, including crewed missions to the Moon and beyond. In 2019, China and Russia both launched uncrewed lunar missions as a step towards

[63] (n.d.). NASA. https://www.nasa.gov/

crewed missions[64] and, in 2021, announced plans to establish a permanently inhabited base on the Moon, formally inviting other states and international organizations to become involved in the International Lunar Research Station (ILRS).[65] The ILRS will focus on projects such as utilizing in-situ resources, extracting minerals and water, manufacturing various products, and identifying the effects of low gravity on human biology.[66]
Russia will continue to support the ISS, it is clear that their efforts are now directed to missions to the Moon. A sustained presence on the Moon will be reliant upon quite different resources from the life support systems required by crewed space stations in low Earth's orbit.[67]

iii. SpaceX

has gained worldwide attention for a series of historic milestones. It is a private
company that is capable of returning a spacecraft from low-Earth orbit. In 2012 its Dragon spacecraft became the first commercial spacecraft to deliver cargo to and from the International Space Station. And in 2020, SpaceX became the first private company to take humans there as well. [68]

c. Questions to be answered

- How can nations collaborate to establish a fair and equitable framework for resource use?
- What are the environmental and technical challenges associated with space resource extraction and regulations to solve these challenges?

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[64] Frans von der Dunk. (2020, September 11). Advanced introduction to space law. Welcome to Edward Elgar Publishing. https://www.e-elgar.com/shop/gbp/advanced-introduction-to-space-law-9781789901870.html

[65] Space News, China, Russia enter MoU on International Lunar Research Station. https://spacenews.com/china-russia-enter-mou-on-international-lunar-research-stat ion/, 2021. (Accessed 16 November 2022).

[66] Pultarova, T. (2021, June 17). *Russia, China reveal moon base roadmap but no plans for astronaut trips yet*. Space.com. https://www.space.com/china-russia-international-lunar-research-station

[67] Space resource activities and the evolution of international space law. (n.d.). Research @ Flinders. https://researchnow.flinders.edu.au/en/publications/space-resource-activities-and-the-evolution-of-international-spac

[68] *SpaceX*. (n.d.). SpaceX. https://www.spacex.com/mission/

- How can the public and private sectors collaborate to ensure the fair usage of space resources among developed and developing countries?
- What strategies are being considered to ensure the long-term sustainability of space activities, considering the continual growth of satellite constellations and space exploration missions?
- How can advancements in materials science contribute to the development of more sustainable and less debris-prone satellite components?

5. Agenda Item B: Research on space debris, and problems relating to the collision of spacecrafts with space debris.

a. Introduction

Space debris is defined as any man-made object that circles the Earth, oftentimes uncontrollably, that no longer serves a useful function. With space development accelerating considerably in recent decades, the presence of space debris has also grown. Today, more than 27,000 pieces of space junk are being tracked, posing a serious threat to the safety of astronauts, space stations, and people on Earth.[69]

In May 2021, the dangers of space junk made international news with the uncontrolled crash of a Chinese rocket.[70] During the incident, there were growing concerns that the artificial debris would fall back to Earth at a dangerous location—luckily, the rocket fell over the Arabian Peninsula into the Indian Ocean.[71]

Even though no harm occurred as a result of this incident, it brought attention to the dangers of space junk and the threat they pose to the world. Space stations, space shuttles, and satellites are most at risk of harm from space junk—there is a 1 in 300 risk of a colossal collision between a space shuttle and space debris.[72] The destructive nature of space junk became apparent in early 2007 when over 3000 fragments of space debris were fragmented into orbit as a result of the Chinese military destroying a weather satellite. This event illustrated the difficulty of controlling and removing space debris once it has been left in orbit, exacerbating the challenges of safely disposing of space debris.

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[69] *10 things: What's that space rock?* (n.d.). NASA Science. https://science.nasa.gov/solar-system/10-things-whats-that-space-rock

[70] Wall, M. (2021, May 10). *Huge Chinese rocket falls to earth over Arabian Peninsula*. Scientific American. https://www.scientificamerican.com/article/huge-chinese-rocket-falls-to-earth-over-arabian-peninsula/

[71] Ibid.

[72] *Space debris | Facts, removal, & examples*. (2009, April 16). Encyclopedia Britannica. https://www.britannica.com/technology/space-debris

Even worse, space junk poses dangers to equipment that affect everyday citizens; for example, weather data, GPS navigation, and global communication all stem from our technology in space. If even a pea-sized piece of space debris were to hit a satellite, the satellite would be destroyed due to the high speeds at which space junk orbits the Earth. Without definitive actions from UNOOSA, a field of junk of millions of pieces of space debris will soon orbit the Earth, making it impossible for future ambitions for space travel or any activities in space at all. If humanity were to wish for a future in space, the dangers of space debris must be resolved.

The United Nations Committee on the Peaceful Uses of Outer Space has paid particular attention to the issue of preventing and minimizing the creation of space debris. Every year, States and organizations exchange information on their space debris research at the Committee's Scientific and Technical Subcommittee.

One important result of those discussions has been a set of Space Debris Mitigation Guidelines, which were endorsed by the General Assembly in 2007. In addition to scientific research, the national and international legal aspects of space debris mitigation measures are being discussed by the Legal Subcommittee.[73]

UNOOSA has also played a role in detecting objects in outer space. In compliance with article 8 of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies stating that: "A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data before their return."[74] In addition to Article 5 of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space states: "Each Contracting Party which receives information or discovers that a space object or its 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."[75]

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[73] Aygul.duysenhanova. (n.d.). Space debris. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/topics/space-debris/index.html

[74] Robert.wickramatunga. (n.d.). Outer space treaty. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html#a8

[75] Robert.wickramatunga. (n.d.). Rescue agreement. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/rescueagreement.html#a5

UNOOSA requires member states to provide reports of space objects discovered in territory under its jurisdiction on the high seas or in any other place not under the jurisdiction of any State.[76]

b. Key events

- **October 4, 1957** — The Soviet Union successfully launches Sputnik 1, the first man-made object in space, beginning an era of space exploration and technological advancement. [77]
- **April 24, 1970** — China becomes the fifth nation to launch a satellite, China I, into space, commencing a period of Chinese development that would go on to make China one of the largest polluters of space debris. [78]
- **January 24, 1978** — Cosmos 954, a Soviet spy satellite, loses control and re-enters the atmosphere before its debris rains over the Canadian Arctic. Both Canada and the United States subsequently investigated the cleanup effort. [79]
- **1979** — The NASA Orbital Debris Program is created, acting as a platform for research into space debris and developments into ways of decreasing the amount of junk in orbit.
- **January 11, 2007** — China launches a ballistic missile at one of its satellites, immediately destroying the satellite and generating the most debris from a single event with over 35,000 pieces of debris being fragmented.[80]
- **February 10, 2009** — Cosmos 2251, an inoperative satellite, and Iridium 33, a functioning commercial satellite, crash at speeds of 11.7 km/s, fragmenting thousands of pieces of space junk into the atmosphere. [81]
- **2019** — Experts estimate that, at current rates, one to two tonnes of disused satellite debris and other space junk crash back into the Earth every day.

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[76] Robert.wickramatunga. (n.d.). Recovery and return of objects launched into outer space. UNOOSA. https://www.unoosa.org/oosa/en/treatyimplementation/arra-art-v/unlfd.html
[77] Sputnik 1. (n.d.). NASA. https://www.nasa.gov/image-article/sputnik-1/
[78] Ibid.
[79] Worst space debris events of all time. (2013, March 8). Space.com. https://www.space.com/9708-worst-space-debris-events-time.html
[80] Pontin, M. W. (2007, March 8). China's Antisatellite missile test: Why? MIT Technology Review. https://www.technologyreview.com/2007/03/08/226350/chinas-antisatellite-missile-test-why/
[81] The impact of space debris. (n.d.). European Space Agency. https://www.esa.int/ESA_Multimedia/Images/2021/03/The_impact_of_space_debris

- **March 27, 2019** — India becomes the fourth country to launch an anti-satellite missile, destroying an Indian satellite and creating more debris in low-Earth orbit, where most space activity takes place.[82]
- **September 22, 2020** — The International Space Station (ISS) performs an avoidance maneuver to prevent a narrow collision with an unknown piece of space debris, the third such maneuver in 2020 alone. [83]
- **May 8, 2021** — After losing control of the Long March-5b rocket a week prior, the Chinese rocket crashes into the Indian Ocean, sparking global concerns over the risk of space debris to humans on Earth.
- **August 25, 2021** — ELSA-d, a device engineered to remove space debris, successfully completes its first trial in space, marking a major milestone in decluttering the amount of space junk in orbit.

c. United Nations and International Involvement

- **The Inter-Agency Space Debris Coordination Committee (IADC)**

In 1993, the IADC was created to act as a collaborative forum for nations to work out a resolution to the issue of space debris.[84] However, similar to other UN agencies, the IACD is not legally binding and is unable to enforce resolutions that governments sign.[85] Nonetheless, the IACD has developed a framework outlining mitigation measures, risk management for space equipment, and post-mission disposal of space junk.[86] However, these guidelines were only established and signed by the members of the IADC, which is largely limited to only a few nations, such as the UK, the U.S., India, China, Russia, and Japan.[87]

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[82] Urrutia, D. E. (2022, August 10). *India's anti-satellite missile test is a big deal. Here's why*. Space.com. https://www.space.com/india-anti-satellite-test-significance.html

[83] Griggs, M. B. (2020, September 23). *The ISS just avoided a 'piece of unknown space debris'*. The Verge. https://www.theverge.com/2020/9/23/21451587/iss-space-junk-debris-avoidance-maneuver

[84] *Ares*. (n.d.). ARES | Orbital Debris Program Office. https://orbitaldebris.jsc.nasa.gov/faq/#

[85] Ibid.

[86] (n.d.). UNOOSA. https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf

[87] Ibid.

The guidelines' shortcoming further extends to the fact that they isolate other, smaller countries and do not support the idea that space is the responsibility of all nations.[88] Because the IACD does not sufficiently involve more nations of the world, other UN committees have become involved with the matter. For example, the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) has conducted significant research and assessment into the scientific aspects of space debris management.[89]

- **The Registration and Liability Conventions**

The Liability and Registration Conventions, entered into force in 1972 and 1976, respectively, both actively set out guidelines for the management of outer space debris; they were drafted and passed in COPUOS under the United Nations Office for Outer Space Affairs (UNOOSA).[90]

Both treaties emphasize the importance of international collaboration and seek ways to use space to the benefit of mankind rather than any individual nation.[91] The Liability Convention, similar to the Outer Space Treaty, established that states must pay compensation for damages caused by objects launched by the source nation into space.[92] More broadly, it states that a country that launches any objects into space is legally responsible and liable for those objects, even after they go inoperational and defunct.[93] Although this treaty promotes the accountability of space agencies and governments, it has had drawbacks. For example, the Liability Convention was drafted with the context of only the US and USSR having objects in space.[94] Moreover, it has not been updated since its initial creation, so it fails to reflect the current situation involving private industry space exploration. The Registration Convention was implemented to better track and register the number of objects in space.[95] Despite its clear goal of improving the accountability of states that launch objects into space, only 44 states are member parties, giving it limited ratification and effectiveness, largely because the treaty failed to contain any distinguishing rights or responsibilities for ratifying countries—nations that signed the treaty were only burdening themselves with an extra duty,

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[88] Ibid

[89] Robert.wickramatunga. (n.d.). *Copuos*. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/copuos/index.html

[90] Ibid.

[91] *Ares*. (n.d.). ARES | Orbital Debris Program Office. https://orbitaldebris.jsc.nasa.gov/faq/#

[92] Ibid.

[93] (n.d.). UNOOSA. https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf

[94] Ibid.

[95] Ibid.

leading to most states that launch objects into space refraining from signing.[96] There are two main reasons why most guidelines from organizations such as the UN have been ineffective. Firstly, many of them have been ignored, because the guidelines would both harm a country's prospects by limiting their space exploration and also place an unfair burden on them.[97] Secondly, if countries were to follow UN guidelines, such treaties would not effectively deal with private companies and their actions. For example, SpaceX's ambitions of sending more rockets to space and creating a mega constellation of 12,000 satellites are largely not considered by the UN guidelines.[98] As such, most of these guidelines are outdated and do not reflect the current state of space exploration.

Additionally, the UN's lack of power in reinforcing these treaties allows for involved countries to simply disregard what has been signed. Unless a new agency that fosters collaboration where each country's interests and considerations are taken into account is established, the involvement that the UN has made today will largely be rendered impractical.

- **Individual Countries**

Even though international guidelines have been ineffective, national policies are attempting to fill this void by governing a country's actions based on its capabilities. For example, the United States released in 2018 the National Space Policy Directive-3 (SPD-3), which outlined the foundation for future U.S. space activity, placing great consideration on debris management and removal.[99] The policy promoted the peaceful usage of outer space without interfering with other countries' space exploration by updating outdated treaties to match contemporary standards.[100] France has also designed new laws to regulate the dangers of debris. Uniquely, France requires all launch parties to precisely calculate rocket trajectories to ensure that when they re-enter the atmosphere, they land in vast expanses of water, away from endangering humans.[101] However, France's laws have been difficult to enforce, as its regulations have been unpopular with space industry leaders in France, such as Arianespace.[102] In 2017, Canada also passed legislation, RP-008, to limit the unnecessary

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[96] Robert.wickramatunga. (n.d.). Copuos. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/copuos/index.html

[97] Msiget. (n.d.). Space law treaties and principles. UNOOSA. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html

[98] Ibid.

[99] (n.d.). School of Law | University of North Dakota. https://law.und.edu/_files/docs/ndlr/pdf/issues/96/2/96ndlr181.pdf

[100] Ibid.

[101] Peter B. de Selding. (2023, January 20). *French debris-mitigation law could pose issue for Arianespace*. SpaceNews. https://spacenews.com/40171french-debris-mitigation-law-could-pose-issue-for-arianespace/

[102] Ibid.

creation of debris.[103] Under RP-008, all parties seeking to launch objects into space must include a detailed, technical plan describing how they intend to mitigate debris in space.[104] Because these new regulations are still recent, their effectiveness is unknown; nonetheless, the implementation of domestic laws that are both enforceable and customized for an individual country is a potential solution to consider.

d. Questions to be answered

- What practices are in place for the responsible disposal of satellites at the end of their operational life?
- How can public awareness be raised regarding the issue of space debris and its potential impact on space activities?
- What are the long-term solutions for achieving a sustainable, safe and debris-free space environment?
- How can the international community work collectively to ensure a safer orbital environment?
- What preventive measures are in place to avoid collisions with space debris?

[103] *In review: Space law, regulation and policy in Canada*. (2021, December 9). Lexology. https://www.lexology.com/library/detail.aspx?g=d65fe470-4083-463e-bdd8-6345345ebf42

[104] Ibid.