SPECPOL

NOVICE GA

TOPIC GUIDE

Harnoor Sachar
Krystal Jiang
Chairs

Table of Contents:

Secretariat

Anjali Anbu
Secretary General

David Wang
Chargé d'Affaires

Cara Hsiao
Chief of Staff

Maya Schonberg
Director of Internal Affairs

Rochelle Xavier
Director of Internal Affairs

Harnoor Sachar
Director of External Affairs

Jeslyn Zhang
Director of External Affairs

Grace Chu
Director of Operations

Neha Vazarkar
Director of Operations

Saskia Trommelen
Director of Technology

Advisors

Mark Kramer
Faculty Advisor

Christine Wallace
Faculty Advisor

Hello Delegates!
Welcome to AMUN XXIII! My name is Krystal Jiang and I am really excited to be one of your chairs. I am currently a Sophomore in the Visual Arts academy. This is my second year participating in high school MUN. I started MUN in 7th grade and when I found out that BCA had MUN, I immediately took the chance to participate. Since then, I have done simulations and practiced my public speaking skills while also meeting amazing new people along the way. I hope that during this committee you will not only learn more about the topics presented, but also about yourselves and each other. One of the most rewarding parts about MUN is having the opportunity to work together with peers and just having fun.
A little about me, outside of MUN, I really enjoy art and particularly oil painting. I find it really satisfying to mix paints and I love studying the important context and the interpersonal relationships between the artists' work and the viewer. I also really love reading books (despite not having the time to ever finish them ;-;) so if you guys have any recommendations please let me know! And with that, I hope you all enjoy AMUN!

Best,
Krystal Jiang, SPECPOL Co-Chair
kryjia24@bergen.org

Hello Delegates!
Welcome to AMUN XXIII! We are so excited to witness some exciting debate and productive resolutions during our time with you during this conference. My name is Harnoor Sachar, and I will be one of your chairs for SPECPOL. I am a current senior at BCA, in the Medical Science Academy, but my interests vary from STEM to humanities and politics.
I enjoy participating in State and National debate and I have strengthened my skills over the years. My favorite issues to debate are foreign affairs, especially in the South Asian subcontinent. Much of my MUN experience reflects this as I have argued about human rights for journalists, women, and children in Asia. I also studied female pioneers in politics at Cambridge University after my freshman year, through a summer program!
I cannot wait to see the talent and passion in the conference room, and as your chairs, I hope you know that we are there to help you along the way. I wish everyone the best of luck in your research and preparation. Of all things, I hope everyone attends the sessions with the intention of learning new things and making new friends! See you all in February!

Best,
Harnoor Sachar, SPECPOL Co-Chair
harsac22@bergen.org

Topic A:

Dangers of Space Debris

Introduction

Space debris is an issue that has greatly affected the international community. Since the 1950s, space exploration has expanded and nations have collectively sent thousands of spacecraft into orbit. Due to this expansion, the risk posed by space debris has increased because the world treats Low Earth Orbit (LEO) as a “space junkyard”. Derelict satellites aren't the only dangerous form of space debris. Even specks of dust or paint can cause serious damage to spacecraft. In the near future, it is conceivable that LEO could become so filled with space debris that complex missions become exceedingly difficult, or impossible. The world depends on satellite technology for everything from television to GPS, and thus a clean and orderly LEO is in every country's interest. In spite of this, limited action has been taken on this incredibly pressing issue. We are teetering on the precipice, and something must be done.

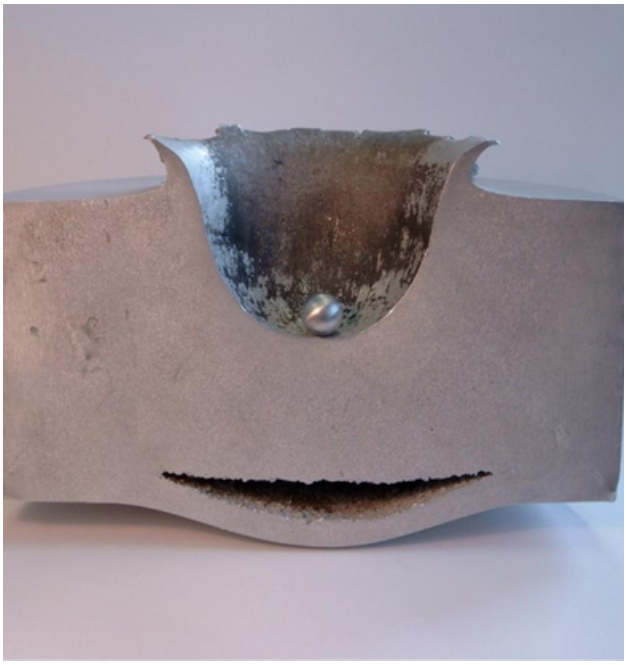
Topic History

As the world continues to make advancements in space exploration, the international community urgently needs to address the serious dangers associated with space debris. Since the 1950s, the world has sent thousands of rockets and satellites into orbit. Today, remnants of those spacecraft

are left floating around unattended, leaving huge risks to future missions and endeavors.

Currently, Low Earth Orbit is being used as an orbital debris junkyard, filled with man-made objects such as spacecraft parts, rockets, and satellites. Even tiny flecks of paint that chipped off floating debris can cause immense damage to spacecraft. The National Aeronautics and Space Association (NASA) has tracked more than 27,000 pieces of space debris larger than 10 cm [1]. Although this may seem like a large number, there is still much more orbital debris that is unaccounted for due to their small size. The unaccounted-for debris has the potential to cause damage to space vehicles such as the International Space Station. Additionally, as debris travels at alarming speeds of up to 1800 mph, they also collide with each other. These collisions could lead to a scenario called Kessler Syndrome, in which collisions create more debris in a cascading effect. If this were to happen, the Earth's orbital space would become unusable [2]. The world has already come dangerously close to this worst-case scenario. In 2009, 2 satellites collided 776 kilometers above Siberia. Both of the satellites were destroyed, creating over 2,300 fragments of debris. Following the crash, orbital debris experts convened to discuss threats to other spacecraft [2]. Accidental collisions are not the only thing contributing to space debris. Anti-satellite missile tests, like those carried out by China in 2007 and India in 2019, have also incurred large amounts of space debris [3].

Orbital debris not only causes issues in space but also on Earth. Occasionally, space debris can leave Low Earth Orbit and enter the Earth's atmosphere. For the most part, the debris burns up and does not make contact with the ground. As more debris builds up in LEO, ground contact becomes an increasingly likely possibility.



[4]

Current Situation

If current trends continue, humanity risks destroying its own future space ambitions by crowding LEO to the degree that future missions are rendered impossible. Kessler Syndrome is not some far-out hypothetical: according to Donald Kessler, the man for whom Kessler Syndrome was named, "it has already started" [4]. As he told Scientific American, "There are collisions taking place all the timeless dramatic and not at the large size scale" [4]. Space debris has already begun to pose a threat to spacecraft of vital importance, most notably the International

Space Station (ISS). Over the course of its existence, the ISS has performed at least 26 special maneuvers to avoid collisions with space debris [5]. According to Jim Bridenstine, the then-director of NASA, the ISS had to make 3 such maneuvers in 2020 alone [5]. This is not to say that the ISS has survived unscathed: in May of 2021, a piece of space junk struck a robotic arm, leaving a visible hole. The functionality of the arm was left undamaged, but the NASA officials acknowledged that this was a "lucky strike" [6].

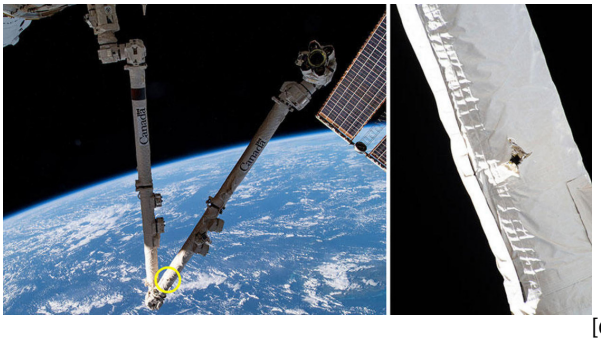
Meanwhile, two emerging innovations seem poised to worsen the problem of space debris dramatically. The first is growing space privatization. As private corporations, like SpaceX, continue to lower the cost of space-resource transportation, more and more entities will have the ability to send satellites into space. Since some of these satellites are bound to fail, it is expected that space privatization will lead to more space debris [4]. The second is the new interest in satellite "mega-constellations", including SpaceX's Starlink broadband internet service, and Amazon's Project Kuiper. These objects are made up of thousands of individual spacecraft: Project Kuiper could end up being made up of as many as 3,200 satellites [4]. Due to concerns over the unpredictability of satellite orbits, Alice Gorman, an expert in space debris from Australia's Flinders University, noted that having the owners of mega-constellations release long-term modeling for collisions is vital to preserving the safety of LEO [4].

Derelict spacecraft, although striking as an example, are not the most dangerous form of space debris. While there is some debate over what exactly is the single most dangerous type, there is a general consensus that small pieces of debris pose the greatest threat. Alice Gorman, for example, said in an interview with Scientific American that pieces of debris between 1 and 10 centimeters in size pose the greatest risk, saying "There's far more of them than whole defunct spacecraft, and there is a far greater probability of collision. While debris this size might not cause a catastrophic breakup, collision with it can certainly damage working satellites and create new debris particles" [4]. By contrast, NASA has said that millimeter-sized debris presents the greatest "mission-ending risk" to machines in LEO [6].

The United Nations have created the United Nations Office for Outer Space Affairs (UNOOSA). They are dedicated to addressing the issue through peaceful prevention and minimization of space debris. From 2007 to the present day, the UNOOSA has done extensive research about the risks associated with space debris. New issues have arisen with the inclusion of nuclear-powered sources [7]. The international community has come together in an attempt to prevent increased risks of collisions. Further discussion has revolved around actions that must be taken if countries find "foreign" space debris within their territories. There has been an established database of found space debris. Through this, countries have been able to measure, document, and identify the origins of space debris found around the

world [8].

Currently, the largest contributors to space debris are Russia, the United States, China, France, India, and Japan. Their additions are not only from space exploration but also anti-satellite missile tests. With political tensions rising, countries have found methods to destroy foreign satellites within Earth's orbit [3].



[6]

Positions (Country Policy)

North American Nations

North American nations have benefited from the results of space exploration, but have contributed a great deal to the space debris issue. The United States Department of Defense is a major space debris tracker, tracking over 23,000 objects in orbit larger than a softball. Sadly, even much smaller objects, like paint flecks or dust particles, can still pose a major threat to spacecraft. The US has also adopted rules related to the mitigation of space debris which encompasses relief efforts, collisions, and economic factors. In Canada, the Canadian Remote Sensing Space Systems Act has made requirements for the Canadian Space Agency to closely follow guidelines from Inter-Agency Space Debris Space Coordination (IADC). Delegates from this region must consider their significant contributions to the issue at hand, and operate in alignment with their nations' previous actions on the topic [9].

European Nations

The European Space Agency (ESA) has worked closely with previous UN initiatives to mitigate damage. They helped fund the first mission to remove orbital debris. Throughout the issue, the ESA has been actively funding for and supporting the reduction and removal of space debris in LEO [2].

Latin/South American Nations

Latin American nations would like to work towards mitigating increases in space debris. Many Latin American countries might be encouraged to expand into space as a remedy for underdevelopment, but that may not be the best course of action. Additionally, many pieces of debris have made ground contact in these areas [10].

Asian Nations

China and Russia have been large contributors to the space debris issue, many of the debris that makes contact with the earth have origins in China or Russia. Recently, China has been accused of irresponsibly managing its space debris. In 2007 and 2019 the Chinese Space Agency controlled the demolition of weather satellites and of the Tiangong-2. This action was generally frowned upon as it produced even more hazardous space debris. The

government continues to claim that the debris burned up upon re-entry to the atmosphere [11]. The Russian Federation has been active in the mitigation process of space debris, they have policies to prevent the creation of "intentional destruction" or self-destructing spacecraft.

African Nations

African countries should be concerned about the risks of space debris making contact within their territories. Possibilities into how to only safeguard the people and the land should be investigated as well as investment into further prevention methods [8].

Middle Eastern Nations

Similar to that of the African nations, there have been reports of space debris making ground contact in these regions. Delegates should be aware of potential hazards that ground contact poses and prepare to ensure the safety of the people. In addition, prevention measures should be considered [8].

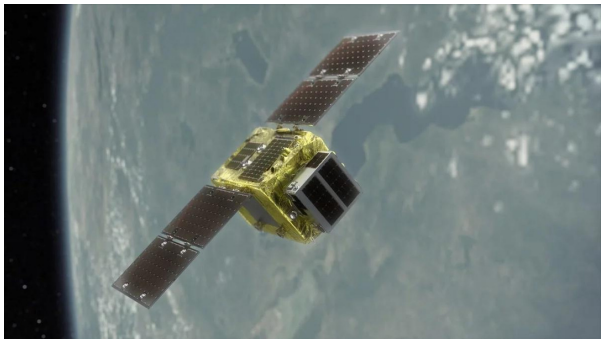
Issues to Address

Space debris is incredibly diverse, ranging in size from microscopic particles or mere flecks of paint to entire spacecraft left floating in orbit. But it is not just diverse in terms of size; anything and everything that is brought into space could one day end up as space junk. A solution well-suited to removing large, thin pieces of space junk (e.g. spacecraft's thermal blankets) is not so well-suited to removing more compact pieces of trash, for example, and is entirely unsuitable for removing the smallest types of debris, like dust or paint flecks [4]. To fully address the problem, delegates must consider responses to all sorts of debris, from the massive to the microscopic. Delegates should also explore ways of improving methods of tracking debris, building a more robust accountability system to handle the aftermath of collisions, and protecting spacecraft from damage.

Solutions should take into account the varying degrees of involvement from different parts of the international community. It should also focus on not only preventing further damage and protecting space crafts, but also the extraction of space debris. This could prove to be a challenging task, as sending more space crafts into LEO could leave behind space debris in the process. Additionally, seeing as this is an international effort, resources and funding should be consolidated. Furthermore, delegates should address anti-satellite missile tests, which have historically been a serious contributor to space debris. Finding ways to discourage countries from pursuing such tests, and hold those who do accountable, should be considered in committee.

Emerging markets and technologies regarding space debris should also be considered. The funding on new technology that limits the amount of space debris left behind is another topic to take into account. One recent innovation in space junk management comes from a private company called Astroscale, which launched the End-of-Life Services by

Astroscale Demonstration (ELSA-d) mission in March of 2021 [4]. The company's work focuses on finding ways to remove space junk in the future. As part of the ELSA-d mission, Astroscale sent a prototype "servicer satellite" and "client satellite", equipped with a magnetic docking plate, into orbit [12]. The servicer satellite works by magnetically attracting the client satellite, which serves as a model for future defunct satellites and pushing it into Earth's atmosphere, where they both will burn up on re-entry [5]. Unfortunately, the technology in ELSA-d is only meant to address future satellites equipped with a compatible magnetic docking plate; it does not address the space junk in orbit today [12]. Nevertheless, the ELSA-d mission is still significant, demonstrating that private corporations are interested in playing a role in the removal and management of space debris. Governments are also taking action: the European Space Agency has plans to launch a self-destructing "space vacuum cleaner" into orbit in 2025 [12]. Delegates in this committee should consider whether a government-led or corporate-led approach is best suited for the task at hand, and how to encourage the private or public sector to take effective action. There is also the problem of getting countries to approve the creation of this kind of technology in the first place. A spacecraft like ELSA-d or the ESA's, with the ability to "service" defunct satellites independent of the satellite owner's approval, could theoretically be repurposed as a powerful form of anti-satellite weaponry, with the ability to destroy other countries' spacecraft in war [4]. Assuaging governments' concerns about this technology is key to getting it implemented, and delegates must consider if it should be at all.



[12]

Questions to Consider

- How should countries consolidate resources and funding to eliminate space debris?
- What should be done about the space debris after it has been collected?
- Is it possible to safely extract space debris from LEO without producing more orbital debris?
- How do political tensions play into the creation of space debris?
- Should countries be held accountable for their contributions to space debris?
- Can there be incentives to stop anti-satellite missile testing?
- Should there be restrictions on what kinds of spacecraft are sent into LEO?

Bibliography

- 1. Garcia, Mark. "Space Debris and Human Spacecraft." *NASA*. NASA, 14 Apr. 2015, www.nasa.gov/mission_pages/station/news/orbital_debris.html.
- 2. "About Space Debris." *ESA*. ESA, www.esa.int/Safety_Security/Space_Debris/About_space_debris.
- 3. Jakhar, Pratik. "Is India Becoming a Major Source of Space Debris?" *BBC News*. BBC, 23 Dec. 2019, www.bbc.com/news/50827462.
- 4. David, Leonard. "Space Junk Removal is Not Going Smoothly." *Scientific American*. Scientific American, 14 Apr. 2021, https://www.scientificamerican.com/article/space-junk-removal-is-not-going-smoothly/.
- 5. Chow, Denise. "Mission to clean up space debris around Earth is poised for launch." *NBC News*. NBCUniversal News Group, 19 Mar. 2021, https://www.nbcnews.com/science/space/mission-clean-space-debris-earth-poised-launch-rcna450.
- 6. Lewis, Sophie. "Space junk slams into International Space Station, leaving hole in robotic arm." *CBS News*. CBS Interactive Inc, 2 Jun. 2021, https://www.cbsnews.com/news/space-junk-damage-international-space-station/.
- 7. Duysenhanova, Aygul. "United Nations Office for Outer Space Affairs." *Space Debris*. UNOOSA, www.unoosa.org/oosa/en/ourwork/topics/space-debris/index.html.
- 8. Wickramatunga, Robert. "United Nations Office for Outer Space Affairs." *Recovery and Return of Objects Launched into Outer Space*, UNOOSA, www.unoosa.org/oosa/en/treatyimplementation/arra-art-v/unlfd.html.
- 9. COPUOS, Sept. 2015, https://www.unoosa.org/documents/pdf/spacelaw/sd/Canada.pdf.
- 10. "Latin America Looks to Space, despite Limitations on Ground." *NBC News*. NBCUniversal News Group, 3 May 2021, www.nbcnews.com/science/space/latin-america-looks-space-limitations-ground-rcna814.
- 11. Grush, Loren. "An out-of-Control Chinese Rocket May Have Dumped Debris in Africa after Falling from Space." *The Verge*. The Verge, 13 May 2020, www.theverge.com/2020/5/13/21256484/china-rocket-debris-africa-uncontrolled-reentry-long-march-5b.
- 12. Weiner, Chloee. "New Effort To Clean Up Space Junk Reaches Orbit." *npr*. npr, 21 Mar. 2021, https://www.npr.org/2021/03/21/979815691/new-effort-to-clean-up-space-junk-prepares-to-launch.