Indore World Summit

Study Guide (UN-COPUOS UNOOSA)

UNOOSA

AGENDA

Space Debris Management and regulations for anti-satellite missile testing

Dear Delegates,

We welcome you to IWS22's emulation of UN-COPUOS and are excited to create a warm yet challenging environment for each one of you to meaningfully engage with the committee's agenda. I want to briefly bring your attention to the importance of, what I call, the '3Cs' – content, conduct, collaboration – which should broadly serve as a comprehensive framework to take you from a good delegate to a great one.

1. <u>Content</u>: Often in MUNs - just like in real life - people resort to attacking the person and not the argument (*ad hominems*), attacking a weaker version of the opponent's argument (strawmanning), creating distractions for the audience to stray from the main point (red herrings) and other miscellaneous insincere forms of rhetoric. Though some EB members do not mind these because they consider an effective use of these to be an important lesson, I do not sympathize with their opinions. I think such fallacies demonstrate a lack of meaningful engagement in the discourse and a blinding lust towards 'winning'. It is always easier to raise your voice in a heated conversation than to make your argument more robust. In our committee though, we shall actively strive towards the latter.
2. <u>Collaboration</u>: Once your arguments are solid, you have the responsibility to share them with others effectively. Make sure that you are actively reaching out to others, try to understand their positions and constraints, carefully dissecting their views and crafting synergetic propositions. The informal capacities in which one can debate, while staying within a largely academic setting, is what makes MUNs unique – try to extract all the value that the unmoderated sessions have to offer.
3. <u>Conduct</u>: This is very straightforward and captured by the age-old adage 'Don't be jerk' (it's easy if your try). While it is always alright to disagree, it is not to okay to be disagreeable. Respect other people's time, space, and identities. I shall not tolerate *any* form of sexism, casteism or class-based discrimination.

The rest of this document (compiled by Avani, Deshnaa and Harshita and edited by Aniruddh) should help you in getting a bird's eye view of the agenda. Treat this as an information archive of useful facts – generating perspectives from this data is your responsibility. Also, remember this document is a launching pad for your preparation – not the end of it.

I look forward to meeting all of you soon.

Warm Regards,

Kartik Tiwari

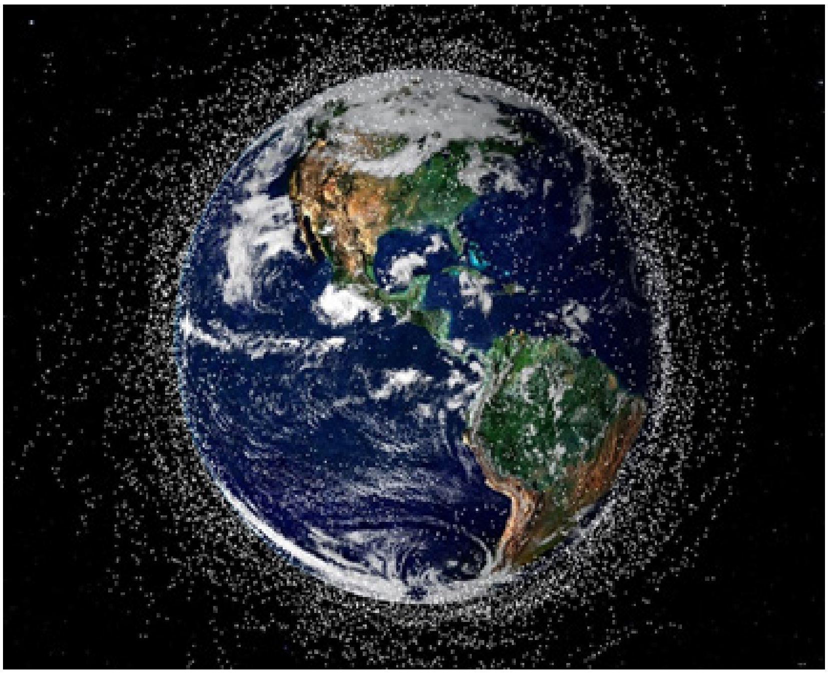

Image Credits: UNOOSA

1. Past and Present of Space Debris

The space environment currently contains approximately 950 operational satellites located in the Low Earth Orbits (LEO), Medium Earth Orbits (MEO) and Geosynchronous Equatorial Orbits (GEO). The space environment also contains massive amounts of space debris. Debris is any man-made object in space that does not serve a useful purpose.

The US Space Surveillance Network (SSN) uses radar and optical sensors to track objects in space. The SSN can track objects larger than 5-10 cm in size in LEO and objects larger than 1 m in size in GEO. Tracked debris is debris that has been tracked by the SSN. The United States also maintains a Catalogue of Space Objects, which currently contains approximately 16,000 objects. There are numerous objects that are tracked. They are not catalogued, though, because their origin is unknown. As a result, the number of tracked objects exceeds the number of catalogued objects. Furthermore, the total amount of debris is significantly greater than the number of tracked and catalogued objects.

Debris is often classified based on its size in the following three categories

Physical Size	Comments	Potential Risk to Satellites
> 10 cm	-Can be tracked -No effective shielding	Complete destruction
1-10 cm	-Smaller objects in this range cannot be tracked consistently -No effective shielding	Severe damage or complete destruction
< 1cm	-Cannot be tracked -Effective shielding exists	Damage

It is currently estimated that the total amount of debris in LEO measuring 1 to 10 cm in size is around 400,000, while the total amount of debris in LEO measuring more than 10 cm in size is around 14,000. In comparison, the total amount of debris in orbit between 1 and 10 cm in size is estimated to be around 750,000, while the total amount of debris larger than 10 cm in size is estimated to be around 24,000. According to evaluations, 50 percent of all debris greater than 1 cm in size is found in LEO.

In the future, tracking capabilities may improve. The Near-Earth Orbit Surveillance Satellite (NEOSSat) initiative of the Canadian Space Agency (CSA) is the first satellite project that aims to monitor objects from space. It will look for asteroids and near-Earth objects (NEOs) around the clock, seven days a week. The initiative essentially involves the deployment of a suitcase-sized microsatellite based on the technology used in the effective Micro Oscillations of STars (MOST) satellite project, which will be directed at the defence research group from the ground. The project is currently being developed and is set to launch in June 2012.

Items in the US Catalogue are of known origin. 57 percent of these catalogued objects were breakup debris, 33 percent were payloads, 11 percent were rocket bodies, and 11 percent were mission-related debris (Fig. 1). Propulsion explosions were the primary source of breakup debris five years ago. However, the composition of breakup debris has recently changed significantly. The 2007 Fengyun 1C breakup contributed 41% of the total amount of breakup debris in orbit. Accidental collisions are also a significant source of breakup debris. The Iridium 33-Cosmos 2251 crash in 2009 accounts for 20% of the breakup debris currently in orbit.

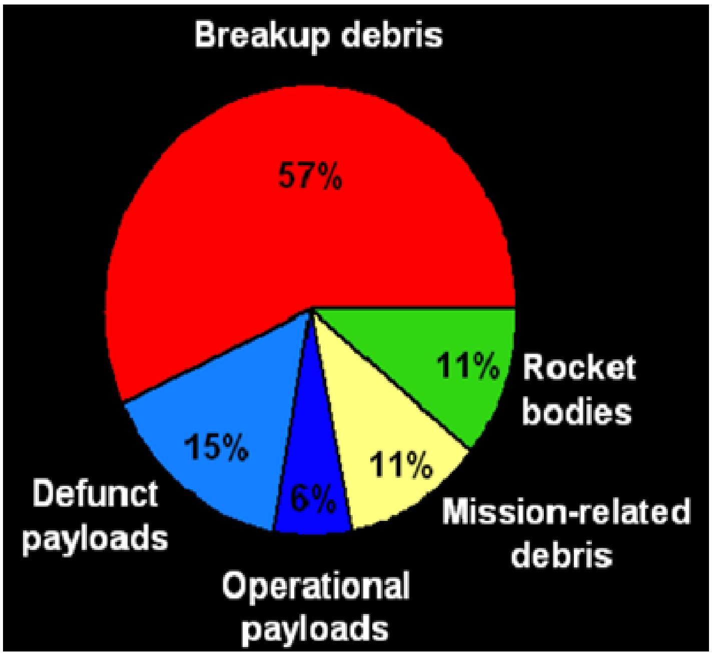

Figure 1: Current composition of objects catalogued in the US Catalogue of Space Objects.

In terms of trends, 18 of the 25 worst non-deliberate fragmentations have involved rocket bodies, owing to the explosion of residual propellant left on board. It is also worth noting that collisions and close conjunctions (the number of objects passing within 5 km of each other) have become more common in LEO, more than doubling between January 2006 and July 2009. Between 1957 and 1996, the United States and the Commonwealth of Independent States (formerly the Soviet Union) added an average of 100-120 objects per year to the Catalogue. Between 1996 and 2006, the United States added an average of 16 objects to the Catalogue per year, while the CIS added an average of 44 objects per year. When debris growth trend lines from 1957 to 1996 are compared to those from 1996 to 2006, the following conclusions are reached: 1) Debris mitigation efforts have had a significant impact; and 2) individual events have generated a large amount of debris.

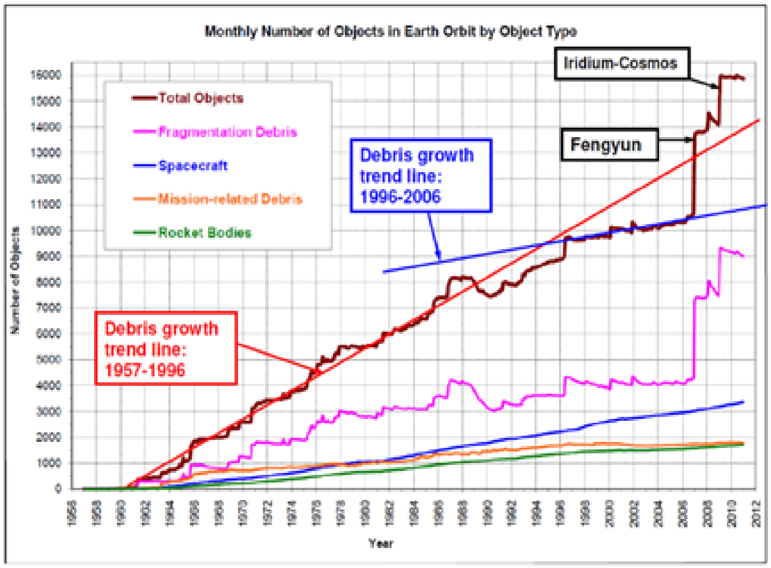

Figure 2: Historical debris growth trends through 2011 demonstrating the dominance of fragmentation debris as a source and the significance of recent individual events such as the Fengyun 1C breakup and the Iridium 33-Cosmos 2251 collision.

Currently, the largest amount of mass is concentrated in the regions of space used for satellites, especially LEO, at altitudes between 800 and 1200 km. Due to which the highest probability of a collision lies in this area.

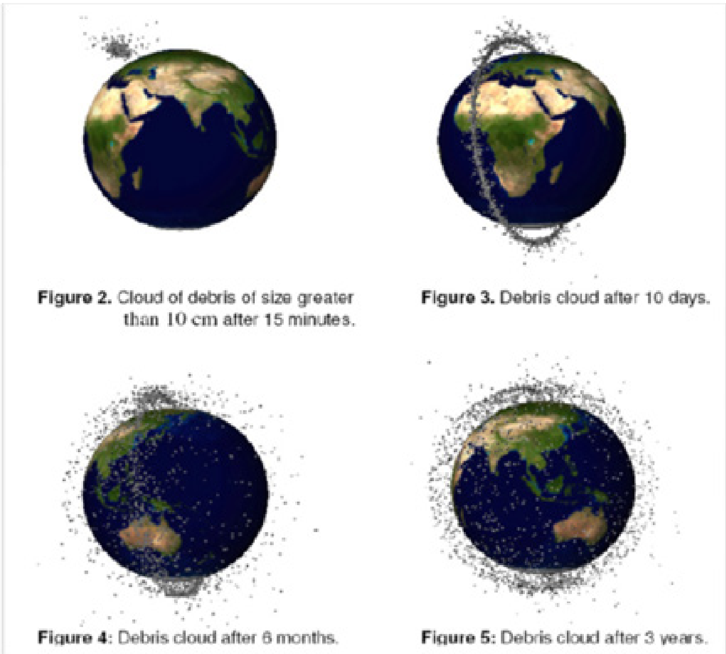

Figure 3: A pictorial demonstration of the evolution of debris following breakup showing how debris spreads around the orbit of the original breakup to form a “debris shell”.

The breakup of a large 10-ton satellite might double or triple the number of debris greater than 1 cm in LEO. Debris tends to stay around the original orbits of the objects but over time, it spreads out around the orbit to create a 'debris shell' (Fig. 3).

The rate of natural decay of objects larger than 10 cm in LEO is currently estimated to be 0.15 percent per year. Based on the 2009 population of such objects in LEO, the Debris Environment Long Term Analysis (DELTA) model suggests that natural decay results in the removal of approximately 5 intact objects per year from LEO at this rate of decay. On the other hand, the current global rate of LEO launch averages 36 per year. If each launch injects two objects into LEO — one payload and one rocket body — this means that at least 72 new objects are injected into LEO each year. Using the natural decay rate of 5 objects per year, the DELTA model predicts that at the current launch rate, 67 new objects will remain in LEO orbit each year. Even if we do nothing, given the number of objects already in orbit, the space environment (at least in the most used Earth orbits) may not be sustainable in the long run if no mitigation or remediation efforts are undertaken.

The issue is not limited to the dangers posed by space exploration. A portion of the space junk in low Earth orbit will gradually lose altitude and burn up in Earth's atmosphere; larger debris, on the other hand, may occasionally collide with Earth and cause environmental damage. Debris from Russian Proton rockets launched from Kazakhstan's Baikonur cosmodrome, for example, litters the Altai region of eastern Siberia. This includes debris from old fuel tanks that contain highly toxic fuel residue, as well as unsymmetrical dimethylhydrazine (UDMH), a carcinogen that is harmful to both plants and animals. While efforts are made to contain fallout from launches within a specific area, complete containment is extremely difficult to achieve.

Anatoly Kuzin, deputy director of the Khrunichev State Research and Production Space Centre, which manufactures Proton rockets, insists that extensive testing reveals no link between reported illnesses in affected areas and rocket launches. Locals' testimonies, on the other hand, refer to a disproportionate number of cancer cases in the area, which many believe is linked to the UDMH in the fuel tank debris; in 2007, 27 people were hospitalised in Altai's Ust-Kansky District with cancer-related complications, with many blaming the rocket fuel. (https://earth.org/space-junk-what-is-it-what-can-we-do-about-it/)

Millions of pieces of space debris are currently orbiting the Earth at an average speed of 22,000 miles per hour, creating an environment in which "a 1-centimetre paint fleck is capable of inflicting the same damage as a 550 pound object travelling 60 miles per hour on Earth," according to NASA. This debris endangers the 1,738 satellites currently in orbit, which support vital modern communication, commerce, transportation, and security systems. Damage to any of these systems can have cascading effects due to invisible interdependencies; for example, the GPS satellite system not only enables basic navigation, but also allows airlines to coordinate routing systems and provides timing synchronisation for sectors such as banking, finance, and power. (https://globalresilience.northeastern.edu/space-debris-poses-growing-threat-to-satellite-infrastructure/)

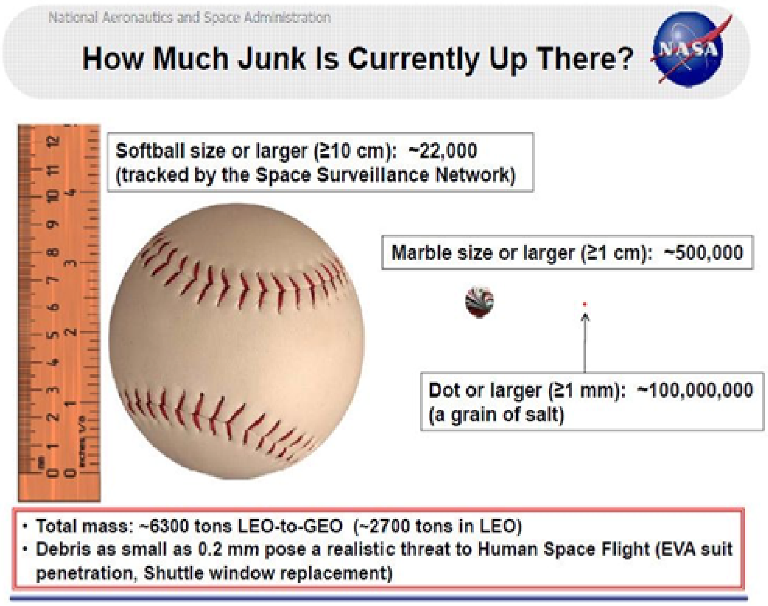

Fig. 4: Space debris size comparison

2. Why is cleaning up complicated?

2.1 Engineering

Over time, space debris around the globe is rapidly increasing as stated previously and leading to more occurrences of collisions in space. The more space junk there is, the harder it is getting for mankind to clean up and cleaning up the space debris is an utmost priority if agencies like NASA, ISRO, JAXA, ROSCOSMOS and other renowned agencies are about to shoot more rockets and satellites into orbit. The cleaning process will become a difficult task because of agencies constantly launching objects into space; and these chunks of debris are starting to pile up to an amount that the coming future will be very complicated for us to clean. The cleaning process had been proposed and also started, but when the cleaning process took place, it involved a lot of engineering and technological aspects. Which was when it started becoming complicated and a hurdle for the scientists to clean up the space debris.

University of Utah's mechanical engineering professor Jake J. Abott has discovered a new method along with a team of researchers to utilise spinning magnets to manipulate orbital debris. Robots with this technology might one day gently navigate the scrap to a deteriorating orbit or farther into space without touching it or they might be able to fix broken things to give them a longer lifespan. (Young. C, 14 September

2022).

The idea relies on subjecting debris to a changing magnetic field, which circulates electrons in the metal debris in charged loops “like when you swirl your cup of coffee and it goes around and around,” Abbott said in a statement. He also said that “What we wanted to do was to manipulate the thing, not just shove it but actually manipulate it like you do on Earth.”

The method that he used is described as dexterous magnetic manipulation and conduction non- magnetic objects. Where this phenomenon has previously been used to induce drag to reduce the motion of objects as they pass through a static field but has not been demonstrated. Although, this would allow and is crucial for removing space debris that cannot be fixed, but it might also be used to stop a damaged satellite from spinning. By doing this, astronauts and engineers might be able to repair the satellite while it is still in orbit, which was not previously thought to be conceivable.

When the team is working on the project day and night, however according to J.-C. Liou of the Orbital Debris Program Office at NASA’s Johnson Space Centre; without more aggressive action, such as active debris removal, or ADR, it can no longer be reversed by full compliance with the mitigating measures now in place; it will get worse. The largest engineering issue of the twenty-first century may be brought on by that. This is because even if all the measures are taken to help clean the space junk, firstly it’ll take decades in the making process and when it’s done it would be too late that the situation will go out of hand. It’s important for not only one agency but all the space agencies in the world to take more aggressive measures.

However, in the meantime there are four Cs of space junk clean-up that are needed at the international level, Liou says.

- Consensus about actively removing debris
- Cooperation: The targets of the removal may come from another nation.
- Collaboration is key to achieving the goal because it is extremely doubtful that any one country or organisation could do it alone.
- Contributions: To actively remove debris, cost-sharing will be essential.

On the other side of the Atlantic, Swiss Space Centre at EPFL is launching CleanSpace One, a project to build the first prototype in a family of “de-orbiting” satellites (Emmanuel Barraud). This satellite has three major technological hurdles, which they need to overcome, and which will necessitate the development of new technology which could be used in the future applications -

- The clean-up satellite will need to modify its trajectory after launch to align with the orbital plane of its target (which takes a lot of fuel and fuel is expensive to carry to space). It might do this by utilising a brand-new form of ultra-compact motor that is being created in labs at EPFL for use in space applications.

- CleanSpace One will catch and stabilise its target when it is within range of the satellite, which will be moving at 28,000 km/h at an altitude of 630–750 km.
- This mission is quite risky at these high speeds, especially if the satellite is rotating. Scientists want to complete the process by creating a gripping mechanism that is modelled after an animal or plant.

Although its first model is destined to be destroyed, the CleanSpace One adventure will not be a one-shot deal. "We want to offer and sell a whole family of ready-made systems, designed as sustainably as possible, that are able to de-orbit several different kinds of satellites," explains Swiss Space Center Director Volker Gass.

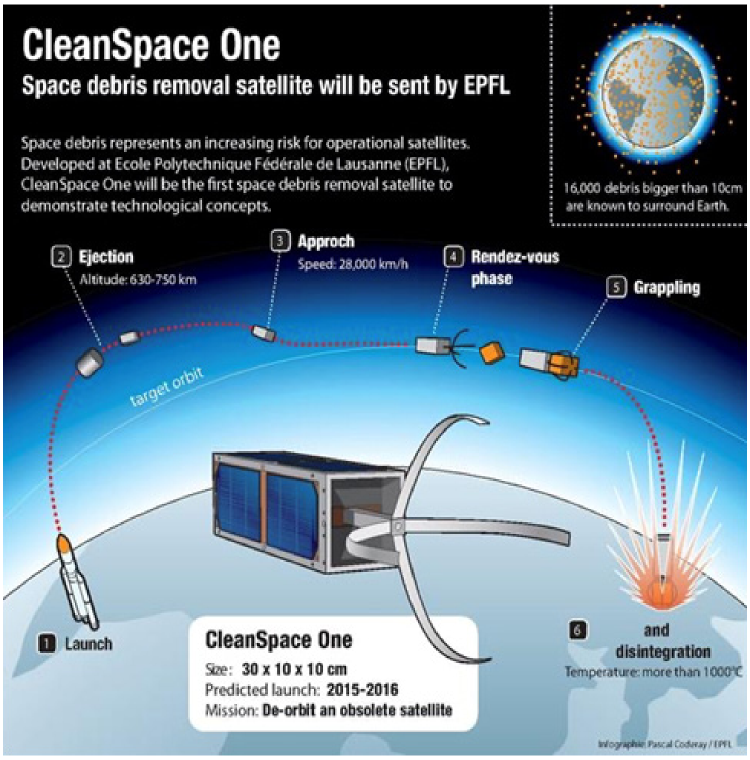

Fig. 5: Overview of CleanSpace mission

2.2 Finances

As per the Organisation for Economic Co-operation and development (OCED), they recently published a report on the economic cost of space debris. Speaking about the costs of space debris, the report stated that the protection and mitigation of the space debris is costly to the satellite operators. However, the cost of inaction would be far greater.

There may be some time before considerable progress is achieved in clearing up space junk as the Office of Space Commerce's budget for 2021 was only $10 million. A collision of the space debris and satellite could result in a considerable financial loss and can cost $290 million or more to develop. In 2020 alone, the International Space Station had to adjust its orbit three times to avoid running into space junk.

There may be some time before considerable progress is achieved in clearing up space junk as the Office of Space Commerce's budget for 2021 was only $10 million. A collision of the space debris and satellite could result in a considerable financial loss, and can cost $290 million or more to develop. In 2020 alone, the International Space Station had to adjust its orbit three times to avoid running into space junk. The European Space Agency (ESA) has a partnership and a deal with ClearSpace for removing piles of debris, five years from now. The deal was of the cost $103 million. ESA thinks that if all goes as planned, this initiative will create "a new economic sector in space" for trash clearance.

In 2010, National Space policy stated that "United States considers the sustainability of space to be vital to its national interests and added a new section on "Preserving the Space Environment and Responsible Use of Space" which contained language from George W. Bush's policy but with few specific additions on space collision warning and active debris removal (ADR).

While the US government has made progress on implementing space debris collision warning measure and fostering international discussions, minimal progress has been made on developing ADR technology. While these modest research and development funding are a positive move, NASA has also chosen to place stringent restrictions on the amount of money it will invest in advancing ADR technology. In June 2014, NASA formally adopted a policy limiting its ADR efforts to fundamental studies and technological development up to but excluding on-orbit technology demonstrations. It is thought that NASA's reluctance to undertake a potentially expensive large new endeavour without extra financing from Congress was the primary cause of this restriction.

Therefore, while the US government was able to make some progress on implementing the space debris collision warning measure. On the other hand, there was a little progress on developing the ADR technology. Also, in a paper in the Proceedings of the National Academy of Sciences, economists Matthew Burgess and Daniel Kaffine, showed an orbital-free use that would be helpful in the long run value of the space -industry, by reducing debris collisions risk.

According to a CU Boulder study, the best method to deal with the space trash issue isn't to collect garbage or de-orbit outdated satellites, but rather to reach an international agreement to charge operators "orbital-use fees" for each satellite launched into orbit.

3. The political landscape of the final frontier

The politics of space are a collection of unresolved conflicts in and of themselves. Involving every type of government and private organisations such as the China National Space Administration (CNSA), the European Space Agency (ESA), the Indian Space Research Organisation (ISRO), the Japan Aerospace Exploration Agency (JAXA), the (US) National Aeronautics and Space Administration (NASA), and the Russian State Space Corporation "ROSCOSMOS". And then there are other private organisations such as SpaceX, Blue Origin, XCOR Aerospace etc. As discussed earlier in the guide, space debris created from anti-satellite weapons is also just one of the unresolved issues in the politics of space. And its concerns rise each day.

Low Earth orbital debris moves 30 times more quickly than a passenger airliner. A satellite can be severely damaged or destroyed by debris larger than 1 cm (half an inch) at these speeds, and it is impossible to shield adequately from junk of this size. However, since 1955 itself countries and organisations have been majorly focused on winning the "space race". And therefore, ever since then holds all kinds of enthusiasm and zeal to advance their technologies and expertise to achieve more and more in this race before anyone else. Due to which severe consequences of these events remain unnoticed and the number of actions and attention it requires lacks. But also, sometimes conflicts like this are already in front of the public eye, but still fails to alarm the public as well as government and private organisations.

People may show lack of urgency to this topic right now because the possible outcomes are not yet begun to show, but as soon as the impacts take place on a larger scale and start affecting all kinds of stakeholders and other parties, it would be too late for damage control. According to statistics, China, the United States, and Russia produce most the world's space debris. The International Space Station was in danger of being attacked when Russia detonated one of its outdated satellites in November using an anti-satellite (ASAT) weapon. The Secure World Foundation estimates that at least 16 ASAT weapons tests that produce debris have been conducted to date, with China's 2007 downing of one of its own satellites—which produced an estimated 3,000 pieces of debris—being the most dangerous. However, the United States developed the first ASAT test in the 1950s, and since then, at least three ASAT debris-creating tests have been carried out by the country: two in the mid-1980s and one in 2008. The main point here is organisations such as CNSA, ESA, NASA, SpaceX etc are not the only parties who will be impacted due to this conflict.

Year	President	Policy Directive	Implementation
1988	Ronald Reagan	Minimize creation of space debris in tests, experiments, and systems	
1989	George HW Bush	+ Encourage other countries to adopt space debris minimization policies	
1996	Bill Clinton	++ Develop design guidelines for space debris minimization, and take a leadership role in promoting international adoption	
2006	George W Bush	+++ Follow national orbital debris mitigation standards, and incorporate into licensing of commercial satellites	
2010	Barack Obama	++++ Preserve the space environment, foster development of space collision warning measures, and research debris removal technology	

Fig. 4: Summary of US national space policy on space debris and its implementation.

The future of humankind's space exploration is particularly catastrophically threatened, although it is unlikely that space debris would have an impact on space travel, it will cause serious issues for flying around the Earth. The risk would be greatest for satellites used for communications and Earth observation, which orbit at an altitude of about 1,000 km (620 miles). That's not just it, telecommunication industries around the world such as Iridium Communications, the US telecommunications provider that owned and operated Iridium 33, was receiving so many alerts about potential close encounters with its craft, or "conjunctions," all with varied probability that it was unable to react to any of them. More than ten years later, when SpaceX was a relatively new player in low-Earth orbit, the European Space Agency sent out a collision warning that SpaceX failed to heed, the significance of private firms in preserving those channels of communication was once again highlighted (ESA.)

The $335 billion global space sector and the space-based services, which are used by most governments, corporations, and people daily to communicate, navigate, predict the weather, and perform many other less obvious but crucial tasks, are seriously threatened by debris and overcrowding. Through a global distribution service that relies on GPS, your Amazon item was delivered promptly, affordably, and safely. The device you purchased was the product of a multinational production chain that was supported by global transportation, global communications, and global finance. Atomic clocks found in GPS satellites date and time stamp your bank and stock market transactions, online payments, and stock market investments. In the future, you might even use telemedicine to get medical care or even have a robot operate on you. Additionally, satellite services like Earth Observation are crucial for decision-makers and first responders in crisis and disaster situations. The list is endless. This is a problem that affects everyone. Even while most space systems and accumulated debris are the responsibility of a small number of countries, everyone benefits from the services, sometimes significantly.

Of course, there is also debris that occurs naturally, such as dust, meteorites, and so forth. Regarding national origins, the degree of contribution is inversely correlated with the country's participation in the space race: China contributed 40%, the USA 27.5%, and the USSR/Russian Federation 25.5%. The equivalent of 12% of all orbital debris was produced in one attack during China's 2007 FengYun-1C test, which saw an inactive meteorological satellite destroyed. After the first American-performed kinetic ASAT test in 1983, this was only the second one ever conducted. The United States tested a new generation of ASAT weapons in operation "Burnt Frost" the following year, after the Chinese test.

For space issues, governance is the process by which stakeholders, especially legitimate holders of authority like governments, elucidate the issues surrounding the upkeep and utilisation of space in the context of complexity in technology, economy, and politics. Engineering-wise, space is a complex system interconnected with terrestrial systems, whose governance must consider key assets, key resources, tangibles, and intangibles, as well as perceptions of all types, but particularly of risk.

The existing system of space governance was created on-the-fly in response to political, economic, and historical restrictions. It is a decentralised system made up of national space agencies, national regulatory frameworks, the United Nations through its Committee on the Peaceful Uses of Outer Space (COPUOS), other international organisations like the International Telecommunications Union, which regulates and assigns communication frequencies, the US Federal Aviation Administration, which has a significant say in space issues because it determines what passes through the airspace of the largest player in space, but also private stakeholders. These private stakeholders include not just companies and civil society groups (the Association of Space Explorers, formerly led by Romanian Cosmonaut Dumitru-Dorin Prunariu) but also businesses who pursue their interests through groups, such as the Satellite Industry Association, or organisations like Unidroit, which harmonises commercial law to facilitate cross-border economic ties (and has attempted to do so for space).

Any spacefaring operator, whether a government or a non-state player, faces a threat from space "Junk." In terms of the general attitude, commerce has long occupied space. In the past, telecommunications firms and government contractors relied on space. It seems logical to design rules that are sensitive to their interests and offer incentives to address challenges caused in the course of spacefaring, such as space debris, as the number of commercial satellites slated to launch soars.

Space systems are a crucial enabler for a wide range of applications that, in the end, serve billions of users and enable the contemporary world with all its comforts. The risk profile of space systems is complex, and for every use where they improve resilience and general efficiency, there is also a situation where our growing reliance on space systems puts us in danger. To maintain humanity's interest in the planet's orbital environment, this risk must be understood and managed through an adequate structure of governance that allows for the creation and acceptance of best practices.

Japan is building "wooden Satellites" by 2023 to control the space junk. The goal of a collaboration between Kyoto University and a Japanese corporation is to create the first wood-based satellites by 2023. According to Sumitomo Forestry, studies on tree growth and the usage of wood products in space have already begun. The cooperation will start testing various wood species in harsh places on Earth. As more satellites are sent into the atmosphere, space debris is growing in importance as a concern. Wooden satellites would burn up when they fell back to Earth, leaving no dangerous elements in the atmosphere or debris in their wake.

Whereas Russia is building a "Cosmic Gun" which is capable to destroy A half-million pieces of space trash orbiting our planet. A proposal for converting a 3-metre (10-foot) optical telescope into a laser cannon was recently presented to the Russian Academy of Sciences (RAS) by Precision Instrument Systems, a research and development division of the Russian space agency, Roscosmos, according to the RT network. This debris-monitoring telescope will be constructed by researchers at Russia's Altay Optical-Laser Center. Then, according to the Sputnik news agency, the researchers intend to combine an optical detection system with an integrated "solid-state laser" to transform it into a debris-vaporising blaster.

De-orbiting (pushing the trash out of orbit and into the Earth's atmosphere where it can burn up) is one method the space industry is using to address the debris issue. The most typical strategy is to choose a controlled re-entry. Due of the need for additional fuel, this approach is both heavy and expensive. De-orbit subsystems are used by another spacecraft. Currently, the majority of these are bulky and heavy and need their own guidance and navigation system to make sure the space craft leaves orbit safely.

For the first time ever with a rocket, Chinese scientists have successfully deployed a drag sail to deorbit one of their newly launched Long March 2 rockets to reduce space debris. According to the official Science and Technology Daily, the drag sail is very thin, measuring just one-tenth the diameter of a human hair, and measures 25 sq metres (269 sq feet) when fully unfolded. This membrane, which resembles a kite, was created to boost atmospheric drag, and quicken the final stage of the 300kg (661 lb) rocket's orbital decline. Last month, the rocket was used to launch remote sensing satellites, but it has since degraded into space debris. The drag sail, the largest one China has created, is a component of the nation's attempts to solve the issue of increasingly crowded space.

The China Aerospace Science and Technology Corporation's Shanghai Academy of Spaceflight Technology created the device. It is the most recent test of deorbit technologies, including long-life membranes, folding and deployment, and collision risk calculations. According to the journal study, these trials on tiny satellites across the world have established a strong basis for the production and application of drag sails on an industrial scale.

4. Appendix: UN-COPUOS

The General Assembly established the Committee on the Peaceful Uses of Outer Space (COPUOS) in 1959 to govern space exploration and use for the benefit of all humanity: for peace, security, and development. The Committee was assigned with reviewing international cooperation in peaceful uses of outer space, analysing space-related activities that the UN could undertake, encouraging space research programmes, and researching legal issues arising from space exploration.

The Committee was responsible for the establishment of the five space treaties and five space principles. Every year, the Committee discusses international cooperation in space exploration and the use of space technology applications to achieve global development goals. The space agenda is constantly evolving due to rapid advances in space technology. As a result, the Committee provides a unique global platform for monitoring and discussing these developments.

The Committee has two subsidiary bodies, both of which were established in 1961: the Scientific and Technical Subcommittee and the Legal Subcommittee. The Committee reports to the General Assembly's Fourth Committee, which adopts an annual resolution on international cooperation in peaceful uses of outer space.

The Committee and its two Subcommittees' overall mandate is to strengthen the international legal regime governing outer space, resulting in better conditions for broadening international cooperation in the peaceful uses of outer space. The Committee's mandate also states that it should support efforts at the national, regional, and global levels, including those of United Nations system entities and international space-related entities, to maximise the benefits of space science and technology and their applications. Overall, the Committee seeks to improve coherence and synergy in international space cooperation at all levels.

COPUOS members are states, and COPUOS membership has steadily increased since 1959, making COPUOS one of the largest Committees in the United Nations. In addition to States, COPUOS and its Subcommittees have observer status with several international organisations, including both intergovernmental and non-governmental organisations.

Since the dawn of the space age, the United Nations has been involved in space activities. Since the first human-made satellite orbited the Earth in 1957, the United Nations has been committed to the peaceful use of space. As part of the International Geophysical Year, this launch marked the beginning of the space age, the first use of satellite technology for scientific advancement, and the beginning of human efforts to ensure the peaceful use of outer space. This was followed in the 1960s by a rapid expansion in space exploration, beginning in April 1961 with Yuri Gagarin becoming the first human to orbit the Earth and culminating in Neil Armstrong's "giant leap for mankind" in July 1969.

During the Cold War, there was growing concern in the international community that space would become yet another arena for intense rivalry between the superpowers, or that it would be left to a small number of countries with the necessary resources to exploit.

In 1958, shortly after the first artificial satellite was launched, the General Assembly established an ad hoc Committee on the Peaceful Uses of Outer Space (COPUOS) of 18 members to consider the activities and resources of the United Nations, specialised agencies, and other international bodies relating to the peaceful uses of outer space, as well as organisational arrangements to facilitate international cooperation in this field within the framework of resolution 1348 (XIII).

Resources

1. Here is a fun video by Joe Scott discussing the Space Debris issue - https://www.youtube.com/watch?v=OA9RqYAsQ1A
2. Section 3 of this paper has a discussion on Hard vs Soft Law (in the context of COPUOS) which might be useful to keep in mind - https://conference.sdo.esoc.esa.int/proceedings/sdc8/paper/194/SDC8-paper194.pdf
3. This is a longer and more comprehensive text (so you don't have to read it by tomorrow - chill) but Pt. II of this booklet is an excellent resource to understand how COPUOS comes into relevance in a diverse myriad of pressing problems -

https://www.unoosa.org/pdf/publications/STSPACE11E.pdf

4. The Outer Space Treaty of 1967 was an historical intersection of international relations, arms development and space race. If not reading it, it would be nice if you're all at least familiar with its significance for geopolitics of 60s and how it shaped our space tech in coming decades.

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- **Rules of Procedure**

Roll Call

A committee meeting begins with a roll call, without which quorum cannot be established. A debate cannot begin without a quorum being established. A delegate may change his/her roll call in the next session. For example, if Delegate answers the Present in the First session, he can answer Present and vote in the next session when the roll call occurs.

During the roll call, the country names are recalled out of alphabetical order, and delegates can answer either by saying Present or Present and voting. Following are the ways a roll call can be responded in -

- Present - Delegates can vote Yes, no, or abstain for a Draft Resolution when they answer the Roll Call with Present;

- Present and voting - An delegate is required to vote decisively, i.e., Yes/No only if they have answered the Roll Call with a Present and voting. A Delegate cannot abstain in this case.

- Abstention - The Delegate may abstain from voting if they are in doubt, or if their country supports some points but opposes others. Abstention can also be used if a delegate believes that the passage of the resolution will harm the world, even though it is unlikely to be highly specific. A delegate who responded with present and voting is not allowed to abstain during a substantive vote. An abstention counts as neither “yes” nor “no vote”,and his or her vote is not included in the total vote tally.

Quorum

In order for the proceedings of a committee to proceed, quorum (also known as a minimum number of members) must be set which is one-third of the members of the committee must be present. Quorum will be assumed to be established unless a delegate’s presence is specifically challenged and shown to be absent during the roll call. The Executive Board may suspend committee sessions if a quorum is not reached.

General Speakers List

After the agenda for the session has been established, a motion israised to open the General Speaker's List or GSL. The GSL is where all types of debates take place throughout the conference, and the list remains open throughout the duration of the agenda's discussion. If a delegate wishes to speak in the GSL, he or she must notify the Executive Board by raising his or her placard when the Executive asks for Delegates desiring to speak in the GSL. Each country's name will be listed in the order in which it will deliver its speech. A GSL can have an individual speaker time of anywhere from 60-120 seconds. Following their GSL speech, a Delegate has the option of yielding his/her time to a specific Delegate, Information Points (questions) or to the Executive Board.

Speakers List will be followed for all debate on the Topic Area, except when superseded by procedural motions, amendments, or the introduction of a draft resolution. Speakers may speak generally on the Topic Area being considered and may address any draft resolution currently on the floor. Debate automatically closes when the Speakers List is exhausted.

Yield

A delegate granted the right to speak on a substantive issue may yield in one of three ways at the conclusion of his/her speech: to another delegate, to questions, or to the Director. Please note that only one yield is allowed. A delegate must declare any yield at the conclusion of his or her speech.

• Yield to another delegate. When a delegate has some time left to speak, and he/she doesn't wish to utili#e it, that delegate may elect to yield the remaining speaking time to another delegate. This can only be done with the prior consent of another delegate (taken either verbally or through chits).The delegate who has been granted the other's time may use it to make a substantive speech, but cannot further yield it.

• Yield to questions. Questioners will be selected by the Executive Board. Follow-up questions will be allowed only at the discretion of the Director. The Director will have the right to call to order any delegate whose question is, in the opinion of the Director, rhetorical and leading and not designed to elicit information. Only the speaker's answers to questions will be deducted from the speaker's remaining time.

• Yield to the EB. Such a yield should be made if the delegate does not wish his/her speech to be subject to questions. The moderator will then move to the next speaker.

Motions

Motions are the formal term used for when one initiates an action. Motions cover a wide variety of things.

- Once the floor is open, the Chairs will ask for any points or motions. If you wish to bring one to the Floor, this is what you should do:
- Raise your placard in a way that the chair can read it
- Wait until the Chair recognizes you
- Stand up and after properly addressing the Chair(":hank you, honourable Chair" or something along these lines), state what motion you wish to propose
- Chairs will generally repeat the motions and may also ask for clarification. Chairs may do this if they do not understand and may also ask for or suggest modifications to the motion that they feel might benefit the debate.

Every motion is subject to seconds, if not otherwise stated. To pass a motion at least one other nation has to second the motion brought forward. A nation cannot second its own motion. If there are no seconds, the motion automatically fails.

If a motion has a second, the Chair will ask for objections. If no objections are raised, the motion will pass without discussion or a procedural vote. In case of objections, a procedural vote will be held. The vote on a motion requires a simple majority, if not otherwise stated.

While voting upon motions, there are no abstentions. If a vote is required, everyone must vote either "Yes" or "No". If there is a draw on any vote, the vote will be retaken once. In case there are multiple motions on the Floor, the vote will be casted by their

Order of Precedence. If one motion passes, the others will not be voted upon anymore. However, they may be reintroduced once the Floor is open again.

During a moderated caucus, there will be no speakers' list. The moderator will call upon speakers in the order in which the signal their desire to speak. If you want to bring in a motion for a moderated caucus, you will have to specify the duration, a speakers' time, a moderator, and the purpose of the caucus. This motion is subject to seconds and objections but is not debatable.

In an unmoderated caucus, proceedings are not bound by the Rules of Procedure. Delegates may move around the room freely and converse with other delegates. This is also the time to create blocks, develop ideas, and formulate working papers, draft resolutions, and amendments. Remember that you are required to stay in your room unless given permission to leave by a Chair.

During the course of debate, the following **points** are in order:

Point of Personal Privilege: Whenever a delegate experiences personal discomfort which impairs his or her ability to participate in the proceedings, he or she may rise to a Point of Personal Privilege to request that the discomfort be corrected. While a Point of Personal Privilege in extreme case may interrupt a speaker, delegates should use this power with the utmost discretion.

Point of Order: During the discussion of any matter, a delegate may rise to a Point of Order to indicate an instance of improper parliamentary procedure. The Point of Order will be immediately decided by the Director in accordance with these rules of procedure. The Director may rule out of order those points that are improper. A representative rising to a Point of Order may not speak on the substance of the matter under discussion. A Point of Order may only interrupt a speaker if the speech is not following proper parliamentary procedure.

Point of Parliamentary Enquiry: When the floor is open, a delegate may rise to a Point of Parliamentary Inquiry to ask the EB a question regarding the rules of procedure. A Point of Parliamentary Inquiry may never interrupt a speaker. Delegates with substantive questions should not rise to this Point, but should rather approach the committee staff during caucus or send a note to the dais.

Point of information: After a delegate gives a speech, and if the delegate yields their time to Points of Information, one Point of Information (a question) can be raised by delegates from the floor. The speaker will be allotted the remainder of his or her speaking time to address Points of Information. Points of Information are directed to the speaker and allow other delegations to ask questions in relation to speeches and resolutions.

Right to Reply: A delegate whose personal or national integrity has been impugned by another delegate may submit a Right of Reply only in writing to the committee staff. The Director will grant the Right of Reply and his or her discretion and a delegate granted a Right of Reply will not address the committee except at the request of the Director.

Draft Resolution

Once a draft resolution has been approved as stipulated above and has been copied and distributed, a delegate(s) may motion to introduce the draft resolution. The Director, time permitting, shall read the operative clauses of the draft resolution. A procedural vote is then taken to determine whether the resolution shall be introduced. Should the motion received the simple majority required to pass, the draft resolution will be considered introduced and on the floor. The Director, at his or her discretion, may answer any clarificatory points on the draft resolution. Any substantive points will be ruled out of order during this period, and the Director may end this clarificatory question-answer period' for any reason, including time constraints. More than one draft resolution may be on the floor at any one time, but at most one draft resolution may be passed per Topic Area. A draft resolution will remain on the floor until debate on that specific draft resolution is postponed or closed or a draft resolution on that Topic Area has been passed. Debate on draft resolutions proceeds according to the general Speakers List for that topic area and delegates may then refer to the draft resolution by its designated number. No delegate may refer to a draft resolution until it is formally introduced.

Amendments

All amendments need to be written and submitted to the executive board. The format for this is authors, signatories and the clause with mentioning the add, delete and replace. There are two forms of amendment, which can be raised by raising a motion for amendment and approval of the chair:

- Friendly Amendments: Amendment,which is agreed upon by all the author's does not require any kind of voting
- Unfriendly Amendments: Amendments that are introduced by any other need not be voted upon by the council and are directly incorporated in the resolution. You need a simple majority in order to introduce a normal amendment.

BODY of Draft Resolution

The draft resolution is written in the format of a long sentence, with the following rules:

- Draft resolution consists of clauses with the first word of each clause underlined.
- The next section, consisting of Preambulatory Clauses, describes the problem being addressed, recalls past actions taken, explains the purpose of the draft resolution, and offers support for the operative clauses that follow. Each clause in the preamble begins with an underlined word and ends with a comma.
- Operative Clauses are numbered and state the action to be taken by the body. These clauses are all with the present tense active verbs and are generally stronger words than those used in the Preamble. Each operative clause is followed by a semi-colon except the last, which ends with a period.

SAMPLE POSITION PAPER

Committee : UNDP

Country : Chad

Topic : Women in Development

Chad is concern with gender equality issues and quite glad with the attention tChad is concerned about gender equality concerns and is pleased that people are paying attention to this subject. We promote human rights and believe that all humans, including men and women, are created equal. We see that violence and gender discrimination would be a violation of human rights. We also think that women, like men, should be allowed a larger role in practically every facet of life.

This crisis has been resolved in practically every country, and we now need to create a safer and more secure environment.

improved environment for women and their activities As many as 70% to 80% of women are responsible for their home. However, they are in an unpleasant condition due to a lack of education, financial management, and even awareness of their rights. Which led to bigger problems such as unpaid overtime work, low education owing to forced young marriage, and other culturally based constraints that make people unhappy.

Our country may have joined and ratified human rights accords that acknowledged the Gender equality is a concept. And our government enthusiastically passed the domestic violence statute, which is yet another step toward recognising this issue. Nonetheless, we think that there is a problem in law enforcement, which is why Chad will participate in UNDP programmes regarding gender equality, women empowerment, and advocating our position to our own people.

The government of Chad presented various remedies to this problem.

1. Creating an environment in which women are accepted and treated equally. in which case

As an example, UNDP should engage in social and cultural activities to create a “model community.” to different villages Education is one of the projects. The majority of the time, young girls are stolen.away from school and compelled to work or marry owing to financial difficulties Developing an option may be night school or another flexible-in-time and free school.

2. A basic financial education. Women should seek out services or products that are effective. capable of handling them We would aid them in obtaining credit and a better and safer loan. And they should be functioning as entrepreneurs in their town or group. Which in this case In this situation, they create a new, independent employment.