

Space Debris: A New Broadway to Address Organizational and Operational Aspects for Removal

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Space debris is a global mounting ultimatum to the enduring maintainability of outer space activities. It ought to be managed from the very beginning. For the last couple of years, collisions have enhanced space debris accumulation, and the rate at which space activities have resulted in the production of debris is at a threshold position in a linear fashion. Ultimately, space has become the rendezvous of space debris. Considering the growing accumulation of debris and the emerging apprehension regarding a horrible strike and collapse of whole space programs, this paper focuses on the legal and administrative challenges. Both developing and developed countries realize the value of a competent regime that could administer, supervise, finance, and promote the research, examination, and development of outer space. Thus, this research suggests an autonomous, competent international space authority be established by a treaty or international agreement following the model of the deep seabed authority because it has similar natural resources but a geographically different location.

Keywords

Space Debris, Definition & Identification of Debris, International Space Authority, Durability of Outer Space

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I. Background

Throughout the centuries, outer space and the moon have been a source of inspiration. The first satellite, SPUTNIK,¹ and the moon walk of Neil Armstrong² marked the dawn of space age. The development of science and technology has enabled the inspection, observation, and usage of outer space. The space race began during the Cold War, which eventually led to space development. More than 50 years' space bustle caused by different space actors has resulted in leftover debris. This garbage is an unending eternal hazard that makes the outer space environment vulnerable.³ Empirical evidence has shown that traditional "fire and forget" and "big skies" mentalities have resulted in accumulating this debris at a threatening level.⁴ Although the risk associated with debris accumulation was identified early,⁵ the full extent of the hazards was not realized for several years.⁶ Space-faring nations have only recently begun to heed the warnings of orbital debris proliferation.⁷ It is now widely recognized that controlling debris production is crucial for maintaining space security and, in turn, international peace and security.⁸ The International Lawyer Association ("ILA") was forced to formulate the "International Instrument on the Protection of Environment from Damage Produced by the Space Debris."⁹ These instructions have also been conceded by the Scientific Technical Sub-Committee ("STSC") of the UN Committee on the Peaceful Uses of Outer Space ("UNCOPUOS").¹⁰

A decade ago, intended or coincidental in-orbit breaking-ups, striking, and

¹ W. Sullivan, *Course Recorded-Navy Picks up Radio Signals - Report Sighting Device*, N.Y. TIMES, Oct. 5, 1957, available at <https://archive.nytimes.com/www.nytimes.com/partners/aol/special/sputnik/sput-02.html>.

² J. Wilforda, *Powdery Surface Closely Explored*, N.Y. TIMES, July 20, 1969, available at https://ipfs.io/ipfs/QmXoyipzjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/John_Noble_Wilford.html.

³ M. Listner, *Legal issues surrounding space debris remediation*, SPACE REV. Aug. 6, 2012, available at <http://www.thespacereview.com/article/2130/1>.

⁴ M. Taylor, *Orbital Debris: Technical and Legal Issues and Solutions* (unpublished LL.M. thesis, McGill University, 2006), available at <http://www.fas.org/spp/eprint/taylor.pdf>.

⁵ E. Davison & P. Winslow, *Space Debris Hazard Evaluation*, NASA technical Note D-1105, Dec. 1961, available at <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19980228158.pdf>.

⁶ J. Kessler & G. Burton, *Collision Frequency of Artificial Satellites: The Creation of a Debris Belt*, 83:6 J. GEOPHYSICAL RES. 2637-46 (June 1, 1978), available at <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/JA083iA06p02637>.

⁷ NASA Orbital Debris Program Office, U.S. Government Orbital Debris Mitigation Standard Practices 1995, available at https://www.orbitaldebris.jsc.nasa.gov/library/usg_od_standard_practices.pdf.

⁸ D. Wright, *Orbital Debris produced by Kinetic-Energy Anti-Satellite Weapons*, *Celebrating the Space Age: 50 Years of Space Technology, 40 Years of the Outer Space Treaty-Conference Report* (Apr. 2-3, 2007) at 155 & 164.

⁹ K. Böckstiegel, *ILA Draft Convention on Space Debris*, 44 ZEITSCHRIFT FÜR LUFT-UND WELTRAUMRECHT (ZLW) 29 (1995).

¹⁰ E. Finch, *Heavenly Junk III- Space Debris*, INT'L SPACE L. 2 (1995).

flare-ups were observed. China's deliberated test and the very grave coincidental collision of a deactivated Russian satellite with a US functional satellite were two major episodes that resulted in the dirty fog of space debris.¹¹ Currently, China's Tiangong-1 space station was knocked down toward the Earth, showering debris on the surface of the Pacific Ocean and massively enhancing the ash residue.¹² The US registered a record 308,984 probable space-junk hits in 2017. As the situation might become aggravated, which is very alarming for outer space, the US announced at least 655 "alarming-reportable" ultimatums from satellite operators.¹³ Thus, the rapid growth of space debris creates a threat to functional satellites, the International Space Station ("ISS"), and astronauts.¹⁴ The catastrophic possibility of the smallest debris particle from comparatively effective momentum in the orbits are giant and towering. The average momentum of orbital debris compared with a space object will be almost 10 km/sec, which is equal to approximately ten times the speed of a bullet in the Low Earth Orbit ("LEO"). As a result, a hit from even a minuscule piece of debris will produce a substantial amount of energy.

The elevating mass of space debris may result in a girdle of debris encompassing the Earth that poses the risk of chain reaction and may begin to increase in an unmanageable manner because of a striking chain reaction.¹⁵ Ultimately, this phenomenon will enhance the chances of collision ten times and soon endanger all functional space vehicles if the space debris population remains increasing and steady. There is apprehension regarding debris hitting the Earth's atmosphere, then breaking up, and finally creating a grave threat to the population.¹⁶ A supplementary "growth feature" that may furthermore effect space debris proliferation is reputed "macro-constellations" that will involve large numbers of petty satellites with a minor

¹¹ W. Brain, 2007 Chinese Anti-Satellite Test Fact Sheet, Secure World Foundation, Nov. 23, 2010, at 5-7, available at http://swfound.org/media/9550/chinese_asat_fact_sheet_updated_2012.pdf. See also W. Brian, *Cosmos is Falling*, Spaceweather.com, Mar. 10, 2009, available at <http://www.spaceweather.com/archive.php?view=1&day=10&month=03&year=2009>.

¹² D. Mosher, *Space-Junk Collision*, BUS. INSIDER, Apr. 15, 2018, available at <http://www.businessinsider.com/space-junk-collision-statistics-government-2017-2018-4>.

¹³ *Id.*

¹⁴ NASA, International Space Station Again Dodges Debris, 15:3 ORBITAL DEBRIS Q. NEWS (2012), available at <https://orbitaldebris.jsc.nasa.gov/quarterly-news/pdfs/odqnv1513.pdf>.

¹⁵ P. Eichlerand & D. Rex, *Debris Chain Reactions*, Orbital Debris Conference: Technical Issues and Future Directions (AIAA Meeting Paper, Apr. 1990), available at <https://arc.aiaa.org/doi/pdf/10.2514/6.1990-1365>.

¹⁶ J. Liou & N. Johnson, *Risks in Space from Orbiting Debris*, 311 SCI. 340-1 (2006), available at <http://www.sciencemag.org/content/311/5759/340.full>. See also J. Liou, *An Active Debris Removal Parametric Study for LEO environment Remediation*, 47:11 ADVANCES SPACE RES. 1865-76 (June 1, 2011), available at <https://www.sciencedirect.com/science/article/pii/S0273117711000974>.

running lifetime and constrained steering aptitude.¹⁷ Currently, approximately 1000 energetic satellites in the LEO are with the publicized One Web macro-constellation network, and this figure will virtually increase twofold.¹⁹ Additionally, if altogether three constellations on the list are propelled, it will produce a decupled escalation in the LEO satellite populace of debris and reveal that there is a deleterious situation.

II. Inadequate Legal Structure regarding Space Debris Removal

A. Definition & Identification of Space Debris for its Eradication.

Actually, the space law and treaties neither explicitly forbids the production of space debris nor levies responsibility on the states to remove them. No global solidarity or agreement on the identification and the definition of space debris has ever been observed. Basically, the main query is whether malfunctional and maloperational satellites are assumed to be space debris. The main purpose is to reveal the not ending ambiguity be there “space debris” tantamount into space object.²⁰ It has become crucial to mark a dissimilarity among the “space object” and particles of “space debris” due to the absence of an obvious judicial definition, which presents substantial confusion in the implementation of rights and the obligations attributed to the maneuvering states. To identify space debris, it is mandatory to research the meaning of “space debris.” Unfortunately, the prevailing space-law establishment has not provided a description of “space debris.”

The functioning term stated in these legal documents is “space object.”²¹ As stated in Article VII of the Outer Space Treat (“OST”),²² the maneuvering state will

¹⁷ R. JAKHU & J. PELTON, IN *GLOBAL SPACE GOVERNANCE: AN INTERNATIONAL STUDY; SMALL SATELLITES AND LARGE SATELLITE CONSTELLATIONS* 369-73 (2017).

¹⁸ IADC, *Statement on Large Constellations of Satellites in Low Earth Orbit* (2017), available at <http://www.iadc-online.org/Documents/IADC-15-03%20Megaconstellation%20Statement.pdf>.

¹⁹ FCC Grants Oneweb Access to U.S. Market for Broadband Satellite Constellation. (June 22, 2017), available at <https://docs.fcc.gov/public/attachments/DOC-345467A1.pdf>.

²⁰ M. BENKÖ & K. SCHROGL, *CURRENT PROBLEMS AND PERSPECTIVES FOR FUTURE REGULATION* 40-3 (2006).

²¹ A. KERREST & C. THRO, *LIABILITY FOR DAMAGE CAUSED BY SPACE ACTIVITIES*, *ROUTLEDGE HANDBOOK OF SPACE LAW* 79-92 (2016). See also S. GOROVE, *Legal and Policy Issues of the Aerospace Plane*, 16 *J. SPACE L.* 154; (1988); J. Verplaetse, *On the Definition and Legal Status of Spacecraft*, 29 *J. AIR L. & COM.* 131 (1963).

²² *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (Outer Space Treaty), Jan. 27, 1967, 610 U.N.T.S. 205, available at http://www.unoosa.org/pdf/publications/ST_SPACE_11_Rev1_Add1_Rev1E.pdf.

be deemed to be globally responsible for harm created by an object that took off into outer space or fragments or elements thereof. Moreover, this postulate is replicated in Article II of the Liability Convention,²³ which states that: “A maneuvering state shall be completely responsible to compensate for destruction created by its space object either over to exterior of the Earth or towards flying aircraft.” Furthermore, Article III of LC also stresses the same criteria, to ascertain the liability to compensate for harm to areas other than the exterior of the Earth. Thus, for the identification of space debris, a *bona fide* description of “space object” is absolutely heightened by the certainty that “the base of compensation is harm which is created by a space object.”²⁴

B. Who has the Authority to Identify and Decide Regarding the Removal of Debris?

Owing to the absence of a definition and the legal status of space debris, plenty of legal issues and troubles have occurred, for instance, because of losing the connection with the Environmental satellite, the gigantic non-Military Earth Observations Satellite was launched into orbit on April 8, 2012.²⁵ Then, after one month of untiring efforts to retain control, the European Space Agency (“ESA”) announced it would finish its mission.²⁶ Eventually, as it was floating unbridled, the apprehension is enhanced regarding its accident with other operational space objects; it is thus a perfect candidate for remediation from orbit.²⁷ So, in such a crucial situation, a question arises: Does the Envisat qualify as a piece of “space debris?” Although space debris is wandering unrestrained and no longer maneuverable because of losing the connection, it is still an undamaged satellite. However, it was re-activated and went back to work with a function similar to an earlier “space object.” The complication for the space actors ceases at the definition of space debris and transfuses into its identification.

In the case of specific minute particle debris, it is not defined as a “space object,”

²³ Convention on International Liability for Damage Caused by Space Objects (Liability Convention), Mar. 29, 1972, 961 U.N.T.S. 187, available at http://www.unoosa.org/pdf/publications/ST_SPACE_11_Rev1_Add1_Rev1E.pdf.

²⁴ S. Rosenfield, *Where Air Space Ends and Outer Space Begins*, 7 J. SPACE L. 145 (1979), available at <https://heinonline.org/HOL/LandingPage?handle=hein.journals/jrlsl7&div=19&id=&page=>.

²⁵ T. Malik, *Huge Satellite Loses Contact with Earth*, Space.Com, Apr. 16, 2012, available at <http://www.space.com/15290-huge-satellite-envisat-contact-lost.html>.

²⁶ United Space in Europe, *ESA Declares End of Mission for Envisat*, May 9, 2012, available at https://www.esa.int/Applications/Observing_the_Earth/Envisat/ESA_declares_end_of_mission_f_or_Envisat.

²⁷ M. Mejia-Kaiser, *ESA’s Choice of Futures: Envisat Removal or First Liability Case*, 55TH IISL COLLOQUIUM ON THE LAW OF OUTER SPACE PROC. (NOV.15, 2012), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3353425.

so that it halts heed by the Liability Convention. For example, an object that stopped working cannot be identified even by the launching state as “soon after functional”²⁸ because the object is no longer a space object. Such a type of inadequacy in the Liability Convention changed loopholes for several entities, which were supposed to be found responsible in a different manner.²⁹ Suppose a chunk of debris manifests a “space object,” it might be difficult to find out its location or to detect its origin. Thus, the matter, therefore, is twofold: describing the subject matter and its recognition. A stringent clarification of the fundamental part of the definition in treaties was never favorable, and the discourse has trended toward assuming an operational approach instead, where the function of the object is used to classify the harm-inducing subject matter.³⁰ Thus, the functionality test might be the ultimate answer for the identification and definition of space debris. Thus, at this stage, the author focuses on the dire need to empower an international space regime or authority that would make firm decisions not only for identification but also for the removal of space debris.³¹

C. Who Requires Prior Approval for Removal?

The existing legal framework does not allow interruption with space objects without the earlier consent from the launching state. If excluding an object without consent, it would establish an internationally wrongful act. Nonetheless, earlier assent acquired from the launching State, or the State of registry in the case of various launching States, would create a situation impeding the wrongfulness of behavior that would otherwise not be in compliance with the international responsibilities of the State performing the remedial activity. The International Court of Justice has pronounced that the presence of such incident does not invalidate or sack the responsibility; it instead offers explanation or plea for non-performance while the situation in question exists.³²

²⁸ Registration Convention 1975, art. IV (1), available at <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html>.

²⁹ F. Dunk, *Space Debris and the Law*, 3RD EUR. CONFERENCE ON SPACE DEBRIS PROC. 863-8 (H. Sawaya-Lacoste ed., 2001), available at <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1003&context=spacelaw>.

³⁰ M. Singh, *Stuck in Space: The Growing Problem of Space Debris Pollution*, 2:1 UK L. STUDENT. REV. 72 (2014), available at https://www.academia.edu/29006127/Stuck_in_Space.

³¹ UNCOPUOS Active Debris Removal - An Essential Mechanism for Ensuring the Safety and Sustainability of Outer Space, U.N. Doc. A/AC.105/C.1/2012/CRP.16, Jan.27, 2012, at 29-39 & 43-6, available at http://www.unoosa.org/pdf/limited/c1/AC105_C1_2012_CRP16E.pdf.

³² *Gabcikovo-Nagymaros Project (Hung. v. Slov.)*, Judgement, 1997 I.C.J. Rep.7, ¶ 92 (Sept. 25), available at <https://www.icj-cij.org/files/case-related/92/092-19970925-JUD-01-00-EN.pdf>.

Article 20 of the International Law Commission's Articles on State Responsibility echoes the straightforward international legal principle of approval as follows: "Valid consent by a State to the commission of a given act by another State precludes the wrongfulness of that act in relation to the former State to the extent that the act remains within the limits of that consent."³³ According to this principle, the permission by a State to specific manner of another State prohibits the unlawful action in relation to the agreeable State, if the approval is binding and, to such level, the behavior leaves over within the limits of the consent agreed. The power of the assent must be judged to confirm that it is generously assumed and undoubtedly proven. The State should thus truly prove what it would have accepted. This process must not be weakened by the any impact of error, deception, dishonesty or compulsion, as well.³⁴

D. Who Has the Jurisdiction to Control Space Object?

The detachment of any space object from the space without proper willingness of registered or launching state is crucial challenge. Also, removal of space object of unknown registry is an acute problem. So, at this stage, the authors would bring the attention to the dire need of empowered international space body which would take firm decisions for removal of space debris.³⁵

III. Significance of International Organizational and Operational Aspects for Debris Removal

A. Who Should Take Responsibility for Space Debris Mitigation and Remediation?

Apparently, the states or entities liable for the production of space debris should be primarily responsible for proper salvage. Regrettably, legal rules created by the global public on space debris or its elimination will probably continue to be unreasonable,

³³ J. Crawford, *The ILC's Articles on Responsibility of States for Internationally Wrongful Acts: A Retrospect*, 96 AM. J. INT'L. L. 874-90 (2002), available at <https://pdfs.semanticscholar.org/6e0b/31d20a0daf3a8723481cf8cc112800f306f4.pdf>.

³⁴ Report of the ILC on the work of its 53rd Session, art. 20, at 72-74, [2001], II Y.B. INT'L L. COMM'N, U.N. DOC. A/CN.4/SER.A/2001/Add.1 (Part 2), available at http://legal.un.org/ilc/publications/yearbooks/english/ilc_2001_v2_p2.pdf.

³⁵ *Supra* note 31.

given that action would only come after an unavoidable, calamitous event.³⁶ States are not willing to have new legitimate, obligatory pacts that could confine their independence regarding acts or place the burden of substantial expenses on them. Thus, due to the absence of political will, which has become a part of a wider current peril,³⁷ a lawful analyst has been observed in the discourse of space debris for some while. Even if legal documents were presented before the states, it was not confident that they would accept newfangled agreements,³⁸ engage in new mandatory or non-mandatory documents of a mainly protective nature,³⁹ or swallow the new rules that would automatically decrease the risk of dissension.⁴⁰

International space progress provides a substantial convenience to the universe as a whole, not just to the space actors engaged in the launching. Thus, it is justifiable that all who are connected in the advancement of space either directly by the mode of application or ultimately by the comforts gained from it would collaborate globally in a struggle to find a proper method for active space debris removal.⁴¹ Although the UN is promoting harmony, it would take many ages and this platform is useful only for undertaking all-encompassing lawful queries. Nonetheless, it is not an appropriate tool for managing functioning adventures. Thus, for practical operations, there is a need to create a specific inter-governmental organization (“IGO”) that is autonomous and competent and may act similar to the International Seabed Authority (“ISA”).

B. Role Model of the Establishment of the International Sea Authority

The ISA is a self-sufficient global organization.⁴² It is an intergovernmental body

³⁶ M. Schladebach, *Space Debris as a Legal Challenge*, 17 MAX PLANCK Y.B.U.N. L. 61-85 (A. Bogdandy et al. eds., 2013), available at http://www.mpfr.de/fileadmin/UNYB/Vol.17_2013.pdf.

³⁷ J. Pauwelyn & R. Wessel & J. Wouters, *When Structures Become Shackles: Stagnation and Dynamics in International Lawmaking*, 25 EUR. J. INT'L L. 733-63 (2014).

³⁸ M. Listner, *The Moon Treaty: failed international law or waiting in the shadows?*, SPACE REV., Oct. 24, 2011, available at <http://www.thespaceview.com/article/1954/1>. The failed agreement has only sixteen State Parties and been signed by an additional four States. Most importantly, the US, Russia (former Soviet Union), and China have neither signed, acceded, nor ratified the Moon Treaty. It is arguably a failure from the perspective of international law.

³⁹ J. Boutwell, T. Hitchens & J. Moltz, *Enhancing Space Security by Improving Stakeholder Cooperation*, 2:2 ASTROPOLITICS: INT'L J. SPACE POL. & POL'Y 105 (2004), available at <https://www.tandfonline.com/doi/abs/10.1080/14777620490493584>.

⁴⁰ E. Vitt, *Space debris: Physical and legal considerations*, 5:2 SPACE POL'Y 129-37 (1989), available at <https://www.sciencedirect.com/science/article/abs/pii/0265964689900714>.

⁴¹ UNCOPUOS, *Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris: A Report of the International Interdisciplinary Congress on Space Debris*, U.N. Doc. A/AC.105/C.1/2011/CRP.14 (Feb. 3, 2011), available at http://www.unoosa.org/oosa/oosadoc/data/documents/2011/aac.105c.12011crp/aac.105c.12011crp.14_0.html.

⁴² B. TURNER, *THE STATESMAN'S YEARBOOK 2015: THE POLITICS, CULTURES AND ECONOMIES OF THE WORLD* 50 (151th ed. 2016).

established by the United Nations Convention on the Law of the Sea (“UNCLOS”)⁴³ to manage and control all mining operations in the international seabed area afar the range of domestic dominion, an area located beneath most of the world’s oceans. Space-law researchers believe that the international regime of the seabed should probably to be applied to regulate the exploitation of resources in outer space, and that several models of a global mechanism for space resources have also been proposed by mirroring the framework of the law of the sea.⁴⁴

Establishment of an authority to control or regulate the exploration and exploitation of the seabed area was essential. The ISA’s Assembly is the “supreme organ” for making its decisions and selecting the central policymakers.⁴⁵ The Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 1994, demands from the Assembly to execute the Part XI of the UNCLOS for making decision and policies as well.⁴⁶ The ISA is the product of numerous years of bargaining, consultation, negotiation, and confrontation. It is necessary for the Authority to confirm that the marine environment is efficient, safe, and secure⁴⁷ from detrimental impacts that may originate from the exploration of this international area and from an examination and search for natural resources.⁴⁸ Deep seabed and outer space are similar in the sense that both have natural resources with potential commercial value.

C. Procedure for Establishing a New International Authority

International organizations are founded by, for instance, a treaty or soft law. In accordance with the UN Charter, it must be registered at the secretariat of the UN.⁴⁹ To establish preliminary procedures, there are two possible means as follows.

⁴³ F. Armas-Pfirter, *How can Life in the deep sea be protected?* 24 INT’L J. MARINE & COASTAL L. 285 (2009), available at http://www.academia.edu/16461357/How_can_Life_in_the_Deep_Sea_Be_Protected.

⁴⁴ Yun Zhao, *Space Commercialization and the New Developments of Space Law*, OXFORD RESEARCH ENCYCLOPEDIA OF PLANETARY SCIENCE 1-21 (2018), available at <https://oxfordre.com/planetaryscience/view/10.1093/acrefore/9780190647926.001.0001/acrefore-9780190647926-e-42?print=pdf>.

⁴⁵ E. Franckx, *The International Sea-bed Authority and the Common Heritage of Mankind: The Need for States to Establish the Outer Limits of their Continental Shelf*, 25 INT’L J. MARINE & COASTAL L. 549 (2010), available at <file:///C:/Users/user/AppData/Local/Microsoft/Windows/INetCache/IE/JDB09346/248350.pdf>.

⁴⁶ U.N. Doc. A/RES.48/263, 33 I.L.M. 1309 (1994), available at https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-6-a&chapter=21&clang=en.

⁴⁷ Rio Declaration on Environment and Development States, prins. 14 & 15, U.N. GAOR annex I, U.N. Doc. A/Coy 151/26, available at <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>.

⁴⁸ M. Lodge, *Current Legal Developments International Seabed Authority*, 26 INT’L J. MARINE & COASTAL L. 463-80 (2011), available at <https://heinonline.org/HOL/LandingPage?handle=hein.journals/ljmc26&div=28&id=&page=>.

⁴⁹ U.N. Charter art. 102; VCLT art. 80.

In the beginning, a prerequisite is to prepare a “Draft for the Convention on the Establishment of an International Space Authority” that should be legislated by excellent space-law professors, space scientists, or diplomats on teams with professionals of the space-faring nations. The task should be assigned to the Tech and Legal Committee of the UNCOPUOS which already has done a lot of work on it. They have been working for the guidance and legal suggestions to prepare a draft which would be approved through dialogs, consensus and energetic discourse.

Then, a simple resolution or declaration prepared by the international community or space-faring nations should be put up before the UN General Assembly demanding the establishment of international space authority on the pattern of ISA, because deep seabed and outer space are common with potential commercial value of natural resources. The most significant difference between them is geographical location which has been done in the past for seabed issues and resources. These challenges can be solved by dialogs, discussion, and bargaining among the space-faring nations for final approval of draft.

D. Proposals to Establish an International Space Authority

It is very significant to develop an international space administration or authority for supervision, security, and safety as well as to provide solutions to the legal challenges and durability of outer space for the sake of the welfare of mankind.⁵⁰ The following are the proposals for the expected International Space Authority.

1. It is proposed that this international space authority should be established by either international treaty or soft law. The draft of the new authority’s preamble would have a definition of space debris (which will bring relief to all of the international space community) as proposed by the UNCOPUOS in the preamble of the International Space Authority draft. Also, this draft should establish an international space authority that organizes and controls all the activities and bears the responsibility for administration, management, supervision, and enforcement.

2. The space debris mitigation guideline proposed by the IADC should be incorporated into the draft of this International Space Authority.⁵¹

3. It is envisaged to be a powerful and strong autonomous authority that promotes long-lasting sustainability of outer space based on the pattern of the ISA. The main

⁵⁰ D. Tan, *Towards a New Regime for the Protection of Outer Space as the “Province of All Mankind,”* 25 *YALE J. INT’L L.* 193 (2000).

⁵¹ IADC Space Debris Mitigation Guidelines, available at https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf.

administrative and decision-making body, including the council seat, is proposed to comprise 15 members. Notably, the distribution should be according to the following methods: three from the main space powers (the US, Russia, and China), six from the largest stakeholders, three from developing countries, and the remainder is to achieve a fair allocation of seats for the principle to choose. Additionally, unanimous consent should be the fundamental mechanism for the council to vote, when no consensus is reached. Then, a majority of not less than two thirds of the members of the council shall pass decisions.

4. The administration should do its best balancing the welfare of the exploration and developing states. The outer space law stipulates that all the countries should explore and utilize space on an impartial and nondiscriminatory basis. Exploration and development must benefit all countries,⁵² irrespective of their pecuniary or scientific development. As only a few countries have the capacity to take space actions, however, the authority should provide reasonable guidance and impetus for developing countries to design their plans. The payment system to the authority should also be fair⁵³ and reasonable. The collection of fees should refer to, for example, such aspects as financing, cost-effectiveness, the effected environment, and the financial condition of the aggrieved country. The financial committee should be set up to monitor the financial problems.

5. The Authority should guarantee the implementation of elementary undertakings, such as education (*e.g.*, astronauts), documentation, studies of future projects, and technological exploration work. The ISA also assists with the gathering of appropriate material and its propagation to the Member States; aid and advice for harmonious national and global plans and the explanation; the carrying out of scientific programs containing the scheme, advance, manufacture, launching, placing satellites; and space shuttle in orbit and control of satellites and all alike actions for launching conveniences.

6. The ISA may, upon pronouncements of the council taken by a two-thirds majority vote of all members, collaborate with other international societies and foundations and with governments, organizations, and institutions of non-Member States and conclude agreements with them to this effect.

7. The Authority should generate an opening to evade clashes and stimulate

⁵² J. Trimble, *The International Law of Outer Space and Its Effect on Commercial Space Activity*, 11 PEPP. L. REV. 3 (1984), available at <http://digitalcommons.pepperdine.edu/plr/vol11/iss3/4>.

⁵³ C. Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and other Celestial Bodies*, 14 INT'L LAW. 429-83 (1980), available at https://www.jstor.org/stable/40706663?seq=1#page_scan_tab_contents.

harmony in the new model. Preferably, space activities should be for the maintenance of global harmony, safety, protection, welfare and full uses of outer space because international law must be sustained. Additionally, unlawful actions must be monitored to evade the hazardous contamination and hostile conversion of the Earth's atmosphere and outer space.

8. The Authority will be financed by its Member States. The scale of aids shall be based on the average nationwide income of each Member State for the three up-to-date years for which statistics are accessible. The ISA must nurture and collect the funds for the rightful allocation from all the State parties regarding the welfare resulting from those resources, whereby the benefits and requirements of the developing countries, and the struggles of those countries which have funded either straight or indirectly, shall be given distinct respect.

9. This organization will be titled the "International Space Authority." It will comprise a General Assembly (supreme organ), a Council (executive organ making executive decisions and possessing discretionary powers), a Secretary General (executive Head), Enterprises (operating body), an Economic Planning Commission, a Legal & Technical Commission, and such other bodies as may be necessary.

10. The issues among Member States must be settled by the Council. If any claim is not resolved in this manner, any party can require the Authority to defer the dispute to arbitration. Unless the Parties agree differently or the council adopts other rules, the Arbitration Tribunal shall comprise three members. Each Party shall engage one of the members, and those two arbitrators shall elect a third member. The third member is the referee and presides over the tribunal. The rules and regulation process may be fixed between the parties or imposed by the Council. The majority of votes awarded by the council shall be final and mandatory. The Council will have broad discretionary powers in, *inter-alia*, administrative, managerial, and executive field, as well. Therefore, the council of the new International Space Authority will be comprehensive.

V. Conclusion

It would be miserable to wait for a catastrophic incident and then remain unsuccessful to counter this grave concern in a meaningful and practical manner. Space debris creation is unavoidable. However, it could be alleviated in a way to minimize the damage. This is dilemma of space debris. There has been repeated clamoring for an

International Space Authority that could be used as rostrum of all segments such as law-enactment, administration, imposition and execution of rules, conflict resolution regarding space and identification of space debris, and providing the expenses for the removal of space debris, either identified or unidentified, by establishing a global fund. Clearly, there is a dire need for an International Space Authority to maintain space in the greater interest of humankind. Thus, this paper suggests establishing a new intergovernmental space authority empowered to consolidate clear-cut, unambiguous definitions and to distinguish definite rules on the inspection and evaluation of state protection, allocation of responsibility, enforcement of sanctions, and awards as a panacea for all space debris issues collectively. This would satisfy the lawful pauses on space debris in the existing outer space law.

