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Space Debris and its Legal Regulation

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The curiosity of the human mind has led to technological development which led to the invention of various sophisticated – satellites, GPS, internet, space travel, mega-constellations of broadband. But our persistent struggle to reach the stars has had its dark side- the space debris crisis, which is a global threat and this crisis poses the danger of space junk falling on earth's surface or destroying any chance of future endeavors in space as the real amount of junk is between 5,00,000 and one million pieces as current sensor technology cannot detect smaller objects. Therefore, there is a high need for new technology which is still developing to clean the space debris and a simultaneous legal development with a comprehensive plan is yet to take place to tackle this issue. This article is an attempt to highlight fundamental issues in the current legal rules and provides suggestions to address the space debris crisis.

Keywords: *corporate space junk, environment, legal regulations, absolute liability, space pollution.*

INTRODUCTION

"The density of space Junk peaks around 620 miles up, in the middle of so-called low Earth Orbit. That's bad because many kinds of weather, scientific and reconnaissance satellites circle in various low earth orbits."

– Sam Kean

On Earth, there are many different types of species and among one they are 'HUMAN', who is always curious about everything and wants to explore from here the study of space starts because humans have always been curious about space. To satisfy this curiosity humans have sent artificial satellites and also reached the moon and different planets with incredible success but this is not a success because this has led to an abundance of space junk. "*In fact, this happened in 2020 when a moon-like object entered the earth's orbit initially leading the scientists to speculate whether it could be an asteroid, but it turned out to be space junk*."[1] With old concerns of space debris re-entering earth's atmosphere and falling on the surface destroying property and civilization which has become the new concerns such as light pollution, it seems the space debris crisis is not a far-fetched issue anymore because it would make low-Earth unusable which can also lead to Kessler syndrome which is a scenario in which the density of objects in LEO (Low Earth Orbit) is high enough that collisions between objects could cause a cascade that increases the likelihood of further collisions and is proposed by NASA scientist Donald J. Kesseler in 1978. The article focuses on the legal aspect and fundamental issue of a legal definition. Then, moves towards liability, rights, and duties of space use and finally provides certain suggestions to strengthen the laws related to space debris.

SPACE DEBRIS: A MATTER OF CONCERN

Space debris is also called space junk, artificial material that is orbiting Earth but is no longer functional and this material can be as large as a discarded rocket stage or as small as a microchip as in one of the tests it was concluded that the travel speed is 28,000 kilometers per hour and even if a small piece of this debris hits a satellite or any object would damage at large this is because the momentum depends on the velocity and the velocity of the debris is very much higher than poses an ability to cause damage as a consequence this a great matter of concern. In one of the articles titled "*Space Debris and the Law*" the writer Frans von der Dunk first writes about the legal challenges in terms of space debris and then tries to suggest some

[1] Devrupa Rakshit, 'Space is not a trash can' (*The Swaddle,* 6 January 2022) <https://theswaddle.com/space-is-not-a-trash-can-says-scientist-about-worsening-debris-problem/> accessed 05 February 2022

solutions[2]. Moreover, "*Space Law and Hazardous Space Debris*" author Martha Mejía-Kaiser discussed space debris by its types- debris that remains in space and debris that re-enters earth's atmosphere and contains the different hazards space debris causes-nuclear, kinetic and chemical hazards. This brings to light that we don't need to deal with just hazardous space debris but also different kinds of hazardous debris. Thus, a legal framework not only needs to pose limitations and liability on launching states but also put different limitations for different hazards. Therefore, just establishing a fund or imposing a form of tax or fine is not enough as it still does not remove the non-cooperative state's space debris. Thus, a strong law is needed to deal with such states. This article's aim is not just to highlight the challenges and solutions with the point of legal regulations by listing out various treatises, policies, and laws already in effect. In addition, it does not limit to space law but also branches out to other laws dealing with similar hazards on Earth.

LAWS WITH DEFECTS

While space debris is not a recent problem and in fact, it has successfully captured the public's attention through books and movies, a recent one being the space sweepers, it still is not defined in the space law. The international space law is one of the points that says if a satellite becomes dysfunctional, then the satellite should deorbit by re-entry into the earth instead of leaving it as space debris. The five space treaties-outer the space treaty 1967[3] (Article 1), the rescue agreement 1968[4](Article 6,7,8 and 9), space liability convention 1972[5](Article 1,3 and 4), registration convention 1975[6], moon treaty 1979[7] do not in clear terms define or even mention the term. As space debris is not defined its production has not been defined nor is it prohibited. Its removal tool has not been made mandatory. Thus, as the law stands, making

[2] Frans Von Der Dunk, 'Space Debris And The Law' (2001) 2 Proceedings of the Third European Conference on Space Debris, 19 - 21 <https://digitalcommons.unl.edu/spacelaw/4/> accessed 05 February 2022
[3] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967
[4] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 1968
[5] Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 1968
[6] Convention on Registration of Objects Launched into Outer Space, 1975
[7] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1979

and not removing space debris is not illegal. Now, this does not mean that nothing has been mentioned about space debris. In fact, Article IX of the outer space treaty which is the "*Magna Carta*" of a space law mentions that states while launching any object into space should take appropriate measures so as to prevent, lessen or inform the harmful contamination of space. However, this does not stop the contamination nor does it encourage the removal of debris as well as does not address the issue or the problem of current space debris that eventually means that the existing international law on space debris has a big flaw and there is no law which talks about the problem of space pollution explicitly because of the fact that they are very old and cloudy, even the term Space Debris is not mentioned in any of the UN treaties and the present laws are not legally binding in nature.

Similarly, space debris may come under the scope of a space object especially considering the fact that a space object includes its component parts. Thus, logically space debris too should fall under this definition. This opens up the possibility of any damage caused by it can be compensated as per liability convention 1972. However, the liability too need not be binding in case the launching state refuses to compensate. Thus, a rethinking over liability and making it binding over states as well as a proper definition of space debris is required.

WHO IS ACCOUNTABLE FOR THIS DEBRIS?

"*If a satellite falls on you or on your property, space law protects you but there are no legal penalties for leaving junk in orbit.*" Who is to blame for this trash? In order to determine liability is that current space law follows fault-based liability. The absolute liability principle is applicable in case the debris causes damage to people or property on earth but fault-based liability is followed in outer space. This means that a state's s debris in outer space may cause damage to other space objects and the state would still not be held liable until it's proved that the damage was intentional or due to an omission on behalf of the launching state.[8] Moreover, it is difficult to hold someone liable or direct someone to clean the debris due to the fact that various organizations launch the satellite or send rockets for research purposes. For instance, from the

[8] Convention on International Liability for Damage Caused by Space Objects,1972, art 3

beginning of space exploration to now there are so many objects which are non-operational and debris also unknown to which state they belong. However, according to the registration convention,[9]the launching states must register the objects they send to outer space, whereas the same is not true for space debris. Thus, not doing anything to remove the current debris and preventing more debris is limiting the rights of future generations to use outer space.

Space existence is prior to human existence and its presence is equally for everyone and it extends to the future generation also. But the current use of outer space and the consequent space debris may lead to a chain reaction where space debris or space objects collide and the space debris increases exponentially putting a stop to any space activities. Thus, not doing anything to remove the current debris and preventing more debris is limiting the rights of future generations to use outer space. Unfortunately, private companies and national governments are slow to act as there most of the efforts focus on mitigation and avoidance of generation space junk when satellites reach the end of their lives, they can either deorbit and burn that in the atmosphere or push that into the graveyard orbit which is hundreds of miles above anything useful.

SOLUTION FROM INDIA - ISRO'S PROJECT NETRA

The Indian Space Research organization has commenced the project network for space object tracking and analysis (NETRA) which aims to safeguard the country's Low-Earth Orbit satellite from space debris and also prevent the danger of space debris. This project is initially focused on satellites in Low Earth Orbit ranging from 160 to 2000 km. This has the ability to solve the worldwide problem and can help in reducing the threat from space debris.

CONCLUSION

"It really is a shame that through our neglect of wonders, hopefulness, and trust we allowed so much clutter and debris to build up in the space that once connected us to Diamond green"

- Michael Chabon

[9] Convention on Registration of Objects Launched into Outer Space, 1975

Human is doing great in exploring the new fields in each and every sector including space but at the same it greats a huge bulk of junk in the outer space and just to prevent this space pollution as well as to avert the impacts of space debris and for sustainable development, we need a legal framework which through enforcement of consequences protects the space orbits for future use and the research needs to be conducted in developing technology to remove space debris and laws need to be amended to keep up with the fast-paced technological advancement. Finally, legal solutions should be made while keeping in mind the political will and financial feasibility of any solution.

SUGGESTIONS

- The process of mitigation can help but it does not help in cleaning the junk in the long term as it is not an effective solution in order to achieve the goal of sustainable development there is a high need for an investigation to build a new and sophisticated technology to clean space debris. Hence, it can be a long-term solution.
- As the space activities are only going to increase thus increasing space debris and damage caused by it, it's time that the fault-based liability system is changed to an absolute liability system.
- The duty to clean the trash must be imposed on the states currently engaged in space activities.
- To solve the problem, we first need to define it in international space law and a need to build a third party to keep an eye on the issue.
- Once the space object becomes non-functional or space debris, the control over it by the launching state should cease to exist or should cease to exist within a justified time period. This can lead to clean-up of space debris by third parties or other states without delay over taking consent from the launching state.
- A mandatory or binding rule is required over states to overcome space pollution.