



SPACE DEBRIS- THE NEAR FUTURE DISASTER & FAILING INTERNATIONAL REGIME

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Abstract

The paper discusses an emerging threat to the near space from space debris. Space debris is the non-functional objects found at outer space and are capable of destroying not only the material satellites but also affecting the environment. The major problem is, out of five UN conventions on outer space none of them specifically deals with space debris. Also, many signatories to the convention have not implemented the provisions in their legislation. The paper further focuses on the loopholes in the present conventions dealing with the outer space and desires to make an effective legislation at both international and domestic level to deal with the issue. It is also desirous to adapt a universal legislation that shall be implemented on all the countries being signatory to it.

INTRODUCTION

Space is an area with no defined boundaries. It has been subjected to many research experiments, explorations by the leading experts from the countries across the globe. Now, almost a decade has been over since the launch of *Sputnik* the first man-made object to orbit the Earth by USSR in 1957. There has been a number of scientific furtherance in the field. From International Space stations to approaching the threats that will come from outer space human beings have left no stone unturned.

The field of space law has evolved and it has widened its scope to deal with questions such as property rights, weapons, space debris, protection of astronauts and more. Also, there is question of legal jurisdiction on space crafts and other bodies. When in 1957 the USSR launched *Sputnik*, In 1958 the United Nations General Assembly created a committee on the peaceful uses of outer space (COPUOUS).

The advancement of technology and curiosity of human being is forcing him to explore the outer space as much as possible. And such exploration is also beneficial for further betterment. Since the man-objects launched in space, many problems have been solved. But it has also created some hazardous threats that are increasing with the man-made and artificial objects particularly space debris.

Space Debris is rapidly increasing and threatening the sustainable use of space by human beings. The countries that heavily depend upon space for their economic and strategic purposes for instance; the United States will be affected more by the increased space debris.

The concern regarding the growing number of space debris is increasing among the nations. That is also indicating that it's time for the legislature to make specific laws at International and domestic levels to reduce the number of debris. The space law at present is combination of many treaties and conventions. First treaty in such regard was the outer space treaty, which came into force



in 1967¹. After that many treaties and conventions were made in this regard to protect the environment and the interest of the countries involved namely:

1. The Liability Convention 1972.
2. The Astronaut rescue and return agreement 1968.
3. The Registration Convention 1975.
4. The Moon Agreement 1979.

The problem is that the issue of space debris has not been specifically dealt by any of the UN treaties dealing with the outer space, due to which it becomes difficult to impose a liability on particular country to pay for the damages done by satellite research experiments leaving debris at the outer space.

Law is very precise but when it comes to space law, it is filled with a number of lacunas not providing for any specific meaning to the words, the jurisdictional issues, the amount of liability to be paid and so on, the list is not exhaustive. The legal convention and legislature must be created keeping in mind not only the present or past but also the future conditions as far as foreseeable.

Concept of Space Debris

There is no universally accepted definition of Space Debris. But the word “Debris” is derived from the French word “*Debriser*” which means to break down. According to the report of Second UN Conference on Exploration and Peaceful Uses of Outer Space 1982, Space Debris consists of dead satellites, spent rocket motors, nuts, bolts, etc.

Also, “Space debris” is²

- A space object as defined by Article I(d) of the Liability Convention and Article I(b) of the Registration Convention;
- That no longer performs its original function or has no tangible function;
- That either re-enters the atmosphere, remains in Earth orbit, in outer space or on the Moon or another celestial body,
- Is either created intentionally or through the actions or inactions of a launching state;
- May have economic value to a launching state;
- And/or may have continued national security value to a launching state.

It is stated that except for those artificial objects that are being tacked in Earth Orbit and known as functional satellites; every other particle found in the outer space is Space Debris. They range in the size from abdicated lens caps to spent rocket stages. The most dangerous pieces of debris are those ranging from one to ten centimeters of diameter, they are large enough to cause serious damage. Even if they are small in size they are capable of ruining the International space stations and threaten still-active satellites.

Inception of Space Debris

Orbital Debris are increasing in the space since the launch of first man-made satellite i.e; *Sputnik*. They’ve been threatening the near space of Earth. From where, these

¹ The Outer Space Treaty, 1967.

² Michael Listner, Legal issues surrounding space debris (August 6,2012)
<http://www.thespacereview.com/article/2130/1>.



debris are coming? What could be the possible source? Well, there are number of sources giving birth to these junks in outer space. It could be the detached part of an exploded satellite or non-functional satellites, material objects, rockets, tools dropped by astronauts in space by mistake or some lost material object, fragmentation events either accidental or intentional anything or everything ranging from the size of a small marble to a bigger stone. The remains further create more debris and this is how they increase in number by each passing day.

It is also believed that fragmentation debris is the largest source of space debris. As per the data published by NASA in the year 2008, at present three major countries are responsible for 95 percent of the fragmentation debris namely, China (42 percent), United States (27.5 percent) and Russia (25.5 percent). It also stresses that these countries should contribute more to cleaning up the near space environment than other countries.

Why Is It So Important to Remove Space Debris?

The issue of Space Debris has been highlighted time and again in number of incidents. This is not the first time that somebody is coming up with such problem. As one of the developed nation, The US is highly concerned with the emerging threats posed by the space debris.

Remember the fictional movie *Gravity* released in the year 2013 in which an astronaut was stranded in space after her

ship was hit by flying remains of a detached Russian satellite? The movie somehow showed the possibility of what could be the dangerous effects of these orbital remains in the outer space.

Travelling at roughly 17,000 miles a marble can be a possible threat to functioning satellites.³ The wake-up call was made only in the year 1996 when a French microsatellite collided with a remnant of an exploded Ariane launcher.⁴ It was not the only clash; the number of space debris has grown significantly thereafter. In 2007, more than 2,000 new junk elements were created by China's anti-satellite test. (ASAT).⁵ Which was followed by an accidental collision between the Iridium 33 and Cosmos 2251;⁶ again creating more than 2000 new debris. Many accidental collisions in outer space have been reported previously but the collision between the Iridium 33 and Cosmos 2251 was the first involving two intact spacecrafts.

The list is not exhaustive, according to a survey it is expected that with the increased number of such elements at the outer space, the collisions are likely to happen in every 5-6 years. In coming years, they are surely going to endanger the life on Earth.

Impact on Environment

³ Bruce Schafhauser, the director of Lockheed Martin's.

⁴ See Mark Ward, "[Satellite injured in space wreck](#)", *New Scientist* 2044 (24 August 1996).

⁵ See Leonard David, "[China's Anti-Satellite Test: Worrisome Debris Cloud Circles Earth](#)", Space.com (2 February 2007).

⁶ See Brian Weeden, "[2009 Iridium-Cosmos Collision](#)", SWF Fact Sheet (10 November 2010)



It is important to note that these scientific activities leave some impact on the environment as well. It is all we have got from the nature. But sometimes human is so much indulged in his experiments/activities that he almost forget about the duty, he owe towards the environment, ie; to keep the environment sustainable. It is recognized that the survival of human actually depends upon the nature, such as- the trees, forest, temperature, etc rather than some experiment on space or may be the construction of satellite.

Space science has always been hard on environment. The instance of Uttar Pradesh Republic (where Russian rockets are being launched) survey shows that several times in a month the farmers in that region find bits of space junk raining down over them. This has killed so much of livestock and also caused illness among the local population. But who shall be liable? Who will clean the mess? The situation can get worst in the future in the space prone regions. The general International law principle of preventive action imposes an obligation on states to adopt such measures as to prevent “*damage to the environment and otherwise to reduce or control activities that might cause or risk such damage.*”⁷ Also, it was pointed out by the International Court in the *Pulp Mills case*, that “the principle of prevention is a customary rule”.⁸ Therefore, it is the duty of state to remove the debris caused by the activities they perform at

outer space. But, the states as well as the International law are deliberately failing, the former in performing and the later in casting such duty.

The Legal Challenges

Indeed the Outer Space Treaty of 1967 is the *Magna Carta* of the International Space Law. But the treaty does not provide any specific provision to deal with the harmfulness of Space Debris. Even there is no universally acceptable definition of “Space Debris” till now. Furthermore, certain provisions such as Article VI of the Outer Space Treaty mentions that the “International Responsibility” for the activities conducted by the countries (govt. agencies or private) in outer space and for ensuring that such activities are obedient with Outer Space Treaty.

Further Article VII elaborates : ‘Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies’.

Furthermore, the Liability Convention provides that liability to pay compensation is absolute if any damage has been done to the surface of Earth or to an aircraft in flight.⁹ Also the Liability convention defines the term “launching state” as a state that

⁷ Philippe Sands et al, *Principles of International Environmental Law*, 3rd ed (New York: Cambridge University Press, 2012) .

⁸ *Case concerning Pulp Mills on the River Uruguay (Argentina v Uruguay)*, [2010] ICJ Rep 14 at 55, para 101.

⁹ Liability Convention, art II (1972).



launches or procures the launching of a space object or from whose territory or facility a space object has been launched. It means that the convention impose a liability upon the state who launches any space object that causes damage to the outer space or object of any other state.

The question arises that whether the definition of Space Object includes Space Debris?

Article I(d) of the Liability Convention and Article I(b) of the Registration Convention states that the *Space Object* includes component parts of a space object as well as it's launched vehicle and parts. This definition does not specifically include space debris. It means that person liable to pay compensation as per the provisions of the Liability Convention may or may not be held responsible for the junk created by them. And in case, if it is held responsible for collision or any loss due to their space component then there is no precise method to calculate the quantum of amount to be compensated by them.

Law is very precise but, when it comes to Space Law lot of puzzles remained unsolved and the treaties are open to a bunch of necessary amendments to be made, keeping in mind the present needs. But it is applaudable that countries are making efforts to improve the situation. For instance

The United State's National Law

The United States one of the most powerful nation in the world is also one of the major countries in space exploration. The country at present is very much concerned regarding

the space debris, which is shown in its efforts as well.

Mitigation is one of the ways of removing Space Debris which means, reducing the further creation of Space Debris. The United State's domestic law contains a provision for the mitigation of Space Debris. The country has its own mitigation standard practices. These practices "*encompasses all program phases, from initial concept development to space hardware disposal, focusing on the minimization of the intentional debris releases and the occurrence of accidental explosions, it also provides for avoidance of collisions and responsible disposal of space hardware.*"¹⁰ These standard practices serve as a foundation for specific orbital debris mitigation requirement issued by the US government agencies including the Federal Communications Commission and the Federal Aviation Administration.

Furthermore, it requires every person making application for the Space stations authorizations; to provide information and statement as regard to that the space station limited probability of space stations becoming a source of junk by explosion or collision with other small debris or detached rockets. It also, requires make a statement detailing the post mission disposal plans for the space station including the quantity of fuel that will be deserved for post mission disposal, the altitude selected and the

¹⁰ *Compendium of space debris mitigation standards adopted by States and international organizations: Contribution of the United States of America*, UNCOPUOS Legal Subcommittee, 43rd Sess, UN Doc A/AC.105/C.2/2014/CRP.15/Add.1 (2014) at 2.



calculations used in deriving the disposal altitude.

The US has undoubtedly the world leader in space in space debris mitigation efforts and it is making more efforts to come up with more strict rules and regulations. Withal, for the propose of ensuring its compliance with International obligations, the country imposes conditions under its regulatory framework to obtain a license to conduct any space activity. Some of these conditions also relates to space debris mitigation measures.

Position in India

India's space researches and technologies have crossed new thresholds in past few years. In 1963, the country launched its first rocket under the guidance of Dr. Vikram Sarabhai. Subsequently, the country launched *Aryabhata*, India's first scientific satellite. Since, then the country has never stopped in making efforts and is marked with tremendous success. With the introduction of Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV), India gained its position to become only the seventh nation in the world with indigenous satellite launch capabilities.

At present the country is competing with the giants such as The United Nations and Russia. It means that the country must be equalizing in terms of making adequate space laws. But, unfortunately this is not true. Indeed, India has developed new technologies, satellites, space stations but when it comes to space laws, the country is lagging behind. There are many countries

such as Canada, Germany, South Africa, Ukraine, who does not come in the list of the top space technology countries but still they have managed to create their legal framework effectively. On the other hand, India is vacuous of national space laws.

India has ratified four out of five UN treaties relating to the activities in outer space. But, almost four decades have been passed the enactment is still awaited. The only provision governing the space activities in India is determined under the Constitution of India, 1950, the revised remote sensing data policy, 2000 and the Satellite Communication Policies, 2000. These policies merely sketches out what the government wished to do without any legal obligation attached to it.

The growing concerns of space debris have reached to India as well. Though India is signatory to The Convention On International Liability for Damage Caused by Space objects, 1972, the country has not implemented any legislation in this regard which has caused a trouble and India is now in the middle of an International Dispute over the fall of debris from an Indian satellite to a Japanese village. As a signatory to the convention, India is absolutely liable to pay the compensation but due to lack of any national space law the country is having difficulty in determining the damages owned.

This clearly emphasizes that India is in need of space laws. The absence of any effective space legislation is surely going to hinder the future growth of the country.

Conclusion



After sixty years of sending satellites, rockets into space, the situation has become more crowded over there. The above discussion has clearly shown that how important it is to implement effective space legislation, particularly in regards to the space debris. No doubt, that the UN conventions and treaties have given birth to the space laws but they lack some important definitions such as, *Space object*, *Space Debris* etc. But the space is not free from problems. The 2009 collision between Iridium 33 and Cosmos 2251 raised concerns among the giant nations like US, China, Russia.

This was not the only incident may known incidents have took place and will pose serious threat in future. The crowd of junk is increasing every year. It's high time to make some technological and legal changes to tackle with this serious issue. As it is better to make laws keeping in mind not only the needs of present but also the growing concerns of future. It is important to make effective laws at International and domestic level.

The present conventions must be amending by keeping in mind the issue of space debris. Coming to the domestic laws of the states, The United States is making serious efforts and has become a worldwide leader in space debris mitigation efforts. The country is also complying with its international obligations by imposing conditions to obtain license to conduct any space activity. Also, the country has its own mitigation practices including a number of guidelines.

The Liability Convention 1972 imposes liability on the country to cause damage at

the near space or to the satellite of other country. But, the problem is many signatories to this convention including India had not implemented the provisions of the convention in their domestic legislature which makes difficult to decide the quantum of damages when any dispute arises between the states.

Also, only those parties can file the claim, those are party to this convention. It also requires to identify the space object causing damage, and further prove that the damage was caused by the element of liable state. But, there is no specific guideline on proving the fault which makes it difficult to impose the liability and claim compensation.

Apart from that, none of the five conventions on outer space deals with specific removal of space debris. Neither any country has taken major steps except the United States which is still at better place. In India, the only regulations dealing with the space laws are The Constitution of India 1950, the revised remote sensing data policy, 2000 and the Satellite Communication Policies, 2000. These policies merely sketches out what the government wished to do without any legal obligation attached to it.

The treaties mentioned above were made for the best of mankind but they are not enough to satisfy the present day needs. The space debris is posing serious threat to environment and to the future of mankind. It is important to solve the problem of space debris to prevent any future threat. If the amount of risk is to be analyzed the government should turn their heads on this issue which has the capability of hampering



the growth of the nations as well. It is desirous that a Universal code must be prepared, implementing on all the nations of the world without any ratification with international cooperation. All countries must focus on planning, drafting and developing a universal approach.

