Liability for Space Debris in the Framework of Private International Space Law

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Abstract

Space debris is considered by many to be the most prominent issue in the arena of outer space Security and safety. With increasing damages caused by space debris, the liability for them has become an important issue during the past years, and it seems it would put an enormous obstacle in front of the international community in the future. According to international space liability regime, the launching state is liable for damages caused by space objects. However, increasing damages caused by space debris has challenged the space regime. For example, one of the issues of space debris in general is finding a suitable definition. There is debate about the definition of space object" in the context of both these treaties in that it is vague as to its meaning. Hence, the implications of legal liability and the resultant financial responsibility makes a definition of space debris a difficult one, especially if that definition is one designed to attach liability to begin with. Has the regime which was based on general international law been successful in compensation caused by space debris? Purpose of this essay is to attempt to identify and briefly discuss compensation should be regulated in the framework of private international law rather than general international law. In this paper, the author tries to investigate challenges of the current space liability regime to space debris, and show that the current international regime is inadequate for determining liability and to indicate that how settle this problem through private international law.

I. Introduction

More than a half-century of space activities have left a debris environment that threatens to render the outer space environment useless. Space debris ranging in size from fragments less than a millimeter in diameter to complete spacecraft many meters across. The nature of this debris includes intact satellites, rocket bodies, fragments from exploded rocket bodies, fragments from collisions, and

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so on. Space debris is becoming a potential threat to many space projects technical. The issues surrounding space debris are in their infancy, and the solutions to those issues can only be had once the issues themselves are clearly defined. Any discussion of legal issues of debris would not be complete without noting the issue of liability.[1]

The legal system as developed by the UN is a foundation for problems constituted by space debris. The current efforts to address space debris ignore the applicability of the Liability Convention 1971. The perception seems to be that the Liability Convention 1971 is so lacking in specificity that it cannot be used to address space debris. There is a need for an International Convention to address space debris. A new convention on debris should address issues such as prevention of debris, its removal from orbit, the question of jurisdiction and control, detection and identification, international responsibility as well as possible remedies for damage caused by orbital debris.

Legal measures can be provided to address liability for space debris. These legal solutions can only sufficiently be achieved by international cooperation among states through private international space law. The current absence of internationally binding standards for liability to space debris calls for a solution. While aviation knows international private international air law, there are no equivalent global requirements in space law. Some authors argue that Warsaw/Montreal system, should serve as models when drafting a new Convention for liability generally including space debris.[2]

Space activities will affect the future of the space developments in numerous ways. Liability of private sector is naturally different from responsibility of States and public section in international law. The former is discussed in private international law; however, the latter is discussed in public international law. Although the Liability Convention provides provisions that includes liability regime for States and private section, there are ambiguities about liability of individuals. There are, for instance, question as to whether it covers debris that by the private space activities as well as public space activities. These inaccuracy and incompleteness in the Liability Convention has influenced private space activities in recent years. The assumption is that the Liability Convention 1971 being unable to include private international provisions relating to liability of individuals and private section. The question is if it is not the time for States to amend or complete the Liability Convention 1971.[3]

One the other hand, one of the issues of space debris in general is finding a suitable definition. A definition of space debris could facilitate space liability for existing space debris. The term "space debris" is used when discussing the

1 Flury W. (1999), Space Debris a Hazard to Operational Spacecraft? in: Commercial and Industrial Activities in Space – Insurance Implications, Trieste Generali.

2 See N. Jasentuliyana, «Celebrating Fifty Years of the Chicago Convention after the Moon Landing: Lessons Learned for Space Law» (1994) XIX: II Ann. Air & Sp. L. 429-437.

3 Gorove S. (1991), Liability in Space Law: An Overview, in: Developments in Space Law – Utrecht Studies in Air and Space Law, Martinus Nijhoff, Dordrecht.

junkyard of expended space objects in orbit as or even naturally occurring objects such as asteroids. While there is not yet to be an acceptable legal definition of what space debris is.[4]

In order for commercial space activities to grow, there must be an attractive legal environment. The existing space law consists mostly of some inter-governmental treaties negotiated during the cold war, which are quite inappropriate for business. As an example, under existing law, governments are liable for damage caused by any launches from their territory. This is quite different from other transport industries, such as air transport which are governed mainly by commercial law, and liability for any damage caused by an accident is governed by private international air law.[5] An attractive legal environment is needed to enable operating companies to plan passenger services and place orders for the vehicles which they require, and for manufacturers to finalize vehicle design details and raise the investment which they need in order to put the vehicles into production. Recently it has begun to be recognized that this situation needs to be changed.

This author is aware of the difficulties associated with proposing treaties for the new issue of liability for debris and its applications. Even an extensive interpretation of existing treaties could not provide for a different liability scheme, which is concluded to be necessary to combat debris sufficiently. This paper discusses liability under current situation, the challenges facing the private international law from the perspective of liability issues including debris and finally provides solution and proposition. This article tries to analyze private international space law focusing on liability for debris in order to propose a need for new international space liability regime alongside the Liability Convention 1971.

II. Liability under the Current Situation

Following Arts.VI and VII of Outer Space Treaty, the responsibility-principle, the Liability Convention was created. The 1972 Convention on International Liability for Damage Caused by Space Objects, commonly known as 'the Liability Convention,' sets forth the rules for personal injury and property damage and for resolution of those issues at the international level.

1. Art. II of the Liability Convention provides that any launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight. The Liability Convention also provides that a State which launches or procures the launching of a space object, or from whose territory a space object is launched, shall be absolutely

4 Listner M, Revisiting the Liability Convention: reflections on ROSAT, orbital space debris, and the future of space law, 2011.

5 Armel Kerrest, Launching Spacecraft from the Sea and the Outer Treaty: The Sea Launch Project, Proc. Coll. L. Outer Space 40, 1997, p 264.

liable for damage caused by its space object on the surface of the earth or to aircraft in flight.
With respect to damage caused elsewhere than on the surface of the earth, however, States are not absolutely liable but rather are liable on the basis of fault. In case of damage caused elsewhere than on the surface of the earth, the launching State shall be liable only, if the damage is due to its fault or the fault of persons for whom it is responsible (Art. III Liability Convention), and this counts as well for non-governmental entities (Art. VI Outer Space Treaty).
The international liability accepted by the State Party under Article VII of the Outer Space Treaty (and the provisions of the subsequent Liability Convention) need not be passed directly to private entity. Instead, it is a matter for the State to decide whether and to what extent it will impose liability.
As it was mentioned above when the Outer Space Treaty was adopted by the United Nations General Assembly in 1968 space activities were the exclusive domain of the Soviet Union and the United States. This remained the case when the Liability Convention was adopted in 1972. At that time there were no international joint efforts, even less the participation of the private sector, in space activities. Four decades later; however, most activities are conducted by commercial concerns operating on a multinational level. The Liability Convention is proving to be inadequate in addressing the issue of the third party liability, private space activities and the settlement of disputes for debris. [6]

2. The Liability Convention does not apply to: (i) nationals of the launching State, and (ii) foreign nationals who participated in the operation of that space object. The first exception is an application of a basic principle of International Law which refrains from dealing with relations between a State and its nationals, and the second was designed to exempt the launching state from liability for foreign observers who accepted invitations to take part in or observe a launching or recovery since these persons could be considered to have assumed any risk entailed. Nonetheless, this exclusion does not imply that the launching State might not pay compensation: it might be paid, for example, under article VII of the Outer Space Treaty.

III. Challenges

The following issues to international space law liability represent serious challenges:

1. Liability in the context of space debris can be broken down into two categories: liability for existing space debris and liability for remediation of space debris. Liability for existing space debris is not discussed in this article. Liability for space objects is governed by Article VII of the Outer Space Treaty and Article VII's extension through the Liability Convention. However, while the current interpretation of both treaties vest responsibil-

6 (Article III).

ity to a launching state for damage caused by space objects in outer space, in practice space debris as currently understood seems to be exempt.

2. It should be mentioned that environmental questions are not part of the Liability Convention so that damage caused to outer space is not covered.[7]
3. After the collision between the derelict Cosmos 2251 and Iridium 33, Russia believed that, since Cosmos 2251 was no longer functional it was not responsible for either tracking it or for its disposal. This says that a space object as defined under international law ceases to become such once it is no longer of use to its launching state and, therefore, liability does not attach, including the responsibility to remove it. This issue can be caused intentionally ambiguous interpretations of both Article VII of the Outer Space Treaty and the Liability Convention accords.[8]
4. Many states, including some of the non-space faring states, feel that the liability for removal of space debris rests with the state that placed it there. That liability also includes financial liability for damage caused by space debris and the cost of removal. Most of the space faring states, including the United States, are obviously less inclined to accept liability for space debris, including liability for in-orbit damages and removal costs, and feel that the responsibility for removal belongs to all states, including the associated costs. Ironically, this point of view seems to support a common heritage approach and thus a common responsibility.[9]
5. The implications of legal liability and the resultant financial responsibility makes a definition of space debris a difficult one, especially if that definition is one designed to attach liability to begin with. More so, applying a definition as proposed earlier will be resisted as well as since implying that space debris fits within the definition of space object as described by the Liability Convention means that liability for space debris attaches as well. This is a policy stance that the space-faring states, are unwilling to take. However, until the ambiguous interpretations of liability are solved to the satisfaction of the space-faring states, remediation of space debris will not in earnest begins.[10]

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7 *Stephan Hobe*, Environmental Protection in Outer Space: Where We Stand And What Is Needed To Make Progress With Regard To The Problem Of Space Debris, The Indian Journal of Law And Technology, Volume 8, 2012.
Gant B J, Space Law and the Expanding Role of Private Enterprise, with Particular Attention for Launching Activities, Singapore journal of international and comparative law (2001).

8 Manikowski P, Examples of space damages in the light of international space law, Poznań University of Economics, VOLUME 6, (2006).

9 Gant B J, Space Law and the Expanding Role of Private Enterprise, with Particular Attention for Launching Activities, Singapore journal of international and comparative law (2001).

10 Hertzfeld Henry R, A Roadmap for a Sustainable Space Legal Regime, Space Policy Institute, The George Washington University. <www.gwu.edu/~spi/assets/docs/Hertzfeld-IISL%20Paper-Revision%2011-30-2012.pdf>.

6. Applicable criteria under Article VII of the Liability Convention are that the State which launches or procures the launching of an object into outer space is liable. One of these challenges is the question as to whether international liability applies at all in the case where a private entity launches an object into outer space. Unlike the Article VI, no mention is made in Article VII as to non-governmental entities, therefore, placing in question whether the activity of a private entity, which in fact launched or contracted for the launch could result in liability of its State. The consequence of a negative answer to this question might be that States do not provide in their domestic legislation for any recourse against the private entity in such a situation.[11]
7. The launching State is absolutely liable and is liable in different degrees of fault, but in final consequence the State is liable for damage caused by a private enterprise. It is imaginable that States refuse to allow private enterprises to perform space activities, or that States set up exaggerated requirements just because of the above mentioned state-liability. This could lead to some kind of forum-shopping towards launching States that either cannot or do not want to grant sufficient control over space activities, or that - in case of damage - would not pay compensation anyway, because of the lack of legal tools for enforcement. Therefore, unlimited liability of States practically according to the Liability Convention is cut by international agreements that stipulate a limited but guaranteed maximum-amount-liability for space activities.[12]
8. Since the provisions of Liability Convention have never been specifically invoked in anger, there are significant uncertainties in the interpretation of its provisions. Controversial issue in the commercial operations remained the definition of a launching State and it's applicable to the multinational nature of the space industry today. The launch operator is not generally the entity that will operate and control the satellite once it has been inserted into orbit. In such cases it would be an injustice to continue to impose liability on the launching States, when they no longer had any control or influence over the operation and control of the space object.[13]
9. The issue of procuring a launch has raised a problem in the context of private launch activities. The mere link of nationality of a private launch operator is not sufficient to make that State a launching State. The State must actively request, initiate or promote the launching of the space object to have procured the launch. An active role on the part of the State of

11 C.Q. Christol, The Modern International Law of Outer Space, Pergamon Press, 1982, pp. 39-42.

12 Gimblett, R, Space Insurance into the Next Millennium, in: Outlook on space law over the next 30 years, Kluwer 1997, p. 163.

13 Gupta Apar, Liability Supernova: "Space Debris" escaping the present Space Law Regime.

nationality may be considered unnecessary for a State to be considered to have procured a launch.[14]

10. The concept of fault as used in article III of the Liability Convention has different meaning in different legal systems. In civil law systems fault is generally interpreted by the courts on a case by case basis while fault is often associated with negligence in common law systems thus necessitating considerations of the applicable duty and standard of care. In practice this discrepancy in the legal notion of fault in different legal systems may be of substantial consequence.[15]
11. The Liability Convention on damage occurring in outer space only refers to the loss of human life or damage to people on board space vehicles, no reference is made to incidents that may occur during one of the many Extra-Vehicular Activities (EVA). In the event of an astronaut's collusion during EVA with a space object registered by another State, or in the event of his space-suit being torn by space debris, according to the Liability Convention, this would be a case of collusion between space objects. Even the space suit, necessary for survival in outer space, could be considered a space object, within a wider concept referring to any object capable of "assuring human conditions of life or allowing the transit of persons throughout outer space or celestial bodies". The question is that of identifying the subject holding jurisdiction over astronauts outside the space station and the transport vehicle, who could be considered being responsible for the astronaut's activity.[16]
12. The launching State retains jurisdiction over personnel on board the space object, but a problem arises concerning space tourists not being part of personnel, but just passengers. The Liability Convention does not contemplate the problems of civil liability, but only those of States' liability. It is not enforceable to the damages caused to any passengers or crew of a spacecraft during the commercial activity of transport.[17]
13. Another gap of the Liability Convention is that nationals of the launching State are excluded from the scope of the Liability Convention.

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14 Wayne White, The Legal Regime for Private Activities in Outer Space. See in <www.spacefuture.com/>.

15 Change B., Article VI of the 1967 Space Treaty Revisited : International Responsibility, National Activities and the Appropriate State Journal of Space Law 26:1, 1998, 7.

16 Catalano Sgrosso., Legal Aspects of Astronauts in Extravehicular Activity and of "Space Tourists" See in <www.esa.int/>.

17 See Catalano Sgrosso, Application of the rules of the Code of Conduct to the First Crews on board the International Space Station, in Proc. Of the 45th Colloquium on the Law of Outer Space, Houston, USA, 2002, p. 77 and fall.

IV. Solution and Proposition

The authors are of the opinion that it is better for international community to provide a new treaty on private international space law by modelling the Intergovernmental Agreements (IGA) and private international air law which could overcome the shortages of the Liability Convention including debris.

1. The Intergovernmental Agreement (IGA) have been established during a phase of the Station program when the partner States were concentrating on the various aspects to be included within the development of the program itself. The dispositions on the various stages of development are detailed and clear, whereas those directly linked to usage operations are vaguer and therefore require a greater interpretation effort in the event of application to concrete events.
The will to establish a common legal regime on specific questions, seems to be the direction suggested by the doctrine and practice of partner States for future developments of the legal framework of new liability regime. The agencies are required not only to regulate the conduct of the astronauts according to their own specific personnel policies, in accordance with the IGA, but also according to the rules of the code which the astronauts are required to understand and accept. Crew members are required to conform to the dispositions indicated in the code, the application of which is in force the moment they are assigned to a specific mission, lasting until post-flight activities are completed. The IGA establishes that each State maintains jurisdiction and control over its personnel, it has been necessary to involve the States in the decision and internal application of the code rules.[18]
The risk allocation regime established under the International Space Station Agreement constitutes an exception to the liability regime in the Liability Convention; however, it can be used in new treaty. The Liability Convention allows the possibility of arrangements between launching States to distribute the risks arising from a joint launch. The risk allocation regime, however, may not impair the right of a non participant State sustaining damage to seek the entire compensation due from any or all of the launching States. It is thus submitted that the risk distribution regime of the International Space Station agreement qualifies as an agreement among launching States to redistribute their financial obligations in terms of article V of the Liability Convention. The risk allocation regime is valid only among these States.
Furthermore, article XXIII of the Liability Convention supports this conclusion, as it further prescribes that the Liability Convention has no effect on other treaties so far as relations between parties are concerned and that States

18 Jakhu Ram, Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris, (2011); and see also <www.oosa.unvienna.org/pdf/pres/stsc2011/tech-35.pdf>.

can enter into treaties reaffirming, supplementing or extending its provisions, provided, however, that this regime do not affect the rights of the victims.[19]

2. Much law that is required will be basically a simple extension of aviation law. Aviation is a huge, popular, profitable, global business, operating within a network of international law. It will be much simpler to add to this to cover private international space law.[20]
Therefore, there is a need for an International Convention in space transport such as those established by the Montreal Convention 1999 subsequently to the Warsaw Convention for aviation. Regulations of the Montreal Convention 1999 for the Unification of Certain Rules for International Carriage by Air could serve as models in space transportation provided that a 'Convention for the Unification of Certain Rules Relating to International Carriage in Space' can be agreed under the auspices of the United Nations, following the example of Montreal Convention 1999, which lays down new rules on liability in respect of the international carriage by air of persons, baggage and cargo. In principle, Article 17 and 18 of the Montreal Convention 1999 regarding liability of the carrier could read in the case of the space carrier for death and injury of passengers- damage to payload or to cargo.[21]

3. The approach of international space law needs to be deeply reconsidered and re-defined to enable private enterprises to (directly) perform outer space activities. The desirable solution could be a differentiating stage-to-stage system, that makes e.g. air law applicable in air space and space law for outer space, or a strictly purpose oriented system, or a completely new international instrument that combines all these elements especially designed for the needs of commercial space activities in legal code.
There arise in the future concrete factual situations that make desirable or even necessitate consideration of one or more specific amendments to the space treaties. However, consideration of such amendment(s) should not take place in the abstract. It is up to these States to decide how to abide by their international obligation of authorization and continuing supervision. In cases where their non-governmental nationals conduct such activities and whether in the event of damage caused by the latter, the State wishes to apportion all or a part of such liability to such actors.[22]

4. There have been proposals for defining space debris but mostly in the context of legally binding treaties and liability for space debris.[5] Lt. Colonel Imburgia

19 Julian Hermida, International Space Law, Kluwer Academic Publishers, 2004, p. 27.
20 S.C. Koops-Jubitana, Commercial Launch Activities: Launch Contracts and Launch Insurance- Liability Aspects- LL.M Thesis Leiden University, 2006, p. 10.
21 Van De Wouwer J.L. & Lambert F., European trajectories in space law, 2006, p. 175-177.
22 Atney-Yurdin I, Space Debris Legal Research Guide, Pace International Law Review, Volume 3, 1991.

proposes the following definition of space debris to include: "…all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional, regardless of whether the debris is created accidently or intentionally"; the term includes but is not limited to, fragments of older satellites and rocket boosters resulting from explosions or collisions, as well as any non-functional space object, such as dead satellites, spent rocket stages or other launch vehicles, or components thereof;
A more practical approach to liability for existing space debris is to apply a quasi-legal definition that directly addresses the problem of ownership. As mentioned above, one the primary issue with removing space debris is that there are no salvage rights to space debris because of the ownership issues related to Article VIII of the Outer Space Treaty. Therefore, before space debris can be removed from orbit, the ownership issue must be addressed.
Incorporating provisions of the Liability Convention and the Registration Convention are sure to controversial since the effectiveness of both treaties is a matter of debate. More so, is the definition of "space object". A "space object" is similarly defined by both of these treaties, which includes not only objects launched into space by a launching state but also components from the object. There is debate about the definition of "space object" in the context of both these treaties in that it is vague as to its meaning.
The challenge with such a definition is that in and of itself it does not solve all the issues surrounding space debris. This definition also does not address the issue of space objects whose national origin and hence their launching state is unknown.
Defining space debris in this manner not only will take into account the current body of international space law, but will also provide the basis of decision making for a nation to determine whether a particular object has value, and whether it can be expressly abandoned and subsequently disposed of. Also, a definition incorporating these elements is not an end-all for solving the legal issues surrounding space debris remediation, but rather it would need to find itself as part of an annex to one or more of the existing space law treaties to set out the rules and protocols for space debris. The idea of a definition of space debris that focuses on the issues surrounding remediation instead of placing is needed to address the present and future situation.[23]

5. The solution to the issue of liability is to grant a general reprieve of liability over existing space debris, which would in effect waive liability under Article VII of the Outer Space Treaty and Article III of the Liability Convention.
However, granting a blanket amnesty for liability for space debris will meet resistance especially if it abrogates past, present, and future liability and requires no commitment from the nations receiving the benefit. To that end, in order

23 Williams Maureen, Safeguarding Outer Space: on the Road to Debris Mitigation, Published in Security in Space: The Next Generation—Conference Report, 31 March–1 April 2008, United Nations Institute for Disarmament Research (UNIDIR), 2008.

for a waiver of liability to be granted a state might be required to make certain commitments. Some of those commitments might be as follows:

- The state will have continuing liability for any damage caused by a space object to aircraft or on the surface of the earth under Article III of the Liability Convention and will still be considered bound by the treaty;
- The state would agree that the waiver would only apply to space debris created within a certain timeframe, therefore creating a cut off date to which the waiver would apply;
- The state would agree to implement and abide by space debris mitigation standards that meet or exceed the UN Debris Mitigation Guidelines for all future launches;
- The state would agree to correlate space debris with the definition of "space object" as found within the Liability Convention;
- The state would agree to identify space objects that it launched, which are now space debris, and provide a plan to remove those space objects from orbit within an agreed to timeframe or expressly abandon them so that they can be removed by another state; and
- The state would agree to enter into good faith negotiations to clarify the responsibilities of states under Article III of the Liability Convention, which deals with liability for damage caused by space objects in outer space.[24]

V. Conclusion

Since 1972, the Liability Convention has provided guidance on the legal principles to be applied in the case of damage caused by space activities. However, its provisions remained untested and some of the uncertainties that exist in the Liability Convention continue to fuel academic debates on many occasions. This is further complicated by the increasing privatization and globalization of the space industry at a pace not foreseen by the authors of the Liability Convention, promoting several States to recognize the need to adopt a new legislation in order to be able to pass on the unlimited international liability under the Liability Convention to private operators.

The Intergovernmental Agreement is a structure of rules that can be considered as a framing law to regulate documents on the matter specifically established for the space activities.

There are elements of air law that make it attractive to use air law as a source of legal configurations that might fit to space debris. While this is unlikely to occur in the near future, it will eventually become necessary for States to reform the liability regime for space activities, similar to the liability frameworks in place in private international air law, in order to reflect the nature of the space industry and to reduce the emphasis being placed on States to be liable for the activities of private operators.

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24 Listner M, Legal issues surrounding space debris remediation 2012.

International community need to provide a new regime for liability in private international space law like Warsaw-Montreal regime in private international air law. Although international liability of states for damages is acceptable regarding the type of activities, due to high costs of compensation, private sector cannot afford it. However, nowadays space activities are moving toward more engagement of private sector no longer the states are the sole actors. Therefore in order to enhance the activities of private sector, a unified international liability regulations regime should be established. It is obvious that the unified regulations should not be in conflict with the public international instruments. The issue of space debris is a topic of concern in unified international liability, where at first the liability of private sector rather than the states should be specified. The author is of the opinion that it is the space debris and not the space object that usually causes damages. If private companies are seriously taken responsible, surely they make necessary provisions for improving safety of their activities, and avoid leaving space debris; and if they are produced company would take to remove them.