## Rethinking State Responsibility in International Space "Environmental" Law: A Case for Collective Responsibility for Space Debris Prevention

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## Abstract

This thesis assesses the current legal regime of State Responsibility in the exploration and use of outer space as it concerns space debris prevention. It argues that the proliferation of space debris is attributable to a lack of clarity in the current regime regarding the duty imposed on state and non-state actors for its prevention. It is contended that this concern must be addressed through regulation in order to be meaningful. In support, it interrogates the current status quo of state responsibility for the space activities of non-state entities and how this differs from state responsibility in international environmental law. The objective is to show that the vicarious responsibility of states for non-state actors under current international space law and the disharmony between international space law and environmental law reinforces irresponsible conduct in space activity. As a preventive measure, it advocates for a return to the jurisprudence on "Mankind" that was the basis of the Outer Space Treaty. It suggests that concern for "all mankind" can be used to impose a duty of due regard on all space actors. In this regard, it advances a case for collective responsibility of all space actors by recommending a "Protocol on Collective Responsibility in the Prevention of Space Debris" to be executed by all space actors as a mandatory mechanism to compel the pursuit of uniform space debris prevention measures.

### Résumé

La présente thèse décrit le régime légal de responsabilité des Etats dans l'exploration et l'utilisation de l'espace en ce qui concerne la lutte contre les débris spatiaux. Un régime obscur quant aux devoirs des Etats et autres acteurs est à l'origine de la prolifération de ces débris. Ce problème doit être réglé par la voie réglementaire, afin d'avoir un impact efficace. Pour ce faire, le présent statu quo dans la responsabilité des Etats pour les activités de leurs nationaux dans l'espace est étudié. L'objectif est de démontrer que la responsabilité du fait d'autrui des Etats dans le cadre du présent droit international de l'espace ainsi que la discorde qui existe entre ce dernier et le droit environnemental encourage les comportements irresponsables dans les activités spatiales. Comme mesure préventive, la présente thèse propose un retour à la doctrine de « l'humanité » qui était à la base du Traité de l'espace. La prise en compte de « toute l'humanité » peut permettre d'imposer un devoir de respect à tous les acteurs de l'espace. A cette fin, cette thèse propose un régime de responsabilité collective de tous ces acteurs au travers d'un « Protocole sur la responsabilité collective pour la limitation des débris spatiaux » qui serait signé par ceux-ci. Ce mécanisme obligatoire imposerait l'adoption de mesures uniformes de lutte contre les débris spatiaux.

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## **Chapter One**

#### 1.1. Introduction

#### 1.1.1. Objectives and Research Justification

Concern over global environmental safety and sustainability has occupied the attention of governments and non-governmental actors across the world for much of recent history.<sup>1</sup> With respect to the terrestrial environment, there are concerns over ozone layer depletion deriving from carbon emissions, melting glaciers and ocean surges that precipitate great flooding, bush burning and disappearing wildlife leading to biodiversity distortions, and the like.<sup>2</sup> What generally is discussed under the rubric of climate change could as easily be considered one of the greatest challenges of human sustainability in contemporary times. But notwithstanding the enormity of this challenge and the implications of inaction in addressing it, no consensus has yet been reached at the global level on the best possible steps to take in designing and implementing solutions.

While the above scenario depicts the challenge of addressing concerns about the earth environment, similar challenges exist with respect to regulating best practices in the use of outer space.<sup>3</sup> One of those challenges within outer space governance has related to the question whether or not non-state actors could be held accountable for their actions that

<sup>&</sup>lt;sup>1</sup> Hugh Ward, "International Linkages and Environmental Sustainability: The Effectiveness of the Regime Network" (2006) 43 J Peace Research 149; see Marc Pallemaert, "International Environmental Law in the Age of Sustainable Development: A Critical Assessment of the UNCED Process" (1995-1996) 15 J L & Com 623; see Jonathan Golub, ed., *Global Competition and EU environmental Policy* (Oxford: Routledge, 1998).

<sup>&</sup>lt;sup>2</sup> W Neil Adger *et al*, "Advancing a Political Ecology of Global Environmental Discourses" (2001) 32 Dev & Change 681; Allan Mazur & Jinling Lee, "Sounding the Global Alarm: Environmental Issues in the US National News" (1993) 23 Soc Stud Sci 681.

<sup>&</sup>lt;sup>3</sup> See Glenn Reynolds & Robert Merges, *Outer Space: Problems of Law and Policy* (Boulder: Westview Press, 1989) at xv.

have inimical consequences for the outer space environment.<sup>4</sup> The debate is particularly strained when such private actions concerning the environment are viewed from a human rights filter.<sup>5</sup> Since the first space tourist Dennis Tito, a new form of private utilization of outer space for space tourism and space transportation is fast emerging.<sup>6</sup> Already questions are being posed about the regulation of the safety of these vehicles that will necessarily impact on the safety of the space participants (passengers). Concomitantly, the US approach of obtaining liability waivers from participants is already a subject of intense criticism.<sup>7</sup>

Current space law is not appropriate to impose legal requirements on national actors to protect the environment. Article IX of the Outer Space Treaty is often cited for protection of outer space environment from contamination and avoidance of adverse consequences to earth. But a close reading of the provision shows such protection is limited to harmful contamination resulting from scientific studies and exploration and not from use. This can also be deduced from the drafting history of the Article which reveals that while co-operation, mutual assistance and due regard were seen to be intrinsic to freedom of use, the principle of non-contamination was closely linked to the peaceful uses

<sup>&</sup>lt;sup>4</sup> Thierry Senechal, "Space Debris Pollution: A Convention Proposal" online: (2013) Harvard Law School Program on Negotiation Harvard Law School <<u>http://pon.harvard.edu/wp-content/uploads/images/pdf</u> > at 50. See also Peter Newell, *Climate for Change: Non-State Actors and the Global Politics of the Greenhouse* (Cambridge: Cambridge University Press, 2000); Steven Bernstein & Benjamin Cashore, "Can Non-state Global Governance be Legitimate? A Theoretical Framework" (2007) 1 Regulation and Governance 347.

<sup>&</sup>lt;sup>5</sup>Neil Popovic, "In Pursuit of Environmental Human Rights: Commentary on the Draft Declaration of Principles on Human Rights and the Environment" (1996) 27 Colum Hum Rts L Rev 487.

<sup>&</sup>lt;sup>6</sup> At a general level but especially with respect to what has been termed "space tourism," questions could arise as to "liability, the development of property rights, and the legal status of tourists..." See Steven Freeland, "Up, Up...Back: The Emergence of Space Tourism and its Impact on the International Law of Outer Space" (2005) 6 Chi J Int'l L 1 at 3.

<sup>&</sup>lt;sup>7</sup> Tracey Knutson, "What is Informed Consent for Space-Flight Participants in the Soon-to-Launch Space Tourism Industry" 33 J. Space L. 105 (2007).

of outer space and in the conduct of military experiments.<sup>8</sup> But present activities in outer space have moved beyond exploration to extensive use from rapid expansion in technology and its consequences like space debris following such use cannot be assuaged by the ambiguous provision of Article IX. The law must therefore follow technology to address the environmental consequences of these activities.

Furthermore, there are concerns about lack of uniformity and in some cases inadequate practice in state compliance with Art VI of the OST for supervision of the space activities of their private entities. The United Nations Environment Program (UNEP) declares that a primary tenet of good environmental governance is that the role of all actors that impact the environment should be taken into account in the rules, practices and institutions that shape humans interaction with the environment.<sup>9</sup> But inadequate supervision of private entities fuelled by inherent gaps in the governance regime of outer space makes it imperative for an alternative system to provoke behavioral change on the part of both the states and non-states space actors. Given the lack of legal obligation, the hypothesis herein is that if private actors could be held responsible for their contribution to the proliferation of space debris under a normative framework that also imposes an obligation on states to ensure their compliance; this could help towards achieving the objective underlying Article VI of the Outer Space Treaty (OST).

<sup>&</sup>lt;sup>8</sup> Sergio Marchisio, "Article IX" in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl eds, *Cologne Commentary on Space Law Vol. I Outer Space Treaty* (Cologne: Carl Heymans, 2009) at 172.

<sup>&</sup>lt;sup>9</sup> Luo Houng, "Environmental Governance" (UNFCC Conference in Copenhagen) (2009) online: United Nations Environment Program <a href="http://www.unep.org">http://www.unep.org</a>>.

Linked to this hypothesis is the suggestion that a responsibility governance regime for space debris comprising both state and non-state actors will have greater acceptance if it borrows and expounds the treaty language of Article IX on "due regard." The duty of due regard is defined as "performance of an act with a certain standard of care, attention or observance."<sup>10</sup> In his commentary on Article VI, Marchisio observed that the principle of "due regard" arose in connection with the exemption granted to military and state aircrafts from ICAO processes and procedures.<sup>11</sup> Such exemption was to be viewed as accompanied by a duty of due diligence to ensure the safety of navigation of civil aircrafts under ICAO oversight.<sup>12</sup> In the exploration and use of outer space, states are bound to ensure that their activities do not hinder similar pursuit by other states (and non-states). In this sense it restricts the freedom of use by states to such use that does not constitute harmful interference to the use by others. Harm is used here in its ordinary meaning of "causing or capable of causing significant harm."<sup>13</sup> To counter any argument that could be made that the use has taken corresponding interests of other states into account, for instance, in a joint launch by two or more states (e.g the regional co-operation under RASCOM), once such use endangers the space assets and environment of other states, it qualifies as harm. In such cases, the state responsible for such use must take appropriate measures including consultations to control or prevent such risk. This extends not only to confirmed risks but also to risks that are yet unidentified. In this regard, consultation can be viewed as a measure to be taken "prior to the situation where harm [...] might actually occur."<sup>14</sup>

<sup>&</sup>lt;sup>10</sup> Marchisio, *supra* note 8 at 175.

<sup>&</sup>lt;sup>11</sup> Ibid.

<sup>&</sup>lt;sup>12</sup> Ibid.

<sup>&</sup>lt;sup>13</sup> *Ibid* at 177.

<sup>&</sup>lt;sup>14</sup> *Ibid* at 179.

A similar duty of due regard and precautionary measures can also be found in other spheres of international law, for instance in environmental law.<sup>15</sup> Legal scholars also maintain that there exists a customary duty of due regard and precaution in the use of outer space.<sup>16</sup> Formal recognition of the existence of such customary rules embedded in the precautionary principle in environmental law will lead to a duty of care or 'due regard' imposed on all space actors within the normative framework of a Protocol.

Granted that there already exists a system of 'soft' responsibility in the form of UN COPUOS Guidelines; but with the present state of affairs in outer space (which will be explored in the next chapter) none legally binding obligations are not sufficient. Unlike in the legal regime governing protection of the terrestrial environment, if and to what extent responsibility could be extended to non-state actors under international space law is grossly under-researched and under-theorized. Yet there is a big gap lurking in this area.<sup>17</sup> Apart from covering some of the gaps that exist in the literature in this area, the goal of this thesis is to draw attention to critical elements that have been excluded in the dialogue so far and to proffer an alternative approach towards achieving a concise regulatory regime for the prevention and mitigation of space debris. Ultimately, the task is to provoke a behavioral change among all space actors by the acceptance of minimum international standards that could be used to measure the existence and breach of a duty of care to

<sup>&</sup>lt;sup>15</sup> The ICJ in its Advisory Opinion in *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) (1996) ICJ rep 226 affirmed that the Precautionary Principle embeds the duty of due regard.

<sup>&</sup>lt;sup>16</sup> Marchisio *supra* note 8 at page 171 citing Phillipe Sands & Jacqueline Peel, *Principles of International Environmental Law*, (2<sup>nd</sup> ed.) (Cambridge: Cambridge University Press 2003) at 54.

<sup>&</sup>lt;sup>17</sup> See Heidi Keefe, "Making the Final Frontier Feasible: A critical look at the Current Body of Outer Space Law" (1995) 11 Santa Clara Computer & High Tech L J 345 at 358.

protect and preserve outer space as a global commons. The challenge in this regard is getting beyond the legal conundrum that this would give rise to in public international law.

#### 1.1.2. Research Questions

Among the questions to be answered in the thesis are:

- What general principles were behind the evolution of the governing principles of international environmental law?
- How relevant are those principles for the management and regulation of the environmental challenges of outer space particularly with regard to the issue of space debris prevention?
- Is there room within the current international normative regime for fixing responsibility on private actors for environmentally unsafe and unsustainable use of outer space especially in the generation of space debris?
- If such room is found not to exist or exists but is not effective, how might a better or more appropriate regime be articulated for this purpose?

One of the tasks engaged in this thesis is to examine the real or perceived interaction between current international space law and international environmental law in the prevention and mitigation of space debris proliferation. In particular, the legal regime governing responsibility for its prevention and mitigation will be interrogated *vis a vis* the allocation of responsibility among the culprits. In the specific area of causation of space debris, there is lack of clarity about the precise form and nature of Article VI "responsibility" duty and Article IX "due regard" that is imposed on states and how this can be extended to require responsible behavior by non-state space actors. It is my contention that clarity must be sought and addressed through a binding regulatory regime that includes non-state space actors in order to be meaningful. To support this contention, I will use examples of civil responsibility regimes in international environmental law to inquire into how and to what extent these can be made applicable to the unique status of outer space and its governance.

I will show that the specificity or what I would call the "state-centric" nature of current international space law practically reinforces irresponsible conduct of all space actors in the creation of space debris. As a preventive measure, a theory organized around the existence of a duty of care or due regard to the interest of all mankind owed by space actors in environmental matters will be examined. I will therefore advance a case for collective responsibility of all space actors and not one that is just limited to states for the protection of outer space. A suggestion is then made for a "Protocol on collective responsibility in the Preservation and Protection of Outer Space" executed by all space actors as a mandatory global governance mechanism to compel the pursuit of uniform space debris prevention measures. In doing so, the thesis will attempt to find a philosophical basis to address the challenges that this will pose in the sphere of public international law where only states are recognized as its subjects.

#### 1.1.3. Understanding the Problem: A Review of the Literature

This thesis addresses an urgent global environmental problem. Space debris is a phenomenon that is unique to outer space. The concerns about this phenomenon arise from the risk it poses to the utilization of outer space and the dangers to the human environment. However, current international space law appears to be inadequate to deal with these risks and dangers posed by the proliferation of space debris caused by the activities of both state

and non-state space actors.<sup>18</sup> Existing space treaties do not define space debris; neither do they impose specific obligations on the states and non-state space actors for its prevention and control. In other fields of international law, particularly in human rights and environmental protection, there is an evolving trend to recognize non-state actors as subjects of international law because of the reach and impact of the activities of these actors.<sup>19</sup> The same argument could be extended to international space law and the specific problem of space debris control. As the space activities of non-state actors continue to grow rapidly and in many cases involve partnerships with state actors thereby making it difficult to distinguish public and private space activity, there is an urgent need to rethink international law principles governing the attribution of responsibility to these actors.<sup>20</sup>

In certain ways, the subject of this thesis fits within Charlotte Ku's conceptualization of international law summarized below:<sup>21</sup>

- That historically international law was made, applied by and to states as a reflection of their interests and values;
- That today, these interests/values including the nature of the issues and variety of people/institutions affected have profoundly changed international law;

<sup>&</sup>lt;sup>18</sup> HA Baker, *Space Debris: Legal and Policy Implications*, (Netherlands: Martinus Nijhoff Publishers, 1989) at 61. SJ Imburgia. "Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreement to Clean up junk" (2011) 44 Vand J Transnat'l L 589 at 611. Ram S. Jakhu, *Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris*, COPOUS Scientific and Technical Subcommittee, 48<sup>th</sup> Sess, (2011), online: United Nations Office of Space Affairs <a href="http://oosa.unvienna.org/">http://oosa.unvienna.org/</a>.

<sup>&</sup>lt;sup>19</sup> Daniel Thurer, "The Emergence of Non-Governmental Organizations and Transnational Enterprises in International Law and the Changing Role of the State" in Rainer Hofmann ed. *Non-State Actors as New Subjects of International Law: International Law- From the Traditional State Order Towards the Law of the Global Community,* Proceedings of an International Symposium of the Kiel Walther-Svhucking-Institute of International Law March 25 to 28, 1998 (Berlin: Duncker & Humblot, 1998) 37 at 46. Tom Obokata, "Smuggling of Human Beings from a Human Rights Perspective: Obligations of Non-State and State Actors under International Human Rights Law" (2005) 17 Int'l J Refugee L 394.

<sup>&</sup>lt;sup>20</sup> See for example Fred Kosmo, "The Commercialization of Space: A Regulatory Scheme that Promotes Commercial Ventures and International Responsibility" (1987-1988) 61 S Cal L Rev 1055.

<sup>&</sup>lt;sup>21</sup> Charlotte Ku, *International law, International Relations, and Global Governance* (New York: Routledge, 2012) at 135-157.

- That the efficacy of and performance of international law in this new environment can be evaluated by looking at its functions;
- That evidence of insufficiency and inadequacy of international law is understood from its operative and normative systems. The operative system signifies legal rules that deal with how international law functions: the sources of laws, rights and obligations of the actors, jurisdictional delineation and dispute resolution mechanism. The normative system deals with issue-specific prescriptions and prohibitions involving topics such as human rights, the use of force.
- That the operative system has expanded to include other actors like International Organisations (IOs), private entities and individuals as actors in international law and norm makers in the area of human rights and international investments. The normative system has also deepened and expanded its boundaries with the result that international law now covers new areas such as governance of cyberspace.
- That both operative and normative systems work together (though may develop at different rates) to give us international law and when both are not aligned an imbalance occurs causing international legal system to function sub-optimally until a permanent change occurs.
- That a permanent change often leads to adaptations outside the formal legal system to redress the gaps created by the imbalance whereby the international political system and its constituent actors move to make international law more effective by substituting for inadequate or non-existent capacity in the operating system. Subtle ways in which the operating system affects the normative change includes:
- It specifies the actors including the right, obligations and identities of 'players' in the formulation of normative rules that will shape the content of those rules;
- It specifies the forums in which the normative rules are drafted which will affect the content of those rules.
- It can directly make law in areas where institutions of the operating system can create normative rules;
- It can shape the identities and interests of the actors in a system and ultimately the system itself.

In the context of outer space, with commercialization and privatization, space operations by private entities have grown and expanded rapidly beyond what was contemplated in the space treaties. Such growth and expansion now poses a challenge to the development of a coherent regulatory regime to address the consequences. From the beginning of space age, international law governing space activities was designed as closed system that applied to and by states as a reflection of their interests and values considered at the time to be national prestige. Participation by non-governmental entities was only to be obtained subject to the authorization and supervision by the appropriate member state.

Granted that the involvement of non-state entities in the utilization of space was contemplated during the drafting of the space treaties,<sup>22</sup> but the negotiating history suggests that this might not have been to the extent that it has reached today.<sup>23</sup> During the negotiation, USSR was adamant that "only a state conscious of its international responsibility should carry on space activities."<sup>24</sup> But a compromise reached between the USA and USSR on state responsibility for the space activities of both governmental and non-governmental actors clearly did not envisage the complexities of globalization or the rise and reach of the multinational corporations (MNCs).<sup>25</sup> Such in fact led Bainbridge to reach the conclusion de that "private exploration of outer space has gone far beyond the

<sup>&</sup>lt;sup>22</sup> The five outer space treaties are *Treaty on Principles Governing the Activities of States in the Exploration* and Use of Outer Space, including the Moon and Other Celestial Bodies, 27 January 1967, 610 U.N.T.S. 205 [Outer Space Treaty]; Convention on Registration of Objects Launched into Outer Space, 14 January 1975, 1023 UNTS 15 [Registration Convention]; Convention on International Liability for Damage Caused by Space Objects, 29 March 1972, 961 UNTS 187 [Liability Convention], Agreement on the Rescue of Astronauts and the Return of Objects Launched in Outer Space, 22 April 1968, 19 UNTS. 7570, 672 U.N.T.S. 119 [Rescue Agreement]; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 18 Dec 1979, 1363 UNTS 3 (July 11 1984) [Moon Agreement].

<sup>&</sup>lt;sup>23</sup> Schrogl & Neumann, Article IV in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl eds, *Cologne Commentary on Space Law Vol. I Outer Space Treaty* (Cologne: Carl Heymans, 2009) at 70.

<sup>&</sup>lt;sup>24</sup> Gerhard, Article VI in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl eds, *Cologne Commentary on Space Law Vol. I Outer Space Treaty* (Cologne: Carl Heymans, 2009) at 106.

<sup>&</sup>lt;sup>25</sup> *Ibid.* Gerhard suggests that USSR-USA compromise was influenced by the presumption that space launches would always be undertaken by States and thereby provide the opportunity to control any private space activities.

terms of the Outer Space Treaty."<sup>26</sup> Indeed, what is being witnessed today is the misalignment in the operative and normative systems described by Ku that causes international law to function sub-optimally until a permanent change occurs. Whereas the operative system of outer space has expanded to include other actors, the normative system continues to ignore not only their overwhelming participation but also the forces exerted on the normative system by such extensive participation.

State responsibility for the commercial activities of non-state actors is a revolutionary concept that is unique to international space law.<sup>27</sup> According to Sands, general international law precludes state responsibility for non-state commercial activities particularly where issues of environmentally sound conduct of private companies are concerned.<sup>28</sup> Perhaps this informed recent writings calling for alteration in states responsibility for the commercial space activities of non-state entities in their territory<sup>29</sup> through recognition of these non-state entities as "significant actors,"<sup>30</sup> "indispensable

<sup>&</sup>lt;sup>26</sup>Stephen Bainbridge, "Revising the Outer Space Treaty" (20 July 2009) online: <a href="http://www.professorbainbridge.com">http://www.professorbainbridge.com</a>>.

<sup>&</sup>lt;sup>27</sup> RS Jakhu, "Legal issues relating to the Global Interest in Outer Space", (2006) 32 J Space L 31 at 52. Armel Kerrest "Liability for Damage Caused by Space Activities" in Marietta Benko & Kai-Uwe Schrogl eds, *Space Law: Current Problems and Perspectives for Future Regulation* (Netherlands: Eleven International Publishing, 2005) at107.

<sup>&</sup>lt;sup>28</sup> Phillippe Sands & Jacqueline Peel *supra* note 15 at 155.

<sup>&</sup>lt;sup>29</sup>Thierry Sénéchal, *Orbital debris: drafting, negotiating, implementing a convention* (Boston: Massachusetts, 2007) at 41; N Pusey, "The Case for Preserving Nothing: The Need for a Global Response to the Space Debris Problem" (2010) 21 Colo J Int'l Envtl L & Pol'y 425 at 450. Generally, Anne Daniel, "Civil Liability Regimes as a Complement to Multilateral Environmental Agreements: Sound International Policy or False Comfort? (2003) 12 Reciel 225–241.

<sup>&</sup>lt;sup>30</sup> Although, a former President of the ICJ Rosalyn Higgins has referred to MNCs as participants rather than as subjects of international law, in 1974 the UN Group of Eminent Persons concluded in its report on "The Impact of Multinational Corporations on The Development Process and on International Relations" that Multinational Corporations are important actors in the international realm; (1974) UN Doc. E/5500/Add.1.

interlocutors to States<sup>\*\*31</sup> or as "entities *sui generis* whose treatment and the treatment of their actions in international law need to be approached on a pragmatic, case-by-case basis to reflect the functions that they perform.<sup>\*\*32</sup> As Ku rightly identified, of the three elements central in governance; power, authority and legitimacy, non-state actors wield two. The power and authority exercised by non-state actors through commercial transactions occurring outside the realm of international space law has forced open the once closed system where all interactions are endogenous. The legitimacy of any space governance system must be derived from recognition of the external forces exerted by these actors.<sup>33</sup> Such a system could then have sufficient adaptability to draw on external resources or alternative mechanisms occurring outside the state-centric system. For example, in oil pollution cases, irresponsible conduct of private entities in protecting the environmental in which they operate led to the adoption of international environmental regimes for civil liability and imposition of binding legal obligations directly on multinational companies.<sup>34</sup>

Although, state responsibility for non-state space activities has contributed to advancement in space technology, this is not without a downside. Apparent fall-out of such advancement is the proliferation of space debris.<sup>35</sup> Bearing in mind that the presence of debris in outer space began in tandem with space exploration one would question whether

<sup>&</sup>lt;sup>31</sup> Hanson Hosein, "Unsettling: Bhopal and the Resolution of International Disputes Involving an Environmental Disaster" (1993) 16 B C Int'l & Comp L Rev 285.

<sup>&</sup>lt;sup>32</sup> V Lowe, "Corporations as International Actors and International Law Makers" (2004) 13 Ita YB Int'l L at 23.

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 &</sup>lt;sup>33</sup> Concept paper submitted by Secure World Foundation to the UN Expert Working Group <</li>
 <a href="http://swfound.org/media/105230/SWF\_GGE\_Inputs\_Feb\_2013.pdf">http://swfound.org/media/105230/SWF\_GGE\_Inputs\_Feb\_2013.pdf</a>>.

<sup>&</sup>lt;sup>34</sup> See International Convention on Civil liability for Oil Pollution Damage 1969, 973 UNTS 3, Arts II and III (1). The Convention incorporates the Polluter-Pay-Principle for imposing civil liability on corporations for oil pollution. See also Articles I (1)(k) and II (1) Vienna Convention on Civil Liability for Nuclear Damage (1963) 1063 UNTS 265. Elisa Morgera, Corporate Accountability in International Environmental Law, (New York: Oxford University Press, 2009) at 12.

<sup>&</sup>lt;sup>35</sup> Peter Martinez, "Fair and Responsible uses of Space: A Perspective from an Emerging Space Country" in W Rathgeber, KU Schrogl & RA Williamson eds, *The Fair and Responsible Use of Space: An International Perspective*, (Germany: Springer-Verlag/Wein, 2010) 29 at 40-41.

the drafters of the space treaties deliberately overlooked the inclusion of clear provisions to account for the logical environmental consequences of man's encroachment in the final frontier.<sup>36</sup> Several writers have proffered explanations for this oversight.<sup>37</sup> Many authors contend that outer space is a vacuum and that its hostile nature does not qualify as an environment *strictu sensu* requiring protection unlike the terrestrial environment.<sup>38</sup> Granted that both environments are not the same especially where it concerns the question of what constitutes environmental pollution, harm or contamination and their legitimate prevention. Also, where it is easy to achieve a nexus between the pollution or harm and the entity responsible on earth, the same cannot be said of outer space.

A starting premise is therefore to examine whether space debris constitutes pollution or environmental harm. Pollution is generally defined as, "a human alteration of the environment by the introduction of undesirable elements or by the undesirable use of elements."<sup>39</sup> As one author has noted, environmental concern is about reducing the level of human interference to acceptable or desirable proportions.<sup>40</sup> Even though there is no specific reference to space debris in the treaty as environmental pollution, harm or contamination, at least from a general perspective it should qualify as such. Moreover, serious concerns about its growing numbers and the hazard that this poses particularly in

<sup>&</sup>lt;sup>36</sup> Marchisio, *supra* note 8 at 182.

<sup>&</sup>lt;sup>37</sup> One reason given is that the adoption of the Outer space treaty in 1967 and the Liability Convention in 1972 preceded the environmental movement, which began with the adoption of Stockholm Declaration in 1972. See Ulrike M. Bohlmann and Steven Freeland, "The regulation of the space environment" in Shawkat Alam, MD Jahid Hossain Bhuiyan, Tareq M.R Chowdhury & Erika J. Techera eds, *Routledge Handbook of International Environmental Law*, (New York: Routledge, 2013) 375 at 381.

<sup>&</sup>lt;sup>38</sup> Heinrich Welf, "Problems in Establishing a Legal Boundary between Air Space and Space" in *Proceedings* of the 1<sup>st</sup> Colloquium on the Law of Outer Space (Vienna: Springer-Verlag, 1959) 28 at 30, J Huebert and Walter Block "Space Environmentalism, Property Rights and the Law" (1997) 37 U Mem L Rev 281 at 282.

<sup>&</sup>lt;sup>39</sup> Stephen Gorove, *Studies in Space Law: Its Challenges and Prospects*, (Mississippi: University of Mississippi Law Center, 1977) at 154 [Gorove, "Studies *in Space Law*"].

<sup>&</sup>lt;sup>40</sup> *Ibid* at 153.

areas of high usage makes it necessary to formulate a system to reduce the level of human interference that precipitates such high levels of interference.

The above notwithstanding the assertion that outer space does not qualify for protection like the terrestrial environment is noted by Lyall as essentially flawed.<sup>41</sup> Several reasons can be given to support this position. First is that such an assertion ignores the intrinsic inseparability and interconnectedness of the two environments. Space activities commence, continue and in most cases terminate in the earth environment. As well, space activities necessarily include mission planning, spacecraft manufacture, launch and operation from Telemetry, Tracking and Command (TT&C) Earth Stations. Usually, space launches take place from a platform located in the earth or high seas (or in the case of Space X, from the air space). Moreover, the hostile nature of outer space is what enables and supports the activities of mankind in it.

But recognizing that these activities are of immense benefit to humanity's continued existence on earth and as such constitute compelling reasons for the presence of mankind in space, man's intervention in outer space has altered the nature of the vacuum. Therefore, there is no reasonable excuse not to care about the debilitating alteration of the natural state of the outer space at least in the interest of latecomers and future generations.<sup>42</sup> As importantly, the impact of the alteration of outer space is increasingly being felt in the re-entry of debris into the terrestrial environment. There are many reasons it is essential to harmonize the legal regimes for both environments. According to Lyall,

<sup>&</sup>lt;sup>41</sup> Francis Lyall, "Protection of the Space Environment and Law" (2000) 42 Proc. IISL 472-482.

<sup>&</sup>lt;sup>42</sup> George T Hacket, "Space Debris and the Corpus Iuris Spatialis" in Marietta Benko & Willem de Graaf eds, *Forum for Air and Space Law*, vol. 2 (Gif-sur-Yvette: Editions Frontières, 1994) 1 at 114. Lubos Perek, "Maintaining the space environment" in Marietta Benko & Walter Kroll eds, *Air and Space Law in the 21<sup>st</sup> century: liber Amicorum Karl-Heinz Bocksteigel*, (Koln: Carl Heymanns verlag, 2001) at 56.

environmental space law should be seen as a specialized area of environmental law.<sup>43</sup> Apparently, the drafters by including Art III provisions in the OST considered that international space law should not be exclusionary but should be inclusive by allowing for holistic approaches to resolving the issues related to outer space.<sup>44</sup> Sadly, this has not been the case with respect to the protection of the spatial environment.

A fundamental environmental principle is that states should ensure activities within their control do not cause damage to the environment of areas beyond the limits of national jurisdiction.<sup>45</sup> Protection of areas not under the national jurisdiction of any state is considered to be vital to the common interests of the global community; hence the designation of such areas as the "global commons." In recognition of the importance to be accorded such interest, the ICJ stated in its advisory opinion on the *Legality of the Use by a* 

State of Nuclear Weapons in Armed Conflict in 1996, that:

"The court...recognizes that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of states to ensure that activities within their jurisdiction and control respect the environment of other states or of areas beyond national control is now part of the corpus of international law relating to the environment."<sup>46</sup>

Outer space by its character is considered a component of the global commons. Although the concept of the global commons emerged from terrestrial environmental law, its

<sup>&</sup>lt;sup>43</sup> Francis Lyall, *Space Law: A Treatise*, (England: Ashgate Publishing Limited, 2009) at 275.

<sup>&</sup>lt;sup>44</sup> Article III states that, "States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

<sup>&</sup>lt;sup>45</sup> This principle is widely acknowledged as part of customary international law arising from state practice, confirmed in the seminal *Trail Smelter* Arbitration and *Corfu Channel* case. A modern formulation is found under Principle 21 of Stockholm Declaration 1972, Declaration of the UN Conference on the Human Environment', Stockholm (1972) 11 ILM 1416. Similar statement is contained in the 1992 Rio Declaration and forms the central theme in Agenda 21, an action program on sustainable development.

<sup>&</sup>lt;sup>46</sup> Advisory Opinion, 8 July 1996 (1996) ICJ Rep. 226, para. 29 (240), (1996) 35 ILM 809 at para. 31.

applicability in outer space can be inferred from the rationale behind the concept. A further area of inquiry that has since emerged in connection with the global commons concept is the idea that it is held in trust for the whole of mankind and this should influence its management.<sup>47</sup> As I will discuss further in the course of this thesis this seemed to create a new international legal personality of "all mankind" represented by states as its trustees ostensibly done to afford the frontier legitimate protection by law for its just use by all the earth's citizens.

Unfortunately, what is evident from national policies that are supposed to be informed by international space law is an antithesis of the treatment that should be afforded to the final frontier. Most national practice seem to be against the prevailing evidence of the actual conception of outer space and how it is framed under current international law as a *res communis*<sup>48</sup> or as belonging to the global commons.<sup>49</sup> Instead most national space polices mask a different reading of the law and unconsciously allow the treatment of the outer space domain as belonging to no one, that is, a *res nullius*.<sup>50</sup>

The apparent disharmony between international space law, national space policies and the regime of civil responsibility in international environmental law is traceable to the

 <sup>&</sup>lt;sup>47</sup> S.J. Buck, *The Global Commons: An introduction*, (London: Earthspan, 1998). J. Vogler, *The Global Commons: Environmental and Technological Governance*, 2<sup>nd</sup> ed. (London: John Wiley, 2000). The Global Commons concept influenced the work of G.H Brundtland as Chairman of the Brundtland Commission in the report on *Our Common Future: The Report of the World Commission on Environment and Development* (1987), UN Doc. A/42/427 (New York: Oxford University Press, 1987).
 <sup>48</sup> Vyer J.D Van der, "State Sovereignty and the Environment in International Law" (1992) 109 S Afr L J

<sup>&</sup>lt;sup>48</sup> Vyer J.D Van der, "State Sovereignty and the Environment in International Law" (1992) 109 S Afr L J 473-487. Vyer refers *to res omnium communis* as the Roman concept for what is known today as "common heritage of mankind." According to Roman law *res communis* signifies property owned by all as a way to reject individual acquisition. It was used to refer to the high seas and later to outer space as an area that is not subject to appropriation by any individual state. See Kemal Baslar, *The Concept of the Common Heritage of Mankind in International Law*, (London: Martinus Nijhoff Publishers, 1998) at 40-41.

<sup>&</sup>lt;sup>49</sup> The global commons concept has gained prominence among international law scholars since Hugo Grotius book '*Mare Liberium*' in which he writes about the non-territoriality of the high seas. online: <<u>http://webasa.org/pubblicazioni/grotius\_2006\_1.pdf</u>>.

<sup>&</sup>lt;sup>50</sup> Kathryn Milun, *The Political Uncommons*, (England: Ashgate Publishing Limited, 2011) at 144.

origins of the space age. Literature demonstrates this fact as well.<sup>51</sup> First, it is held that space law was drafted before the environmental wave. Negotiated during the cold war, the ideology behind space law at the time was rivalry and suspicion. Fast forward to today that the ideology has evolved to include capitalism; the legal concerns should also evolve correspondingly.<sup>52</sup>

It has also been suggested that when the space treaties were negotiated the contracting parties had a limited awareness and understanding of the issues that now hinder the progressive development of international space law. The laws were negotiated without knowledge of the extent of current commercial use to which outer space could be put. Unlike in the beginning when there were only two space faring states, today there are over forty states with the capability to access space while consumers of space technology cut across the entire world community.<sup>53</sup>

Equally significant beginning in 1990s is the involvement of non-state space actors motivated by capitalist interests opposed to the sentiments of social responsibility or public good.<sup>54</sup> That their activities in outer space have grown significantly over the years was not considered sufficient to warrant an alteration of the responsibility imposed on the states for their commercial activities under the multilateral space treaties. Rather the corpus of

<sup>&</sup>lt;sup>51</sup> AE Boyle, "Globalizing Environmental Liability: The Interplay of National and International Law" (2005) 17 J Env L 3; Thomas Gehring & Markus Jachtenfuchs, "Liability for Transboundary Environmental Damage: Towards a General Liability Regime?" (1993) 4 Eur J Int'l L 92.

<sup>&</sup>lt;sup>52</sup> Lotta Viikari, *The Environmental Element in Space Law: assessing the present and charting the future,* (Netherlands: Koninklijke Brill NV, 2007) at 57 [Viikari, "The Environmental Element"], where she describes the ideology at the beginning of space age in terms of a "pro-state" and "anti-free enterprise" binary.

<sup>&</sup>lt;sup>53</sup> NM Matte, *Space Policy and Programmes Today and Tomorrow*, (Montreal: McGill University, 1980) at 21.

<sup>&</sup>lt;sup>54</sup> Inge Kaul, "Exploring the Policy Space between Markets and States: Global Public-Private Partnerships" online: <a href="http://web.undp.org/thenewpublicfinance/background/gppp%20-%20kaul.pdf">http://web.undp.org/thenewpublicfinance/background/gppp%20-%20kaul.pdf</a>>. Gabriele Wohl, "Outer Space, Inc.: Transmitting Business, Ethics, and Social Policy 'Across the Universe'" (2008) 111 W Va L Rev 311.

international space law remains unchanged and continues to ignore apparent environmental protection principles. As the numbers of space faring nations and private actors increased vertically along with the risk of contamination and damage to the frontiers of human existence by space debris, international space law, in contrast, remained either horizontally stagnant or in some cases, regressive.<sup>55</sup> The "binding" multilateral treaties negotiated between the States in the first wave<sup>56</sup> were complemented by a number of "non-binding" United Nations General Assembly resolutions that facilitated continued commercial exploitation of outer space by non-state actors without extracting the necessary environmental protection commitments from these actors. However, the consequence of increased space exploration by all actors in the form of debris can no longer be ignored.

Issues surrounding the proliferation of space debris have garnered a lot of interest within academic circles but few writers have argued for collective responsibility as against state responsibility. Neither has any writer recommended for a protocol for collective responsibility of all actors founded on a duty of care for all mankind.<sup>57</sup> It is in this respect

<sup>&</sup>lt;sup>55</sup> Ben Baseley-Walker, "Current international space security initiatives" in W Rathgeber, KU Schrogl & RA Williamson eds, in *The Fair and Responsible Use of Space: An International Perspective* (Germany: Springer-Verlag/Wein, 2010) at 109-120. Nathan C. Goldman, "Space Law: Space Politics and Policy: an evolutionary perspective" in Eligar Sadeh ed. *Space Regulations Library*, Vol. 2. (Dordrecht: Kluwer Academic Publishers, 2002) at 163-180.

<sup>&</sup>lt;sup>56</sup> Characterized by the political, institutional and normative developments, the Space Age has been classified into three waves or periods: Classic, Transitional and Modern periods. See the discussion in Julian Hermida, *Legal Basis for a National Space Legislation*, (Dordrecht: Kluwer Academic Publishers, 2004) at xv-xxi.
<sup>57</sup> Collective responsibility is a well-known international law concept used mainly in the context of

<sup>&</sup>lt;sup>57</sup> Collective responsibility is a well-known international law concept used mainly in the context of international criminal law to advocate for the punishment of violations of the principles of humanity, that is, acts which, though not illegal from the point of view of international or national law, are breaches of the norms of morality against which neither international nor national law provides any sanction, and for which no legal responsibility is established. Hans Kelsen, "Collective and Individual Responsibility in International Law with Particular Regard to the Punishment of War Criminals" (1943) 31 Cal. L. Rev. 530. In this thesis, it is used to suggest the design of a normative framework that defines the respective obligations of states and non-state actors in a space governance regime. The idea is to have a system of primary rules that impose obligations on states to authorize and supervise the non-state actors within their jurisdiction and at the same time impose secondary obligations on these non-state actors to hold them responsible for their conduct even where the appropriate state has done or omitted to carry out its primary obligation. See also generally Senechal *supra* note 4.

that the thesis can be distinguished as a unique contribution to the discourse on space debris. The thesis also opens up the opportunity for further research on the appropriate institutional platform where such a protocol can be realized.<sup>58</sup>

#### **1.1.4. Theoretical Framework**

Two crucial principles underlying the United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (OST) will be examined here. The first is found in Article 1 (transposed from the preamble) that makes reference to the "common interest of all mankind." The second principle in Article 2 states that, "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." Bearing in mind that the preamble is also viewed as a component part of the treaty and that it signifies the specific meaning to be given to substantive provisions in the treaty, <sup>59</sup> the "Mankind" concept is identified as a relevant theory here. In this regard, Article 1 (freedom of exploration and use), Article 2 (non-appropriation) and Article 3 (State Responsibility) must be interpreted in the context of the preamble in order to achieve the intent of the drafters.<sup>60</sup>

<sup>&</sup>lt;sup>58</sup> Though not strictly a protocol; a possible line of inquiry is the Global Mobile Personal Communications by Satellite Memorandum of Understanding GMPCS-MoU) between ITU member states and sector members comprising the private sector. <a href="http://www.itu.int/en/gmpcs">http://www.itu.int/en/gmpcs</a>. Moreover the ITU has included space debris in its agenda because of the risk to satellite systems. See also Viikari, "The Environmental Element" *supra* note 52 at 87.

<sup>&</sup>lt;sup>59</sup> Article 31 (2) Vienna Convention on the Law of Treaties (concluded 23 May 1969) (entered into force 27 January 1980) 1555 UNTS 331 (VCLT).

<sup>&</sup>lt;sup>60</sup> H.D Treviranus, 'Preamble' in R. Bernhardt (ed), *Encyclopedia of Public International Law* Volume III, (Amsterdam: Elsevier, 1997) at 1098. The author makes the point that the interpretative value of the preamble is not to suggest that the preamble confers rights and obligations that go beyond the text. Although it is as binding as the operative provisions. Rather, it aids in giving specific meaning to the substantive provisions.

The overarching theoretical framework of this thesis would be anchored on these three pillars. I could go so far as to describe this nascent theory as one founded on what I would describe as transcendental humanity and state non-territoriality. This captures both the interest of mankind as the overarching value as well as the corollary prohibition of any state territorial claims. When applied to this research, it would become clear that not only the benefits of exploration of outer space should follow those engaged in space activities. Rather, the freedom of use is to be enjoyed within set boundaries; a state's freedom ends where another state's freedom begins. In this sense, all states are equally free. The idea that one state cannot be more free than other states links well into the principle of nonappropriation to suggest that outer space vacuum has a unique spatial character that does not make it a *terra nullius* and an object of conquest by states (and non-state actors).<sup>61</sup> Rather, its res omnium communis nature means that it should be treated as the 'common province of all mankind.' To signify general acceptance by states of this notion of province of mankind, delegates including the US and USSR did not raise any contest. In fact, the US delegate Arthur Goldberg thought that the principle would help to ensure that outer space is preserved for latecomers.<sup>62</sup> Non-state actors derive their right of use from the freedom conferred on states but their right is also curtailed by the obligations imposed on the states to authorize and continually supervise these entities.

When applied to this research, it would become clear that not only the benefits of exploration of outer space should be enjoyed by those involved in the use but also the

<sup>&</sup>lt;sup>61</sup> Steven Freeland and Ram Jakhu, "Article II" in Stephan Hobe, Bernhard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Cologne Commentary on Space Law*, (Carl Heymanns Verlag, 2009) 44 at 50. The authors quote Goedhius to emphasize that based on the drafting history, the principle of non-appropriation applies to both state and private entities: D Goedhius, 'Legal Aspects of the Utilization of Outer Space' (1970) 17 Netherlands International Law Review 25, 36.

<sup>&</sup>lt;sup>62</sup> Department of State Bulletin (1967) 09 January 1967 at 81.

obligations for responsible conduct in the pursuit of those benefits. As such state and nonstate actors alike should share equally in the responsibility of preventing nonenvironmentally sustainable exploration especially the generation of space debris.

This will inevitably lead me to apply, significantly, a contemporary theory of international law (or transnational governance) that engages the activities of non-state actors and thereby deconstructs the Westphalian assumptions of "state-centricity [and] positivist international law."<sup>63</sup> By implication, where traditional international law would be inadequate to capture the activities of non-state entities in outer space, they could still be brought into the regime through the contemporary process of global governance. This will include a discussion of the inappropriateness of the historical distinction between the public and private spheres to contemporary discourses on international law and global governance.<sup>64</sup> As a focal point, I will compare my proposal for the extension of individual and corporate responsibility for managing the environmental uses of outer space and creation of space debris to on-going efforts to combat the effects of climate change on a global scale.

#### 1.1.5. Methodology

The style of presentation for this research is mainly descriptive and analytical. I will pursue a coherent epistemological conceptualization and logical reasoning as well as highlighting the relationship between both. In that sense, my research will consist mainly in analyzing

<sup>&</sup>lt;sup>63</sup> A Claire Cutler, "Critical Reflections on the Westphalian Assumptions of International Law and Organization: A Crisis of Legitimacy" (2001) 27 Rev Int'l Stud 133. Ku *supra* note 21 at 158-184.

<sup>&</sup>lt;sup>64</sup> Philipp Pattberg & Johannes Stripple, "Beyond the Public and Private Divide: Remapping Transnational Climate Governance in the 21<sup>st</sup> Century" (2008) 8 Int'l Env Agreements: Pol L & Econ 367; Steven Bernstein & Benjamin Cashore, "Can Non-State Global Governance be Legitimate? An Analytical Framework" (2007) 1 Regulation & Governance 347; Philipp Pattberg, "What Role for Private Rule-Making in Global Environmental Governance? Analyzing the Forest Stewardship Council (FSC)" (2005) 5 Int'l Env Agreements: Pol L & Econ 175. Annelise Riles, "The Anti-Network: Private Global Governance, Legal Knowledge and Legitimacy of the State" (2008) 56 Am J Comp L 605.

key concepts in the current outer space environmental regime, how they relate to current challenges in the governance of this area at the global level and how the challenges I identify and proposals I make for reform build towards better governance practices.

I will use already generated empirical data that have a relationship to results and challenges facing the current regime for management of outer space and the minimization of space debris generation. My research will therefore be basically library based. To the extent that I utilize the strategies of international law strictly speaking as well as global governance, some aspects of my work will be comparative in nature. The aim is basically to test principles from both paradigms and recommend the most appropriate for dealing with the international phenomenon of space debris.

#### 1.1.6. Outline

This thesis is organized as follows. The first chapter sets out the background and objectives of the study. It also addresses structural issues and maps the content and parameters of analysis. This chapter also identifies the research questions around which the inquiry is organized, literature review, the conceptual and theoretical customs applied as well as the research methodology. In the second chapter the problem of space debris is set out in a historical context. The third chapter expounds further on the problem of space debris by considering the environmental element of the phenomenon. To this end, the chapter looks critically at the development of international environmental law and how its principles specifically the Precautionary Principle and the Polluter-Pays-Principle (PPP) could inform a better regime for the regulation of outer space. Emphasis is made on an implied duty of care embedded within these principles as a unifying obligation for responsible use of outer space.

Chapter 4 builds on the preceding chapter by examining in considerable detail the environmental element in the exploitation and regulation of outer space. Specifically, it considers how international law and national law have responded to the challenges of enforcing safe and sustainable environmental standards in this domain. In this light, the emergence of the concept of "mankind" is analyzed both in general international law and this specific area especially regarding extending the definition of humankind to this area of international law. Chapter 5 serves to congregate the foregoing discussion in an exposition of the responsibility and liability regime within the *lex specialis* and the *lex generalis*. To follow through with the exposition, the chapter considers the basic elements involved in responsibility as well as the challenges of enforcing responsibility for environmental misdemeanors using the due diligence and precautionary principle standards. It also considers shortcomings in current norm creation owing to lack of agreement among states and how global governance principles could be applied instead. This will be done in light of the overarching theoretical framework used for the research. Recommendations and concluding remarks are provided in Chapter 6.

# **Chapter Two**

### 2.1. Historicizing Space Debris: Space Pollution as an Environmental Concern

#### 2.1.1. Introduction

Having mapped the content and various components of this thesis in chapter 1, the aim in the present chapter is to provide a proper understanding of the issue of space debris in its textual and historical context. Specifically, it asks what is space debris and how it has become a critical issue in the management of outer space? This section investigates how this question has been answered historically, taking into account the rise of space debris as a global environmental concern? In addition to attempting a definition of this phenomenon and its evolution as an environmental concern in the exploitation of outer space a case is made for the effective control of space debris from a commercial and legal perspective. From the latter point of view specifically, the need is demonstrated for the elaboration of a binding international normative order to address the problem of space debris. Essentially, space debris has existed since the dawn of the space age with the launch of the first artificial satellite in 1957, the USSR Sputnik. Where it might be impossible to completely eliminate the production of debris it is possible to mitigate its creation in the future through preventive measures.

#### 2.1.2. Space Debris: A Textual and Contextual Problem

Several authors have proposed a definition of space objects and space debris. Yet (a) many others have opposed these definitions as well.<sup>65</sup> Space debris has been described as uncontrolled space objects.<sup>66</sup> However, this definition does not take into account the fact that control of space stations and satellites in outer space can at one point or another, due to technical glitches be lost and later regained. To close the gap created by international space laws an evolving trend is for national laws to contain definitions of space objects. For instance, in Australia's Space Activities Act 1998<sup>67</sup> space object is defined as comprising: (a) launch vehicle, and (b) payload (if any) that the launch vehicle is to carry into or back from an area beyond the distance of 100 km above the mean sea level; or (c) any part of such a thing, even if the part is to go only some of the way towards or back from an area beyond the distance of 100 km above the mean sea level; or (d) the part results from the separation of a payload or payloads from a launch vehicle after launch. The variety of definitions of space objects available demonstrates a major obstacle that is hindering the progressive and sustainable development of international space law: a lack of coherent definition of space debris.<sup>68</sup>

Lack of a comprehensive definition of space debris is created by the absence of a coherent international definition of a space object. Adopting an "ordinary" and contextual definition of space objects in Article 1 of the Liability Convention would lead to the conclusion that space debris are component parts of space objects. In ordinary parlance

<sup>&</sup>lt;sup>65</sup> See Hacket, *supra* note 42 at 2; see also Baker, Space Debris *supra* note 18 at 61-67; Viikari, "*The Environmental Element*" *supra* note 52 at 31. International Law Association, Report of the 66<sup>th</sup> Conference, Buenos Aires, Argentina, 1994.

<sup>&</sup>lt;sup>66</sup> Hacket, *supra* note 42 at 2.

<sup>&</sup>lt;sup>67</sup> Space Activities Act 1998 of Australia, Part 2 s 8.

<sup>&</sup>lt;sup>68</sup> Viikari, "The Environmental Element" supra note 52 at 70.

debris is usually considered to be junk because it is no longer useful,<sup>69</sup> but in space law this is a subject of much debate.<sup>70</sup> One could argue that space debris are also space objects for the simple reason that debris are objects regardless of whether their usefulness has elapsed, but there is a further complication regarding their location.<sup>71</sup> There is gainsaying that this definition has not found wide acceptance and still remains a matter for debate amongst scholars.<sup>72</sup>

Given this lack of a definitional consensus, I will for the purposes of the thesis adopt the definition advanced in the United Nations Committee for Peaceful Uses of Outer Space (UN COPUOS) Debris Mitigations Guidelines. The preamble in the guidelines defines space debris as, "all man-made objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere that are non-functional."<sup>73</sup> Even though this definition does not emanate from any of the formal sources of law, it still has value as 'soft' law often used in international law to resolve ambiguities in texts or fill gaps.<sup>74</sup> As Shelton notes, "[Soft law instruments] is part of an increasingly complex international system with variations in forms of instruments, means, and standards of measurement that

<sup>&</sup>lt;sup>69</sup> See Baker, *supra* note 18 at 62.

<sup>&</sup>lt;sup>70</sup> Ibid.

 $<sup>^{71}</sup>$  *Ibid* at 64.

<sup>&</sup>lt;sup>72</sup> *Ibid*.

<sup>&</sup>lt;sup>73</sup> Although there are some differences, the UN COPUOS Guidelines is based on the IADC Space Debris Mitigation Guidelines, IADC 02-01, 15 October 2002, online: <http://stage.tksc.jaxa.jp/spacelaw/kokusai\_utyu/space\_debris/iadc.pdf>. Some countries like Germany adopt a hierarchical structure in dealing with space debris and treat COPUOS Guidelines as the statement of the goals and the IADC Guidelines as the technical requirements to be undertaken in order to attain the goals set out in the UN COPUOS Guidelines.

<sup>&</sup>lt;sup>74</sup> Dinah Shelton, "Introduction: Law, Non-Law and the Problem of Soft Law," in Dinah Shelton ed. *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System*, (Oxford: Oxford University Press, 2000) at 25, 29.

interact intensely and frequently, with the common purpose of regulating behavior within a rule of law framework."<sup>75</sup>

In some cases, soft law has been used as supplement to treaties, for instance in the case of the 1987 Montreal Protocol to the *Vienna Convention for the Protection of the Ozone Layer*.<sup>76</sup> Often times, soft law is used to extend international law to private entities like transnational corporations normally regulated under municipal law.<sup>77</sup> An example is the UN Global Compact, a mulitlateral platform for compelling adherence by individual corporations to ethical labor and environmental practices contained in the domestic law of their host countries.<sup>78</sup> But critics warn against the dangers in the increasing use of soft law, that it "might destabilize the whole international normative system and turn it into an instrument that can no longer serve its purpose."<sup>79</sup>

Based on the definition contained in the UN COPUOS Guidelines, space debris includes fragments of older satellites and rocket boosters resulting from explosions or collisions during the launch phase of spacecraft. In addition, space debris is also held to include "un-fragmented dead satellites, spent rocket stages, a camera, a hand tool and junkyards of whirling debris abandoned or lost in outer space."<sup>80</sup> This broad definition of space debris affirms that space exploration is 90% certain to result in the generation of

<sup>&</sup>lt;sup>75</sup> *Ibid.* For a broader discussion on how hard and soft law interact under different conditions in international law see Gregory C. Shaffer and Mark A. Pollack, "Hard vs. Soft Law: Alternatives, Complements, and Antagonists in International Governance" (2010) 94 Minn L Rev 706.

<sup>&</sup>lt;sup>76</sup> 1522 UNTS 3; 26 ILM 1550 (1987). Discussed in Ku, *supra* note 21at 143.

<sup>&</sup>lt;sup>77</sup> See Ku, *Ibid* at 143.

<sup>&</sup>lt;sup>78</sup> Online: <http://www.unglobalcompact.org/HowToParticipate/index.html>. The UN Global Compact is stated as a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. It is a platform for business and non-business entities to proactively network and engage in these areas as well as contribute to UN goals in order to achieve the common objectives of building a sustainable and inclusive global economy.

<sup>&</sup>lt;sup>79</sup> Prosper Weil, "Towards Relative Normativity in International Law?" (1983) 77 Am J Int'l L 423.

<sup>&</sup>lt;sup>80</sup>Some of the newest space debris includes a \$100,000 set of grease guns and other tools that Space Shuttle Endeavour astronaut Heidemarie Stefanyshyn-Piper lost during a spacewalk on November 19, 2008.

debris to reinforce the urgent need to limit its propagation in the launch and operation phases through legally binding regulation that would counter outer space degradation.

#### 2.1.3. Space Debris as a global environmental concern

The next question to deal with regards the sense in which space debris became a critical issue in the management of outer space. How is this question answered by the historical circumstances of the rise of space debris as a global environmental concern? This section is not meant to cover all aspects of space debris phenomenon; rather it aims to provide some insight as to what is in space, how it came about, who the actors are and why there is need to tackle the problem of its proliferation.

According to experts, environmental degradation by space debris occurs in two main ways: forward and backward contamination.<sup>81</sup> Forward contamination consists in pollution by introducing "undesirable elements into outer space through some form of human intervention."<sup>82</sup> On the other hand, backward contamination occurs by introducing undesirable extraterrestrial matter into earth through human intervention.<sup>83</sup> Cases of forward contamination include release of biological or nuclear radioactive contamination into outer space. It also includes artificial matter from the earth environment injected, abandoned or lost in outer space. Examples include un-fragmented "inactive" satellites (including ESA's Envisat the largest civilian Earth observation satellite) fragments of dead satellites as well as rocket boosters resulting from explosions or collisions, spent rocket

<sup>&</sup>lt;sup>81</sup> Ulrike M. Bohlmann, "The Legal Aspects of the Space Exploration Initiatives" in Marietta Benko & Kai-Uwe Schrogl, eds., *Space Law: Current Problems and Perspectives for Future Regulation* (Netherlands: Eleven International Publishing, 2005) 215 at 225.

<sup>&</sup>lt;sup>82</sup> Gorove, *Studies in Space Law supra* note 39 at 154.

<sup>&</sup>lt;sup>83</sup> *Ibid* at 155.

stages,<sup>84</sup> a camera and a hand tool whirling in outer space.<sup>85</sup> Backward contamination also includes products of man's intervention in space ranging from extraterrestrial bacterial organisms to the re-entry of the results of forward contamination back to earth. A notable example is the re-entry of the Russian satellite Cosmos 954 that crashed and scattered radioactive material across a wide area in the Northern region of Canada.<sup>86</sup>

Therefore, space debris is composed of artificial or man-made objects. Natural space objects such as meteoroids or small particles generated from collisions between asteroids; decay of comets or from stellar activity outside the solar system are excluded from the definition.<sup>87</sup> An important point to make is that there is no way to know concisely the number of debris in outer space. A lot of what is written about the numbers of space debris is estimates and cannot be held as authoritative of what is actually in space. In this vein, total debris is to be distinguished from tracked debris and catalogued debris.

Tracked debris refers to debris that can be detected. Tracking debris with radar and optical sensors is an important debris mitigation measure undertaken by the US Space Surveillance Network (SSN). In the Lower Earth Orbit (LEO) said to be between 800 and 1200 km away from the earth, the SSN can track debris larger than 5-10cm in size and in the Geostationary orbit which is farther away from the earth at about 3000km debris larger than 1m in size. As at 2012, total tracked debris measuring between 1 and 10 cm in orbit at all altitudes is estimated to be 750,000 and for debris measuring more than 10 cm in size,

<sup>&</sup>lt;sup>84</sup> *Ibid* at 156

<sup>&</sup>lt;sup>85</sup> Viikari, "The Environmental Element" supra note 52.

<sup>&</sup>lt;sup>86</sup> See Alexander Cohen, "Cosmos 954 and the International Law of Satellite Accidents" (1984) 10 Yale J Int'l L 78; Edward Finch & Lee Amanda Moore, "The Cosmos 954 Incident and International Space Law" (1979) 65 ABAJ 56.

<sup>&</sup>lt;sup>87</sup> For the purposes of this thesis, meteoroids and other natural objects in space are excluded because they do not constitute manmade contamination of the outer space environment and do not to pose a greater hazard to launch activity than the hazard posed by artificial and man-made space debris. As at 1978, the hazard from manmade debris had already exceeded the hazard from the natural meteoroid environment.
around 24,000.<sup>88</sup> From this figure, in LEO the number of debris measuring between 1 and 10 cm is around 400,000 and 14,000 for debris larger than 10 cm in size. By implication, LEO contains about half of all debris measuring more than 1 cm in size. Debris in GEO comprises mostly inactive satellites. Out of about 4000 satellites in GEO, about 1,046 satellites are operational, an increase of 4.9% from the 2011 figure of 994 active satellites.<sup>89</sup>

### 2.1.4. Fact sheet about debris catalogue

A key fact about debris is that it is impossible to know the origins of all debris even when they are detectable. Debris that its origin is known is entered in a catalogue maintained by the US and is important for making the connection with the launching state(s). As of 2012, the US catalogue contains 16 000 objects; which means that the origin of about 734 000 detectable debris is unknown. Out of 16 000 catalogued debris 57 per cent was caused by breakup, 33 per cent from payloads, 11 per cent from rocket bodies, and another 11 per cent are mission-related debris.<sup>90</sup>

Breakup debris or fragmentation debris normally results from collisions, which can be accidental or deliberate. Accidental fragmentation result from several events, including failed space craft launches and subsequent spacecraft breakups. It could also result from inter-debris collisions such as debris colliding with active or inactive satellites. A notable example is the *Iridium 33-Cosmos 2251* crash in 2009 that caused 20 per cent of breakup debris currently in orbit. On the other hand deliberate fragmentation includes the intentional destruction of in-orbit satellites using anti-satellite (ASAT) missiles. ASAT

<sup>&</sup>lt;sup>88</sup> <http:swf.org>

<sup>&</sup>lt;sup>89</sup> Paper for the Working Group Roundtable on Space Security Index 2013 [manuscript] at 2.

<sup>&</sup>lt;sup>90</sup> Ibid.

missile tests carried out by the three major space powers: Russia, China and the United States resulted in an overwhelming increase in the number of debris particles.<sup>91</sup> For example, China's destruction of its old weather satellite, *Fengyun 1C* using ASAT weapons in 2007 contributed 41 per cent of total catalogued breakup debris in orbit. A total of 5500 debris from the *Iridium–Cosmos* collision and the Chinese ASAT test, which is about 36% of all LEO debris, is catalogued by the SSN. One sizable addition to the debris population in 2012 is ESA's bus-size earth observation satellite, *Envisat* that is now inactive and floating in outer space. Other additions include two new satellites recently launched by the Russian *Briz-M* booster but failed to reach their orbit.

### 2.1.5. Historical Evolution of Space Debris and "Kessler Syndrome"

Although space debris has existed since 1957, it was not until several decades later - specifically in 1993 - that space debris was discussed for the first time as an agenda item at an international forum.<sup>92</sup> It is unclear why international consciousness was not attentive before 1993, yet there have been calls by scientist to the urgency of regulating space debris.

A retired NASA scientist, Donald J. Kessler had predicted in 1978 that by the year 2000 inter-debris collisions could potentially cause a "cascade of collisions" that would

<sup>&</sup>lt;sup>91</sup> Imburgia, *supra* note 18 at 611. M Benko "The Problem of Space Debris: A Valid Case against the Use of Aggressive Military Systems in Outer Space" in M Benko & KU Schrogl (eds.), *Essential Air and Space Law* 2 - *Space Law: Current Problems and Perspectives for Future Regulation* (Utrecht: Eleven International Publishing, 2005) at 155. Deliberate fragmentation is also said to be a political, economic and military strategy to deny rival states use of specific orbital slots and jeopardize enemy state satellites.

<sup>&</sup>lt;sup>92</sup> Prior to 1993, the USA National Security Council had sponsored a study contained in the Report on Orbital Debris by the U.S Interagency Group (SPACE) in 1989. In April 1993, the First European Conference on Space Debris was held in Darmstadt Germany. The Scientific and Technical Subcommittee of UNCOPUOS considered space debris as a new agenda item for the first time in 1994 and in 2007 the UN General Assembly endorsed the COPUOS guidelines.

multiply debris to levels that jeopardize space exploration.<sup>93</sup> Some years later a Committee of the United States National Research Council warned that: "*The threat that orbital debris poses to international space activities is presently not large, but it may be on the verge of becoming significant. If and when it does, the consequences could be very costly—and extremely difficult to reverse.*"<sup>94</sup>

During Kessler's alert in 1978, no record of significant inter-debris collisions or collisions between active spacecraft and debris had been recorded.<sup>95</sup> And interestingly, between 1978 and 1999 the rate of space debris was lower than the predicted worldwide growth of 510 objects per year.<sup>96</sup> Instances of debris collisions with spacecraft were mostly from explosions during launch operations than collisions.<sup>97</sup>

<sup>&</sup>lt;sup>93</sup>This is described as "Kessler Syndrome." See DJ Kessler, "Impacts on Explorer 46 from an Earth Orbiting Population" in DJ Kessler & SY Su eds, *Orbital Debris*, (NASA CP – 2360, 1985) at 220-232. See also *Proceedings of a Workshop sponsored by NASA and the Lyndon B Johnson Space Center*, Houston, July 27-29, 1982 (Washington DC: NASA Scientific and Technical Information Branch, 1985) at 8; See further Harry H Almond, "Space Debris: An Emerging Problem for Global Regulation" in *Proceedings of the 38th Colloquium on the Law of Outer Space* (Virginia: AIAA, 1995) 89; Donald Kessler in his paper "Collision Frequency of Artificial Satellites: The Creation of a Debris Belt" predicted that around the year 2000 the population of catalogued debris in orbit around the Earth would become so dense that catalogued objects would begin breaking up as a result of random collisions with other catalogued objects and become an important source of future debris. D. J. Kessler & B. G. Cour-Palais, "Collision frequency of artificial satellites: The creation of a debris belt" (1968) J. Geophys. Res. 83(A6), 2637–2646.

<sup>&</sup>lt;sup>94</sup> [emphasis added] National Research Council (NRC) Committee on Space Debris, *Orbital Debris: A Technical Assessment*, (Washington DC: National Academy Press, 1995) at 9.

<sup>&</sup>lt;sup>95</sup>The first debris collision occurring in1991was so insignificant that it was not recognized until 2005. Between 1991 and 2005, three collisions occurred to produce less than four cataloged fragments each. In July 1981, the Russian *Cosmos 1275* military navigation satellite experienced an unexpected breakup caused by space debris and in December 1991 fragmented debris from two defunct Russian navigation satellites collided creating even more debris.

<sup>&</sup>lt;sup>96</sup> Online: <http://spacedata.org>Thirty-three space shuttle flights were recorded to have sustained debris damage. Also, the Hubble Space Telescope has a three-fourths-inch hole in its antenna caused by space debris while a school bus-sized satellite in LEO belonging to NASA recorded more than 30,000 hits by debris within six years in orbit

<sup>&</sup>lt;sup>97</sup> For example, an explosion that occurred in 1986 was from the third stage of an Arianne rocket launched by the European Space Agency (ESA). Resulting debris hit the French reconnaissance satellite *Cerise* ten years later severing its stabilization boom. The boom continued to orbit around the Earth as debris until it reentered Earth's atmosphere in 2000.

In recent times the proliferation of space debris is considered a "hot"<sup>98</sup> topic among states. Academics and industry experts are increasingly concerned about exponential growth in space debris since the beginning of the 21<sup>st</sup> century and the role, played by the various space actors. The popularity of the discourse on space debris has therefore arisen primarily out of the expanding number of abandoned satellites in orbit and intentional fragmentation that started in 2000. Already, the 21<sup>st</sup> century is dominated by an increasing number of random, catastrophic collisions. From 2004 to 2010, an annual growth rate of tracked debris was observed. At the beginning of 2010, earth's orbit held 2,347 more space debris objects measuring more than ten centimeters in size than it held at the beginning of 2009, a 15.6 percent increase.<sup>99</sup>

The first catastrophic event in 2000 was from a Chinese CBERS 1 rocket body that exploded in space causing debris about 2.5 times greater than debris figure predicted for that year. This was primarily because the 1978 prediction of a catastrophic collision was based on a catalogue containing 3, 866 objects while the catalogue in 2000 contained about 700, 000 large debris.<sup>100</sup> Another collision occurred in 2005, when pieces from a US rocket used to launch a satellite in 1974 collided with debris from the 2000 explosion. This trend

<sup>&</sup>lt;sup>98</sup> Christian Brunner & Alexander Soucek, eds, *Hot Issues and their handling* (Morlenbach: Springer-Verlag-Wein, 2011) at 492-725.

<sup>&</sup>lt;sup>99</sup> Gotz Neuneck, "China's ASAT-test-A warning shot or the beginning of an arms race in space?" (2008)1 YB Space Pol'y 211 at 214.

<sup>&</sup>lt;sup>100</sup> <http://www.spacelaunchreport.com>. From 1957 to 1999, 4353 successful launches and 396 failures were recorded at an average of 113 launches a year. The period between 2000-2012 show an estimated total of 1060 successful launches and 67 failures; an average of 94 launches a year. This signals that launches will increase with the increased reliability of launch vehicles. In addition, the numbers of inactive satellites abandoned in space includes the figures from the 1950s.

continued up to the 2009 Iridium-Cosmos collision with majority of the collisions occurring as predicted in the LEO and GEO orbits.<sup>101</sup>

Although Kessler rightly predicted the frequency of the random collisions, this was however not the most significant long-term source of debris around the year 2000. The greatest annual increase in space debris to date occurred in 2007 following the Chinese intentional destruction of its aging weather satellite, *Fengyun 1C*, using an anti-satellite (ASAT) ballistic missile. The unprecedented space debris created was "described as the worst satellite fragmentation event in the 50year history of spaceflight."<sup>102</sup> The aftermath of the ASAT test was an upsurge in debris levels by over 20 percent in less than a year. This alarming rate in the growth of debris did little to dissuade the United States from using an ASAT missile to destroy the *USA-193* spy satellite's toxic hydrazine fuel propellant tank on February 14, 2008.<sup>103</sup>

These examples by the three major space powers: the United States, Russia and China call to question why States have not adopted a regulatory regime to control and prevent the creation of space debris. This question could be answered by looking at States attitudes towards adopting stringent international environmental laws. As is the case in international efforts to combat the effects of climate change (which has made little progress over the years), state-centered efforts to minimize the incidence of space debris

<sup>&</sup>lt;sup>101</sup> Unfortunately, apart from uncontrolled entry of debris to earth atmosphere there is no natural process of debris removal, which means that if the amount of debris in these orbits, continues to increase, these orbits could soon become unusable. Unlike LEO satellites, spacecraft in a GEO orbit generally stay in the same spot above Earth throughout their orbit. Because Earth's atmospheric drag will not naturally remove objects in GEO, these debris will last anywhere from 1 million to 10 million years.

<sup>&</sup>lt;sup>102</sup> Leonard David, "Russian Satellite Hit by Debris from Chinese Anti-SatelliteTest" *Space.Com* (08 March 2013), online: Space.Com <a href="http://www.space.com">http://www.space.com</a>.

<sup>&</sup>lt;sup>103</sup> The USA-193 ASAT mission was not the first for the United States. In 1985, the United States shot down one of its satellites creating over 250 pieces of space debris that was considered more significant than the debris caused by the USSR ASAT missions in the 1970s and 1980s.

has been thwarted by the more powerful states who are usually the culprits. These powerful states adopt various strategies to frustrate any consensus in discussions concerning debris within COPUOS.

As a result of the 'fire and forget' attitude of space actors, in just over fifty years the earth's orbital region has become a junkyard of debris that is currently hindering the utilization of outer space. For instance, in January 22 2013, an active Russian Ball Lens satellite collided with a piece of *Fengyun 1C* debris and recently, NASA announced its decision to change the orbit of the International Space Station (ISS).<sup>104</sup> These events confirm Kessler's prediction and indeed suggest that we may have passed the tipping point.<sup>105</sup> Because space debris is the result of human activity in outer space, an international regulatory regime holding participants accountable is necessary in order to reduce or control the amount of debris. This explains why the need to impose debrismitigating measures has become an important component of contemporary outer space studies.<sup>106</sup>

### 2.1.6. Environmental Concerns about space debris

Regardless of how debris comes into being, all categories of space debris are hazardous to space exploration and warrant urgent attention in order to mitigate the risks they pose to mankind. A notable fact is that the effect of space debris is indiscriminatory because it affects states and non-state actors as well as space faring and none-space faring nations.

<sup>&</sup>lt;sup>104</sup> Eddie Wrenn, "How can we be so messy? ISS prepares to change orbit after scary near-miss with space junk" *The Daily Mail* (5 April 2013). Available online at <a href="http://www.dailymail.co.uk">http://www.dailymail.co.uk</a>. <sup>105</sup> Darren Mcknight & Donald Kessler, "We've Already Passed the Tipping Point for Orbital Debris" *IEEE* 

Spectrum (September 2012), online: IEEE Spectrum < http://spectrum.ieee.org>.

<sup>&</sup>lt;sup>106</sup> The International Interdisciplinary Congress on Space Debris is organized annually by the Institute of Air and Space Law (IASL) at McGill University in collaboration with Erin JC Arsenault Foundation, Cologne Institute of Air and Space, International Association for the Advancement of Space Safety (IAAS), Canadian Space Agency (CSA) and the United Nations Office for Outer Space Affairs (UNOOSA).

By-products from rocket fired during the upper stages of space craft launch mission emit gases and release small solid particles that affect the accuracy of scientific data. In some cases the debris interferes with the debris tracking process causing uncertainties in debris avoidance maneuvers.

Another significant risk is the interference with radio-frequency reception. Immense concentration of space debris is found in areas considered as useful and effective for a space object to carry out its necessary functions. This is particularly true of action in LEO where many earth observation satellites are located, and in the GEO, where most of the telecommunications satellites are hosted.<sup>107</sup>

In addition, of concern is the risks association with the re-entry of space debris carrying radioactive payloads into the earth environment. The re-entry of U.S.S.R. satellite Cosmos 954 into Canada in 1978 carrying a nuclear payload has already been mentioned. However, the re-entry of Cosmos 954 was attributed to an earlier collision with another object in outer space. A year later in 1979 portions of the US module, Skylab weighing over 70,000 kilograms crashed over Australia. Earlier in 1969, a Japanese ship was hit by pieces of space debris assumed to be of Soviet origin, injuring five sailors.<sup>108</sup> In fact it is

<sup>&</sup>lt;sup>107</sup> It is important to bear in mind that there is no consensus as to where the air space ends and where outer space begins, popularly referred to as the debate on the Delimitation of Outer Space. For the discussion, see Bin Cheng, *Studies in International Space Law*, (New York: Oxford University Press, 1997) 444-456. Generally, LEO is said to be between 600 and 1,500 kilometers from the earth and GEO at 36,000 kilometers. The central focus here will be in the GEO orbits where most private commercial activities occur for telecommunications. Also, debris here will include orbital and space debris, whole and fragmented satellites as well as catalogued and un-catalogued debris.

<sup>&</sup>lt;sup>108</sup> P Malanczuk, "Haftung" in KH Bockstiegel ed, *Handbuch des Weltraumrechts* (Koln: Karl Heymanns, 1991) at 756-763. Also, in 1997, Lottie Williams was reported to have been hit by material from the fuel tank of NASA's Delta II rocket that had launched a U.S Air Force satellite in 1996. <a href="http://www.foxnews.com/scitech/2011/09/21/woman-gets-hit-by-space-junk-lives-to-tell-tale/">http://www.foxnews.com/scitech/2011/09/21/woman-gets-hit-by-space-junk-lives-to-tell-tale/</a>

the case that space debris re-enters earth daily with Africa bearing the highest risk of reentries because of its location near the equator.<sup>109</sup>

A fast emerging risk caused by debris is the danger posed to manned spaceflight. Manned space stations such as the ISS currently operate in LEO where debris concentration and velocities are high.<sup>110</sup> Astronauts aboard the ISS are constantly in danger and have on numerous occasions dodged close encounters from artificial debris as that observed on April 5 2013. Recently, NASA made the decision to change the orbit projection of the ISS after it narrowly avoided collision with two pieces of debris from an inactive Russian satellite and an old Indian rocket.<sup>111</sup>

### 2.1.7. Completing the Loop: Roping in Non-State Space Actors

As a matter of logic, most debris is located in orbits where human activity is highly concentrated; that is orbits that are lucrative for space activity: the LEO and GEO orbits. Whereas LEO is preferred for earth observation, the GEO where satellites appear to remain nearly stationary above Earth is best suited for communications, the highest revenue generating space application. As a result, the GEO is the most favored orbit evinced by intense competition for Geo orbital positions. Sources claim about 6,600 satellites have

<sup>&</sup>lt;sup>109</sup> Sattrackcam Leiden, "Mapping a year of space debris re-entries" Sattrackcam Leiden (5 April 2013), online: <http://sattrackcam.blogspot.nl>

<sup>&</sup>lt;sup>110</sup> The ISS is a space station orbiting in LEO between 330kilomenters to 400 kilometres above the earth. It is operated under an Inter-Governmental Agreement (IGA) between the ISS partners; USA, Russia, Canada, Japan and the countries participating from the European Space Agency (ESA). The ISS is equipped to support human crew and operate as a base for scientific research and other space-related activities. A shuttle service usually conveys the crew from earth to the ISS. Before the advent of the ISS, an incident that occurred in the Russian Space Station, Mir Space Station caused concerns about the risk of space debris to life of humans in space. In 1987 a cosmonaut almost lost his life trying to remove a plastic bag that was obstructing the docking of an astrophysics module with the Mir Space Station. Such concerns will escalate with plans of space tourism and space transportation underway. Already questions bordering on human rights in space have been raised over the US policy on obtaining waivers of responsibility from spaceflight participants to absolve operators from responsibility in the event of accidents and loss of life. <sup>111</sup> Eddie Wrenn *supra* note 104.

been launched.<sup>112</sup> Out of these about 3,600 remain in orbit, of those, about 1000 are operational and the rest are part of the space debris.<sup>113</sup> Approximately 500 operational satellites are in low-Earth orbit, 50 are in medium-Earth orbit (at 20,000 km), the rest are in geostationary orbit (at 36,000 km).<sup>114</sup> There is estimated 1,000 pieces of tracked debris occupying valuable orbital slots. Unlike in LEO where objects decay and due to the occasion of atmospheric drag re-enter the Earth, objects in GEO remain in outer space for hundreds to thousands or even millions of years.

With the privatization of telecommunications across the world, most communications satellites hosted in GEO are owned and operated by private entities. Communications satellites similar to every other space object requires two indispensable tools: orbital positions and radio frequencies; both very scarce and very valuable resource. The International Telecommunications Union, a UN Agency responsible for the regulation and allocation of these resources requires member states to ensure that these scarce resources are used rationally, efficiently, and economically and should avoid causing harmful interference to other users. But intense competition for the more lucrative geo slots and abandoned satellites have resulted in overcrowding in geo with the potential of causing interference in the performance of other satellites.

Since the US ASAT test in LEO in 2008, there have not been any more ASAT tests in outer space, which means that currently the cause of space debris is mainly mission and

<sup>113</sup> "Global Experts Agree Action Needed on Space Debris" European Space Agency (25 April 25 2013), online: <a href="http://www.astropyli.org">http://www.astropyli.org</a>. "UCS Satellite Database" UCS Satellite Database Union of Concerned Scientists (12 November 2013), online: <a href="http://www.ucsusa.org">http://www.ucsusa.org</a>.

<sup>&</sup>lt;sup>112</sup> David Rising, "Satellite hits Atlantic-but what about next one?" *Seattle Times* (11 November 11 2013), online: Seattle Times <a href="http://www.seattletimes.com">http://www.seattletimes.com</a>>.

<sup>&</sup>lt;sup>114</sup> Fraser Cain, "How Many Satellites are in Space?" *Universe Today* (24 October 2013), online: <a href="http://www.universetoday.com">http://www.universetoday.com</a>>.

operation related. Of all the sources of space debris, inactive satellites abandoned in orbit constitute 22% of total debris.<sup>115</sup> According to Buzdugan, the Satellite industry is currently the main generator of space debris.<sup>116</sup> It should be noted that the satellite industry comprises Satellite Operators, Satellite Manufacturers, Launch Services Providers, TTC&M Services Providers as well as Space Insurers.

Increasingly, commercial satellite operations take place without mandatory governmental regulation or oversight. Satellite manufacturers are not obliged to comply with any design specifications to reduce the release of debris and they provide no post-launch warranty for the satellite. In many cases, third party liability is not mandatory and where it is required, the liability is limited.<sup>117</sup> To make matters worse, manufacturers insist on obtaining waiver of the subrogation rights of launch and in-orbit insurers.

Furthermore, the number of public-private partnerships in space activities has blurred the lines between what is private and what is public.<sup>118</sup> It is submitted that this trend was not considered and therefore not covered in the space treaties. Beginning in the early 2000s, the US military started to rely on the commercial satellite industry for its communications needs. In fact, during the US invasion of Iraq in 2000, 90% of US military communications was carried on commercial satellites.<sup>119</sup> In today's space industry especially in the US where government relies on commercial satellites for defense communication, the lines between what is public and what is private is blurred and raises

<sup>&</sup>lt;sup>115</sup> Union of Concerned Scientists *supra* note 113. See also the discussion in Viikari, "*The Environmental Element*" *supra* note 52 at 34.

<sup>&</sup>lt;sup>116</sup> Maria Buzdugan, "Who is Afraid of Space Debris? The Response of Satellite Industry" Presentation to International Interdisciplinary Congress on Space Debris, 8 May 2009, Montreal.

<sup>&</sup>lt;sup>117</sup> Lisa Daniel, "Satellite insurance operators returning to outside providers" *Via Satellite*, (1 November 2007) online: <a href="http://www.satellitetoday.com">http://www.satellitetoday.com</a>>.

<sup>&</sup>lt;sup>118</sup> online: <http://www.spacepolicyonline.com/commercial>.

<sup>&</sup>lt;sup>119</sup> The Satellite Wars, online: <http://www.spacetoday.org/Satellites/YugoWarSats.html>.

the crucial question of what is meant by "commercial" space. Based on the close collaboration between governments and private entities, one can correctly speculate that the influence of private entities in space activities would further increase. This only increases the difficulty to correctly draw the line between public/state and private/individual/corporate responsibility for mishaps and for space debris. An argument could be made that such collaborations should be subjected to regulation but the gap in the treaties still has to be filled. Not to regulate such activities will most likely hinder international co-operation and undermine global peace and security.

Besides, the business strategy pursued by Intelsat, a US private telecommunications operator of relocating satellites in orbit represents a trend that could emerge in the industry with its attendant problems. In response to a request from the US Department of Defense, Intelsat had to move a domestic satellite operating over the US across the globe in order to provide military surveillance services in Afghanistan and Iraq. The possibility of collision with debris or another space object operating in the crowded Geo zone exists and this could give rise to conflict.

With respect to new uses of space for tourism and transportation, the role of private providers of these services cannot be ignored. Already discussions are ongoing about the classification of these vehicles and safety regulation. To avoid bearing responsibility for the participants, the US has devised a system to obtain waivers of liability form participants exonerating the operators from liability. This system marks a huge departure from the liability regime in the airline industry and may not pass the test of legitimacy especially in the realm of human rights. Even within NASA, the rationale for excluding private entities from the dialogue on responsibility for space debris is being questioned. To

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quote a NASA chieftain, "[o]ver the long run the safety of all human beings in the global commons of space is a responsibility that must be shared by all space-faring powers."<sup>120</sup>

### 2.1.8. A Stitch in Time: Making a Business Case for Space Debris Control

With the globalization of the world economy, commercialization and privatization of space activities gained momentum in the 1990s. Space technology and applications have become ubiquitous in daily life such that the interdependence of earth and outer space is firmly established. Countries, corporations, organizations and individuals rely heavily on unhindered use of outer space for myriad needs including national security, navigation, communications and economic sustenance. Rather than reduce, this need is more likely to intensify as more technological advances are recorded.

Though states remain the central space players, the pressures of globalization and privatization have brought about a paradigm shift in the nature and numbers of space actors. States are no longer the sole actors in space activities. In present times, and grossing over \$2billion per annum, communication satellites operated by private entities are the largest revenue generating space application.<sup>121</sup> It is worth mentioning that navigation signals are freely provided by satellites, launched and operated by governments like the US-GPS, EU-Galileo, and Russian-GLONASS. However, the revenue is derived from the sale of the equipment and accessories by corporate entities.<sup>122</sup> Worldwide commercial sector revenue from launch vehicles, satellites, ground equipment and

 <sup>&</sup>lt;sup>120</sup> G Rodney, NASA Associated Administrator S&MA, 40<sup>th</sup> IAF Congress, (October 1989, Beijing - China)
<sup>121</sup> Futron Corporation "Final State of the Satellite Industry Report 2012" Satellite Industry Association (May 2012), online: Satellite Industry Association < http://www.sia.org>.

<sup>&</sup>lt;sup>122</sup> <http://www.spacepolicyonline.com/commercial>.

telecommunications is worth over USD4.23 trillion thereby affirming private actors as legitimate stakeholders in the space domain.<sup>123</sup>

Investment figures of the commercial space industry continue to evolve upwards with increase in satellite launches and the expansion of space activities into other areas of endeavor, like space transportation and space tourism. Since 2001 when the first space tourist, Dennis Tito paid \$20million to be transported on the Russian Soyuz capsule to visit the ISS, demand for private space transportation has grown steadily. A new space tourism industry is crystallizing rapidly with the construction of spaceports across the globe. In March 2012 Ashton Kutcher became the 500<sup>th</sup> passenger to reserve a seat at a cost of \$200, 000 on Virgin Galactic suborbital spaceship scheduled to commence operations in 2012.<sup>124</sup>

Not only does space debris pose a significant threat to the global network of communication, navigation and earth-observation satellites, it also poses substantive risk to the emerging space tourism and transportation industry and particularly to the space participants. For space activity to safely grow and simultaneously ensure all parties, States, individual and corporations benefit from a fair and just legal regime; corporations seeking to engage in this new industry require clarity on legal restrictions and risks involved. This would enable them to devise economically feasible and commercially profitable activities for the space venture with full knowledge of the risks. It would seem that many governments can survive economic shocks and losses far better than companies would

<sup>&</sup>lt;sup>123</sup>James Reilly, "The Space Report: The Authoritative Guide to Global Space Activity" online: <a href="http://www.spacefoundation.org">http://www.spacefoundation.org</a>>.

<sup>&</sup>lt;sup>124</sup> Richard Branson "Our 500<sup>th</sup> Astronaut" *Virgin Galactic News* (22 March 2012), online: Virgin Galactic <a href="http://www.virgingalactic.com">http://www.virgingalactic.com</a>. As at July 2013 the price had increased to \$250,000 and the number of passenger reservations to 600 with the signing of Marsha Waters a UK national.

which makes proper risk assessment, risk management and liability control issues a bigger concern to private entities.

Although the incidence of space debris propagation has become an issue of significant global concern, there seems to be no legally enforceable prohibition on the creation of space debris under the space treaties. The provision often cited for prevention of space debris contained under Article IX of the Outer Space Treaty is criticized as ambiguous and inadequate to impose obligations on state actors.<sup>125</sup> And because responsibility is not effectively fixed, culpability cannot arise. Where insurance could exist as a form of risk management in space activities, if the anticipated losses are not recoverable in legal actions, either insurance will be unavailable or it will be very expensive. Normally satellite manufacturers insist on obtaining waivers of any subrogation rights of insurers in the satellite procurement contracts. Moreover, under the space treaties, states have absolute discretion whether or not to pursue claims for liability and compensation for damage to space objects. While authorization, supervision, national registration and indemnification are identified as the most important building blocks for national space legislation, in reality the contents of national space legislations where they exist differ significantly and thereby emphasize even more the gaps in the legal regime.

Currently, it could be argued that both private industry and state actors have an interest in ensuring that the legal regime remains as vague as possible. Still it is evident that the cost of doing so is far greater.<sup>126</sup> For instance, the costs of shielding a spacecraft from space debris impacts using buffer technology and the costs of avoidance maneuvers

<sup>&</sup>lt;sup>125</sup> Joanne Irene Gabrynowicz, "A Chronological Survey of the Development of Art. IX of the Outer Space Treaty" Available online <a href="http://www.spacelaw.olemiss.edu/resources/pdfs/article.ix.pdf">http://www.spacelaw.olemiss.edu/resources/pdfs/article.ix.pdf</a>.

<sup>&</sup>lt;sup>126</sup> Imburgia, *supra* note 18 at 611.

(which reduce the life span of the satellites) increase operational costs across the industry. Unarguably, economics drives innovation and technology and therefore law follows technology. As Choucri observes, the quest for solutions to environmental issues provides an opportunity for corporations to do what they do best; innovate and shape new markets.<sup>127</sup> Presently, a private industry association; the Space Data Association (SDA) is spearheading practical efforts to avoid the impact of space debris through data sharing on space debris situational awareness.<sup>128</sup> Various robotic programs are also being explored for orbital debris retrieval and disposal.

Without commitment of funds it is unlikely that the research and commercialization of orbital debris clean up technologies will be realized.<sup>129</sup> Both States and corporate entities already utilizing or intending to utilize outer space have an important role to play in ensuring safe and environmentally sustainable use. From the current situation, the responsibility of corporate entities in this regard in the absence of clarity in the international legal regime could either be out of moral persuasion or it could be economic on the basis that an unsafe outer space is bad for business. But the law still has to follow closely behind.

Initiatives, such as individual and/or corporate morality do not have foundation in national or international law and only go so far. To be effective, an international legal regime for debris control and prevention must allocate responsibilities among the various

<sup>&</sup>lt;sup>127</sup> N Choucri, "Corporate Strategies toward Sustainability", in W Lang ed, *Sustainable Development and International Law*, (London: Martinus Nijhoff, 1995) at 189.

<sup>&</sup>lt;sup>128</sup> Online: <<u>http://www.space-data.org</u>>.

<sup>&</sup>lt;sup>129</sup> Patricia M Sterns & Leslie I Tennen, "The Autonomous Space Processor for Orbital Debris (ASPOD) Project and the Law of Outer Space: Preliminary Jurisprudential Observations" in *Proceedings of the 38th Colloquium on the Law of Outer Space* (Virginia: AIAA, 1995) at 107-120.

actors for minimizing the generation of orbital debris. The call for genuine collective responsibility has been made in several quarters and the search is on for how this can be realized.<sup>130</sup> One approach is to incorporate the Polluter-Pays Principle (PPP) whereby the cost of pollution is allocated among the actual polluters as an efficient market mechanism.<sup>131</sup>

The intent here is to explore the usefulness of this principle in the latter part of this thesis. But it would suffice to note for present purposes that one benefit of applying this principle is to create a fair and competitive environment. Critics of this approach might contend that it is an enabling tool to enshrine a right to pollute.<sup>132</sup> But an immediate riposte is to say that the funds should be held in a Global Space Debris Fund.<sup>133</sup> Again, the commitment to the PPP and payments to the fund has to bind the various actors. Recent discussions in various fora suggest this to be an arduous task.<sup>134</sup> To address legal gaps in the treaties, states resort to soft law instruments like the UN COPUOS Guidelines and UN General Assembly resolutions to set voluntary standards. However, as mankind is forced to face the consequences of the past, with the present involuntary realities of debris phenomena, the legal regime must be correspondingly involuntary. As Lachs argues, "[t]he law of outer space must be anthropocentric in character and reflect the most progressive

<sup>&</sup>lt;sup>130</sup> Henry Hertzfeld, "A Roadmap For A Sustainable Space Regime" *Space Policy Institute* (30 November 2012), online: George Washington University <a href="http://www.gwu.edu">http://www.gwu.edu</a>

<sup>&</sup>lt;sup>131</sup> U Kettlewell, "The Answer To Global Pollution? A Critical Examination of the Problems and Potential of the Polluter-Pays Principle" (1992) 3 Colo J Int'l Envtl L & Pol'y 438. Viikari, "*The Environmental Element*" *supra* note 52 at 184.

<sup>&</sup>lt;sup>132</sup> Kathryn Milun, *supra* note 50 at 141.

<sup>&</sup>lt;sup>133</sup> Joseph Pelton, "Global Economic Fund for Space Debris Removal" *IASL* (February 2011) online: Mcgill University <a href="http://www.mcgill.ca">http://www.mcgill.ca</a>.

<sup>&</sup>lt;sup>134</sup> For example while the USA and EU advocate for a Code of Conduct containing voluntary principles on space debris mitigation; Russia and China favor a binding Treaty on Prevention of Weapons in outer space without debris mitigation provisions.

tendencies of international law. It must be directed to the future not to a world that has been left behind."<sup>135</sup>

### 2.1.9. Lost in the Gaps: The Legal Case for Space Debris Control

A starting point in the legal analysis of space debris control is that there does not seem to be any mention or definitive prohibition of space debris in international law. In the absence of any definitive prohibition of space debris causation under any of the sources of international law there can be no attribution of international responsibility. Though there may be instances of attribution under the International Law Commission (ILC) Articles on International liability for Injurious Consequences arising from Acts not prohibited by International Law,<sup>136</sup> this does not extend to the commercial acts of private entities. By implication, in the body of international law there is no international responsibility for the creation of space debris by non-state actors. Remedies for damage caused by space debris can only be pursued under contractual arrangements governed by national laws or in tort based on negligent breach of a duty of due regard or diligent care.<sup>137</sup> Although based on common law concepts, the argument can be made that such a duty is already espoused under Article IX of the Outer Space Treaty (discussed below) albeit in relation to studies of outer space.

The origins of this duty of diligent care is traceable to the latin principle *sic utere tuo ut alienum non laedas* (good neighborliness) expressed as the "No Harm" principle in

<sup>&</sup>lt;sup>135</sup> Manfred Lachs, *The Law of Outer Space: An Experience in Contemporary Law Making*, (Leiden: Martinus Nijhoff, 2010) at 21.

<sup>&</sup>lt;sup>136</sup> Morgera, *supra* note 34 at 34-48. Detailed discussion on this will follow in the next chapter on Responsibility under International Law and International Space Law. The ILC Articles is available online: <<u>http://legal.un.org/ilc/guide/9.htm</u>>. Commentaries can be found in the *Yearbook of the International Law Commission, 2001*, vol. II, Part Two.

<sup>&</sup>lt;sup>137</sup> Hertzfeld, *supra* note 130.

the *Trail Smelter Arbitration* and followed by the (ICJ) subsequently in the *Corfu Channel* case.<sup>138</sup> This rule has over the years been endorsed in several United Nations (UN) instruments.<sup>139</sup> It has also been implicitly recognized by the ICJ in its Advisory Opinion in the *Legality of the Threat or Use of Nuclear Weapons* case as a rule of customary international law.<sup>140</sup>

Due regard or due diligence rule requires that every state is responsible for ensuring that its activities do not cause damage to the environment outside that State including areas beyond the jurisdiction of any state. This rule has also *prima facie* been extended to private entities. Considering that the "No Harm" principle should be self-standing and independent from government's own regulatory failures, John Ruggie defines corporate social responsibility as the "baseline expectation for all companies in all situations to do no harm."<sup>141</sup> Unfortunately, contrary to this principle, the reality seems to be that the most compelling component of space activity has been nationalism and capitalism not environmentalism.

<sup>&</sup>lt;sup>138</sup> Viikari, "The Environmental Element" supra note 52 at 150.

<sup>&</sup>lt;sup>139</sup> Declaration of the United Nations Conference on the Human Environment" (16 June 1972) UN Doc A/CONF.48/14/Rev.1 (referred to as Stockholm Declaration); Rio Declaration on Environment and Development (13 June 1992) UN Doc A/CONF.151/6/rev.1 (referred to as Rio Declaration); 'Agenda 21' (13 June 1992) UN Doc. A/CONF.151/6/rev.1, para.30.1.1 (referred to as Agenda 21); ECOSOC, "Follow-up to the United Nations Conference on Environment and Development as related to Transnational Corporations: Report of the Secretary General" (4 March 1993) UN Doc E/C.10/1993/7. Principle 21 of the 1972 Stockholm Declaration lays down the basic rules that States the sovereign right to exploit their own resources and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. This rule is also reiterated in Principle 2 of Rio Declaration. Morgera, *supra* note 34 at 43.

<sup>&</sup>lt;sup>140</sup>Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion) (1996) ICJ Rep 226

<sup>&</sup>lt;sup>141</sup> John Ruggie, Protect, Respect and Remedy: A Framework for Business and Human Rights — Report of the Special Representative of the Secretary-General on the Issue of Human Rights and Transnational Corporations and Other Business Enterprises, 8th sess, Agenda Item 3, UN Doc A/HRC/8/5 (7 April 2008) paras 51–81 ('Protect, Respect and Remedy'). Ruggie's corporate responsibility to respect ('RtR') deems 'no harm' principle to be a responsibility on corporations to take due diligence steps to prevent or remedy harm.

### 2.1.9.10 Article IX Outer Space Treaty

The 1967 OST described as the "*Magna Carta*" for space activities espouses several principles including the rights of states to the freedom of use and exploration of outer space guided by the principle of co-operation and mutual assistance.<sup>142</sup> Article IX of the treaty provides that State parties to the treaty are to conduct their space activities with due regard to the corresponding interests of all other state parties to the treaty. In the pursuit of studies of outer space, states are to refrain from causing harmful contamination to the outer space environment. As well they are not to introduce extraterrestrial matter to the earth that would have adverse effects. If a state has reason to believe that an activity or experiment planned by it or its nationals is likely to cause harmful interference with activities of other states, such state shall engage in prior appropriate international consultation.

Despite its lengthy provision, Art IX has been criticized as fraught with ambiguity. The wording provides no clarity on whether avoidance of harmful contamination and adverse effect is applicable only while conducting studies of outer space. No indication is given as to what constitutes "harmful contamination" or "adverse effect" to the earth environment and the debate is on about whether the harmful interference refers back to harmful contamination particularly as both interference and contamination occur in outer space.<sup>143</sup> Moreover, the jury is still out as to whether this provision can be applied to the problems caused by space debris. Can space debris fit the definition of "harmful

<sup>&</sup>lt;sup>142</sup> See Marchisio *supra* note 8 at 170.

<sup>&</sup>lt;sup>143</sup> The matter of space debris has been discussed for several years in many fora including the 11<sup>th</sup> Scientific-Legal Roundtable of the International Academy of Astronautics/International Institute of Space Law (IISL) under the theme 'Legal and Technical Implications of Space Stations' in 1987. In 1990, at its 13<sup>th</sup> session, following intensely debated issues on the various aspects of space debris, the Panel on 'Legal Aspects of the Control of Space Debris' was changed to 'Scientific/Legal Aspects of Management of Space Debris." See also Gorove, "Studies in Space Law" *supra* note 39 at 153.

contamination" under this treaty? Can it be described as "extraterrestrial matter" within this context?

Significant as these questions are, what could be considered as pertinent is that responsibility for conduct is deemed very necessary to prevent the devastating environmental outcome caused by space objects on the earth and in outer space. But the failure caused by such definitional deficit especially in connecting the provision to the major hazard jeopardizing the present and future use of outer space would seem to undermine the goal of that provision.

### 2.1.9.11 Article VI Outer Space Treaty

Under the treaty as well, the right to freedom of access and use of outer space is extended to non-state entities through the operation of Article VI of the Outer Space Treaty. However, private activities are subjected to the international responsibility of the "appropriate state" which has to authorize and continually supervise the 'national' activities of these entities.<sup>144</sup> No mechanism is suggested for such authorization and continuous supervision. Based on contemporary practice, states implement this provision through a national licensing regime administered by a government agency, but such regimes are conflicting and lack uniformity. Ideally, the rationale for authorization and supervision by "the appropriate state" should be to determine the sphere of influence as practiced under public international law, which is based on jurisdiction and legal control over the space object. But the treaty confers the right of jurisdiction and control on the State of registry and further undermines the clarity in the interconnectedness of the state of

<sup>&</sup>lt;sup>144</sup> Gerhard *supra* note 24 at 104.

registry and the launching state.<sup>145</sup> Pursuant to Art VIII, even where the space activity is being carried out by a non-state entity, the state of registry of the space object (which must also be a launching state) retains jurisdiction and control over such object.

The lack of clarity in the provisions opens the door to countless interpretations and scenarios especially in the context of Multi-national Corporations (MNCs). A relevant question that arises is how to determine the 'appropriate state' of a subsidiary of an MNC registered in multiple jurisdictions. For instance, Section 11 of the South Africa Space Affairs Act<sup>146</sup> (SASAA) contains the licensing regime and provides that a license is required for launching from South African territory or from a foreign territory or on behalf of a South African national or a person registered in South Africa. In the USA, a launch license is required for anybody including foreigners residing in the USA.<sup>147</sup> A license is also required for a launch by a US citizen if the entry (or re-entry) of the space object is taking place outside the US. In addition, a license is required for a USA citizen residing in a foreign territory where there is an agreement between the USA and the foreign government that the USA should have jurisdiction. Under US law, a citizen includes individuals; an entity organized or existing under US law or an entity organized under the

<sup>&</sup>lt;sup>145</sup> Article VIII provides that "a State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body". Bearing in mind that the "appropriate state" that authorizes and continually supervises may not always be "the launching state" (as defined by Art VII) which has jurisdiction and control over the space object, there is serious disconnection between the obligations and the obligors that could lead to unpleasant surprises for states and private actors in the event of mishaps. Adding insurance complexities to the cocktail of responsibilities, rather than resolve the issues could potentially cause an explosion with nobody to hold responsible upon the occurrence of an insured event.

<sup>&</sup>lt;sup>146</sup> South Africa Space Affairs Act (1993 as amended)

<sup>&</sup>lt;sup>147</sup> Brent M. Timberlake, "To boldly go where only a select few have gone before: exploring the Commercial Space Launch Act and the legal risks associated with reaching for the stars" *troutmansanders* (15 October 2009), online: Troutmansanders LLP <a href="http://www.troutmansanders.com">http://www.troutmansanders.com</a>. United States of America, 49 USC 70101 (a)-(b) (2006), 49 USC 70104 (2006); Commercial Space Launch Activities, CFR 14 III 400.

law of a foreign country if the controlling interest as defined by the Secretary of Transportation (SOT) is deemed to be held in the US.

Clearly, a lack of commonality in the practices of states regarding the appropriate nationality of a corporate entity could potentially cause duplication of licenses and conflict in compliance. The United States, for instance, would consider the majority ownership (subjectively interpreted by the SOT) as a determining factor for the appropriate jurisdiction. But South Africa prefers the place of incorporation. Some other states give preference to the place where the corporation's headquarters is located. Although the ICJ has settled this in favor of the place of incorporation,<sup>148</sup> international law has no clear rules on what is considered or deemed to meet the qualification of incorporation. It would seem though that national law is determinative of whether the condition for incorporation is met.<sup>149</sup> Presumptively, there will always be a responsible state in relations to space activity but there are no assurances that the elements of authorization/supervision and jurisdiction/control will always be coextensive. Where this is unclear, challenges definitely set in because clear obligation is a precursor for compliance and a definite requirement for determining breach.

The issue of liability adds yet another level of complexity to the discussion. Pursuant to the OST and the Liability Convention (LC) a state may be held liable for damage caused by a space object where it launches, procures its launch or where the launch takes place from its facility or within its territory.<sup>150</sup> For the purposes of Article VII,

<sup>&</sup>lt;sup>148</sup> Barcelona Traction Case (5 February 1970), ICJ Reports 3.

<sup>&</sup>lt;sup>149</sup> Bernhard Schmidt-Tedd & Michael Gerhard, "Registration of Space Objects: Which are the Advantages for States Resulting from Registration?" in Marietta Benko & Kai-Uwe Schrogl, eds, *Space Law: Current Problems and Perspectives for future regulation* (Netherlands: Eleven International Publishing, 2005)121 at 128.

<sup>&</sup>lt;sup>150</sup> Article VII of the OST and Article 1(c) of the Liability Convention.

a state of registry must also be a launching state. From Cheng's analysis, the operation of these provisions, seem to negate any practical or legal debris preventative measures within the space treaties.<sup>151</sup> It is possible to have *de facto* launching state and another state that has *de jure* jurisdiction and control but is not the launching state. For instance, for the SES satellites Netherlands had purchased in-orbit from France that were not registered, while Netherlands has consistently maintained that it is the 'appropriate state' for the SES satellites, it also maintains that it is not the launching state. Although France could be said to be the *de facto* launching state, it is not the state of registry because it did not register the satellites.

A practical problem that often materializes with reference to satellite operations concerns who bears the responsibility to remove space objects at the end-of-life or in the event of in-orbit failure. In a majority of cases satellites are insured by respective insurance companies and upon occurrence of the insured event, the insurer reserves the salvage right to the satellite. In most cases this right is exercised contractually whereby the insurer deducts an amount from the insurance claim equivalent to the salvage value. Such practice, calls to question the entity vested with the "right" to remove the satellite from the orbit. Although, this has not been addressed within the insurance community, fears exist that in the long term the number of abandoned satellites in the Geo-orbit will impede insurance and lead to prohibitive premium rates.

In summary, outer space is a global commons shared by all nations. Proliferation of space debris in the commons is a global problem deserving a global solution. An approach

<sup>&</sup>lt;sup>151</sup> Bin Cheng, "Space objects and their various connecting factors" in *Outlook on Space Law Over the Next 30 Years*, Gabriel Lafferranderie & Daphne Crowther eds (Netherlands: Kluwer Law International, 1997) at 203-215.

towards a solution is to view the legal obligations of all the space actors as a commitment to do no harm to all mankind. The momentum on prevention of space debris is building albeit on a voluntary basis. For example, the Inter-Agency Debris Mitigation Guidelines (IADC) adopted by the UN Committee on Peaceful Uses (UN COPUOS) is being implemented voluntarily by some states. But the fact that guidelines are declaratory and non-binding makes it a piecemeal approach and allows for cherry picking. Additionally, the selective implementation of the guidelines could lead to forum shopping for competitive advantage by commercial operators. In the long run, states that are currently implementing the guidelines may be forced to abandon it especially where the space activities of the non-complying actors would continue to pose the same environmental risks to all space actors. Divesting states of the vicarious responsibility for non-state actors in line with general international law and acknowledging non-state actors as legitimate stakeholders in space debris related issues would, in my view, be a positive step towards achieving consensus on a binding regulatory debris prevention regime.

# **Chapter Three**

### 3.1. Space Debris in International Environmental Law

### **3.1.1. Introduction**

In the previous chapter, I examined the emergence and historical evolution of space debris as a major environmental concern in the exploration and use of outer space. I looked at the importance of ameliorating the more harmful consequences of space debris proliferation from a commercial and legal perspective. I discussed in some detail the inadequacies of the current international law regime in regulating activities carried out in outer space especially from the point of view of non-state actors. In this chapter I expand further on the environmental element of the space debris phenomenon. I will look critically at the development of international environmental law and how the application of its principles could inform a better regime for the regulation of outer space. This inquiry responds to the first two core questions raised in this research.

The development of modern international environmental laws and principles built on the goals of environmental preservation, conservation or protection traced to the political and legal developments of the 19<sup>th</sup> century. At the beginning of this era, there were few bilateral or multilateral environmental agreements (MEAS) among the industrialized western nations. These agreements, bordering on international environmental issues and problems were largely influenced by diverse inputs. Behind those inputs though was often the undeclared goal of preserving the economic interests and agendas of the West.<sup>152</sup> That these agreements were concluded at all was in recognition of the dangers to human existence if industrialization were to be conducted in such a manner as not to account for its environmental costs.

As humanity progressed further, these environmental costs became heavier and demanded the urgency of more structured action. Therefore, since the turn of the 20<sup>th</sup> century or so, international environmental law has evolved through four remarkable periods, all marked by changes in political consciousness and the international legal order.<sup>153</sup> Gradually, it began to dawn on the Western industrialized nations that the

<sup>&</sup>lt;sup>152</sup> Bosselmann, Klaus, *A Rocky Path Towards Sustainability: The Environmental Jurisprudence of International Courts*, (New Zealand Centre for Environmental Law, 2006) at 4.

<sup>&</sup>lt;sup>153</sup> Phillipe Sands & Jacqueline Peel *supra* note 15 at 22.

consequences of the industrialization age spelt doom for the continued existence of humanity if its environmental reverberations went unchecked.

There was no gainsaying the fact that an appropriate mechanism to check the effects of rapid industrialization that was being felt globally was a system of governance endorsed by the global community. The most appropriate platform was the United Nations created in 1945 as an international institution of global governance. Though not created for the sole purpose of regulating the environment, it has garnered an expanded mandate that now includes such issues. In June 1972 the first UN Conference on the Human Environment was held in Stockholm. A major achievement of the Conference was the development of multilateral environmental agreements (MEAs) and policies concentrated in environmental protection and conservation of natural resources. This trend spread to such areas as the preservation and protection of the marine environment, its living resources as well as flora and fauna.<sup>154</sup> Ever since, these concerns have become entrenched agenda items in international environmental and political discourses to the present day.

With the global community converged on the platform of the United Nations, it was hoped that a system for effectively responding to such increasingly urgent environmental issues as deforestation, oil pollution, nuclear testing, dumping of hazardous waste and more recently "space junk" was in place. Several regional and global conventions have been held to integrate environmental concerns into all spheres of UN activities. This culminated in the UN Conference on Environment and Development (UNCED) held in Rio Janeiro in June 1992. The Conference adopted three non-binding instruments; of which the two relevant here are the Rio Declaration on Environment and

<sup>&</sup>lt;sup>154</sup> *Ibid* at 29.

Development (the Rio Declaration) and Agenda 21.<sup>155</sup> Part of the principles espoused by UNCED was the idea that environmental concerns must be integrated into economic and development activities in order to influence the behavior of those engaged in these activities. This was expanded in the Rio Declaration to oblige states to ensure that in their developmental polices they do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction. But as the body of jurisprudence on environmental law reveal, states have been generally slow to embrace the limitations imposed by the treaties and conventions in a proactive fashion. Instead they adopt a reactive approach often triggered by disasters with catastrophic implications.<sup>156</sup>

## 3.1.2. Sustainable Development: The "Precautionary" and "Polluter Pays" Principles in Context

Following my earlier brief reference to the PPP, I will in this section elaborate further on it and especially how it came to influence the development of international environmental law principles. I will also look at the corollary "precautionary principle." These are all important considerations for a good number of reasons not the least of which is to insert these twin principles in the debate over space debris prevention and removal. This, will to some extent measure the suitability of these principles to the challenge posed, their effectiveness or lack thereof and what needs to be done going forward in this regard.

<sup>&</sup>lt;sup>155</sup> Two treaties including the UN Framework Convention on Climate Change were also opened for signature at the UNCED conference.

<sup>&</sup>lt;sup>156</sup> An example is the Titanic disaster that claimed hundreds of lives because the UK had refused to allow the sharing of its *Marconi* emergency communications systems. Lessons learned from the tragedy resulted in adoption of the International Convention for the Safety of Life at Sea. See Tony Hoffman, "How the Titanic Disaster Forever Changed Telecommunications" *pcmag* (11 April 2012), online: pcmag <<u>http://www.pcmag.com</u>>.

Initial environmental law principles were borne out of economics and politics agenda of certain states (and corporations in some cases) as they pushed forward their political and economic goals rather than environmental protection exigencies. However, in 1949, the ICJ decision in the *Trail Smelter case* popularly cited for the reformative reasoning contained therein caused a change in the thinking. The case arose out of the US-Canada dispute over the emissions from a smelter plant in Canada that caused damage across the Canadian border in a neighboring US community.<sup>157</sup> In espousing what is known today as the "good neighborliness principle" the Tribunal stated that:

"Under international law, no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another state when the case is of serious consequence and the injury is established by clear and convincing evidence."<sup>158</sup>

The principle has formed the basis of several treaties on environmental protection. It is applied in many cases and in varying scenarios of trans-boundary environmental pollution.<sup>159</sup> It has also been reaffirmed by the ICJ, in the *Lake Lanoux Arbitration* where the Court stated that it is every state's obligation not to knowingly allow its territory to be used for acts contrary to the rights of other states.<sup>160</sup> By this statement, the ICJ settled the question of priority between the environment and development. Not only did it force the states to recognize the limitations on their rights to treat their natural resources as they wished it also recognized the interconnectedness of many environmental problems. The judgment could also be seen as a major challenge to the concept of state sovereignty.<sup>161</sup>

<sup>&</sup>lt;sup>157</sup> Trail Smelter Arbitration, United States v Canada (1939) 35 Am J Int'l L 684.

<sup>&</sup>lt;sup>158</sup> Sands & Peel, *supra* note 15 at 26.

<sup>&</sup>lt;sup>159</sup> See Viikari, "The Environmental Element" supra note 52 at 151.

<sup>&</sup>lt;sup>160</sup> Spain v France, 24 ILR 101 (Arb Trib 1957), (1949) ICJ Reports 4.

<sup>&</sup>lt;sup>161</sup> *Ibid*.

At the heart of the good *neighbourliness* principle is the duty of due regard. Put simply, the due regard duty or due diligence duty does not make the state responsible for all harm. Rather, the expectation is that of "[a] good government acting in consideration of its international responsibilities not to cause (or to prevent) damage."<sup>162</sup> However, this does not make a state an absolute guarantor of harm,<sup>163</sup> rather the state is to ensure that it takes necessary steps to avoid or prevent the occurrence of harm. One such step is that contained in the Precautionary Principle to the effect that "action to protect the environment from harm should not be delayed or prevented by lack of full scientific certainty on questions of cause and effect or extent of potential harm."<sup>164</sup>

Beginning in the early 1950s, the duty of due regard as an obligation of conduct was also extended to non-state actors in the prevention of damage to the marine environment. The repertoire of international maritime regulation reveal that this was sparked by several oil pollution disasters that made it necessary to engage the responsibility of vessel owners and operators for the environmental consequences of their activities. Regulation and compulsory insurance for oil pollution liability were seen to be effective tools to prevent the occurrence of oil spills. Thus in 1954, the first global convention for the prevention of oil pollution was adopted under the auspices of the International Maritime Organization (IMO) closely followed by a regime of civil liability for oil pollution damage that broadened the definition of damage. Thus, the institutionalization of liability of private actors effectively incorporated the PPP into the field of environmental liability. To meet damage claims from large-scale oil disasters, the

<sup>&</sup>lt;sup>162</sup> Viikari, "The Environmental Element" supra note 52 at 155.

<sup>&</sup>lt;sup>163</sup> *Ibid*.

<sup>&</sup>lt;sup>164</sup> Mark Stallworthy, Understanding Environmental Law (London: Sweet and Maxwell, 2008) at 155.

1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (IOPC Fund Convention), as amended by 1992 Protocols was adopted. Implemented by IMO, till 2002, the IOPC Fund was utilized to compensate for oil pollution damage where either the responsible ship-owner is exempt from liability or where the damage exceeded the ship-owner's insured liability limit.

Innovation and progress achieved in the civil liability regime can be valuable in the progressive development of a regulatory regime to achieve sustainable exploration and use of outer space. This is particularly true with respect to two principles: the polluter-pays-principle and the precautionary principle discussed above which are anchored in the discourse on sustainable development. A third Principle equally gaining significance is the Common but Differentiated Responsibility, particularly important in the interest of developing countries. The next chapter will highlight each of these principles, how they stand individually in relation to the environment as well as how they relate to each other within the same context.

### 3.1.3. Understanding Sustainable Development

The idea of Sustainable Development (SD) was introduced in the "Brundtland Report" as being in the global interest of present and future generations. SD is a concept that has been embraced widely in the environmental discourse. Generally, SD is defined as "development that ensures the needs of the present without compromising the ability of future generations to meet their own needs."<sup>165</sup> Principle 1 of Stockholm Declaration expresses this concept in terms of the fundamental rights of mankind to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity

<sup>&</sup>lt;sup>165</sup> *Ibid* at 9.

and wellbeing. With the assurances of these fundamental rights, mankind has the concomitant responsibilities to protect and improve the environment for present and future generations. SD is the 'earth' principle around which the other principles orbit.

### 3.1.4. Minding the Gap: The Precautionary Principle

At the general level of environmental sustainability, this principle builds upon Article 1 of the 1992 UN Framework Climate Change Convention (UNFCC) and as well the Kyoto Protocol of 1997. It sets the agenda for reduction of greenhouse gas emissions (GHG) through a growing acceptance of human precaution. It is also based on a specific obligation of conduct by the present generation to take precautionary measures to anticipate, prevent or minimize the causes of climate change to mitigate its adverse effects. To this end, Principle 15 of Rio Declaration states that, "where there are threats of serious or irretrievable damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

Notwithstanding the above, the precautionary principle has been criticized as weak, nebulous and inappropriate for requiring particular outcomes.<sup>166</sup> But subject to economic cost constraints, the principle is better viewed as an obligation of conduct rather than as an obligation of outcome.<sup>167</sup> Despite the criticisms, the precautionary principle still underlies numerous treaties.<sup>168</sup> Birnie and Boyle agree that jurisprudence from national and international courts support its use.<sup>169</sup> This is a clear indication of a growing consensus and

<sup>&</sup>lt;sup>166</sup> R. Dworkin, *Taking Rights seriously*, (London: Duckworth, 1977) cited in Stallworthy *supra* note 164 at 155.

<sup>&</sup>lt;sup>167</sup> Clearly the principle is geared towards preventative measures which should not bear heavily on poor countries as much as the cost of consequence of the outcome where such preventative action is not taken. <sup>168</sup> See Article 3 of the 1992 UNFCC.

<sup>&</sup>lt;sup>169</sup> PW Birnie & AE Boyle, *International Law and the Environment* (Oxford: Oxford University Press, 1994). See the discussion in Sands & Peel *supra* note 15 at 217-228.

acceptance that a lack of scientific proof of the certainty of harm would be insufficient to justify a state's inaction or failure to perform its environmental protection obligations.

While some authors and commentators have gone so far as to ascribe the principle the status of a peremptory international norm, which cannot be derogated, I hesitate to enter that debate.<sup>170</sup> That there are yet no precedents to attest to the peremptory effect and implications of any derogation from the principle does not undermine its acceptance. Rather, the lack of precedent could be viewed as acquiescence by states.<sup>171</sup>

What is often contended in most cases is the nature of the risk and the preventative obligation. For instance in *Pfizer Animal Health SA v Council of the EU*,<sup>172</sup> the European Court of Justice decided that a zero risk approach or mere conjecture was not acceptable without scientific verification to conclude that there exists a risk to human health. However, the court accepted that the decision-maker could take qualitative factors and judicial opinion into account in according priority to public health over economic interests.<sup>173</sup>

<sup>&</sup>lt;sup>170</sup> See generally a discussion of the legal status of the Precautionary Principle and case law in Arie Trouwborst, *Evolution and Status of the Precautionary Principle in International Law*, (Netherlands: Kluwer Law International, 2002). See also Joakim Zander, *The Application of the Precautionary Principle in Practise: Comparative Dimensions*, (Cambridge: Cambridge University Press, 2010), *Tatar v Romania*, Judgement of 27 January 2009, para. 120. But in the *Beef Hormones* case the US disagreed with the EC argument before the Appellate Body of the WTO that the Precautionary Principle had acquired the status of general customary law and preferred to view it as an approach which content would vary depending on the circumstances. Although Canada was willing to accord it the status of an emerging principle of international law, the Panel declined to pronounce on the status of the Precautionary Principle was still 'unsettled'. However, Sands & Peel believe there is sufficient evidence to conclude the Precautionary Principle is a principle of customary international law and support their contention with the EU practice and several instruments that have codified the principle including Rio Declaration and the ITLOS Seabed Disputes Chambers decisions. Sands & Peel, *supra* note 15 at 227.

<sup>&</sup>lt;sup>171</sup> Alpharma v Council (Case T70/99) [2002] ECR II-3495.

<sup>&</sup>lt;sup>172</sup> [2002] ECR I-3305

<sup>&</sup>lt;sup>173</sup> But see *R. v Secretary of State for Trade & Industry, Ex parte Duddridge* (1995) 7 JEL 224, Smith L.J where the issue the issue was the alleged carcinogenic risks of high voltage power cables to children and the UK court ruled that Community Law did not impose an immediate obligation upon member states to apply the precautionary principle in legislation concerning the environment or human health.

Although the precautionary principle derives from general environmental considerations, there are doubts whether it could be extended to environmentally harmful practices in outer space. My proposal is that it could be extended to outer space especially where the underlying rationale is to obtain the commitment of space actors to take preventive measures based on minimum standards established in a binding regulatory framework. When transposed to space activities, the principle should require only precautionary or preventative measures as the basis to establish compliance with a duty of due regard. In this sense, the principle bears directly on the responsibility of space actors and differs from the Polluter Pays Principle (PPP), which on its face value is punitive and compensatory.

### 3.1.5. Matching Offense and the Offender: When the Polluter Pays

Originally conceived as a purely economic idea, the PPP has evolved from an ordinary market economic policy designed to internalize the cost of pollution in product pricing to a potential mechanism for pollution abatement and control.<sup>174</sup> Simply put, "the costs of pollution should be borne by the **person** responsible for causing the pollution."<sup>175</sup> By imposing the cost of pollution abatement on polluters, rather than on their governments, the PPP passes on the real costs in terms of social and economic inconvenience to the consumer as a true cost. In economic terms pollution implies improper cost allocation but in environmental language it means much more than that. To capture the grave significance

<sup>&</sup>lt;sup>174</sup> Gregory Wetstone &Armin Rosencranz, "Transboundary Air Pollution: The Search For An International Response, (1984) 8 Harv Envtl L Rev 89 at 96. The authors of this article point out that the principle of having the polluters, instead of their governments pay the abatement costs had been widely accepted, and in 1972 was officially endorsed by the Organization of Economic Cooperation and Development (OECD). This Organization officially recognized it as the Polluter-Pays Principle. See infra sec. II. Since then, the European Economic Community (EEC) and individual European nations have also officially adopted this principle.

<sup>&</sup>lt;sup>175</sup> (Emphasis added). See Sands & Peel, *supra* note 15 at 228.

of pollution, a 19<sup>th</sup> century North American native Cree made this statement: "Only when the last tree has died, and the last river has been poisoned, and the last fish has been caught, will we realize that we cannot eat money."<sup>176</sup>

On the other hand, the PPP has garnered significant criticism as "recognition of a right to pollute."<sup>177</sup> It was first cautiously adopted in a non-binding formulation by the Organization for Economic Cooperation and Development (OECD) Council in the 1972 Recommendation on Guiding Principles Concerning International Economic Aspects of Environmental Policies (Guiding Principles). In adopting the PPP in 1972 as the recommended method for allocating costs of pollution, the OECD explained it as follows:

The principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment is the so-called 'Polluter-Pays-Principle. Such measures should not be accompanied by subsidies that would create significant distortions in international trade and investment.<sup>178</sup>

Put simply, the principle requires that the polluter should bear the costs of carrying out any pollution control measures specified by national authorities to ensure that the environment is in an acceptable state. As a further requirement, the cost of these measures are to be reflected in the cost of goods and services which cause pollution in their production and/or consumption.

Although the Guiding Principles left the states with the flexibility to interpret the content and means of implementation at the national level, by its statement, the OECD

<sup>&</sup>lt;sup>176</sup> Quoted in James Cameron & Juli Abouchar, "The Status of the Precautionary Principle in International Law" in Freestone D and E Heys, *The Precautionary Principle and International Law: The Challenge of Implementation* (Hague: Kluwer Law International, 1996) at 29.

<sup>&</sup>lt;sup>177</sup> C London, 'Le protocol de Kyoto: Innovations sur le Plan du Droit International en General et du Droit International de Li'Environnement en Particulier' (15 October 2001) *Les petities affiches*, 4ff.

<sup>&</sup>lt;sup>178</sup> OECD Council Recommendation C(72) 128 (1972), 14 ILM 236 (1975) annex, para. A.4. The Council specifically recommended that members should not assist polluters in bearing the costs of pollution through subsidies or other tax relief advantages.

acknowledged that the levels of environmental policies and standards differ among states and that there is need for harmonization to enhance consistency in the application of the principle. It therefore enjoined state members "to strive toward greater harmonization in environmental policies and regulation to avoid the unjustified disruption of international trade patterns and of the international allocation of resources that may arise from diversity of national environmental standards."<sup>179</sup>

A notable feature of the 1972 OECD recommendation is the prohibition of any governmental instruments of subsidies, tax advantages or other measures that would cause market distortion and inhibit competition. But because the Guiding Principles did not specify how these costs were to be implemented; whether through regulation, taxes or permits, the method was dependent on the policies of the particular government imposing the restrictions. What was clear though was that the goals of the principle could be realized by prohibition, standards setting and levies for pollution which meant that the PPP became not only a method for allocating costs to control pollution but was also a precautionary measure to discourage potential polluters.<sup>180</sup>

Subsequent OECD Council Recommendations in 1989 listed instruments for implementation included under these guidelines as emission charges or taxes, marketable permits, deposit-refund systems, and some forms of financial assistance consistent with the PPP. Pollution prevention and control costs could also costs of insurance for accidental environmental harm, expenses incurred in clean-up operations to minimize the ecological

<sup>&</sup>lt;sup>179</sup> OECD Council Recommendation C(72) 128 (1972), para. b(7).

<sup>&</sup>lt;sup>180</sup> OECD 1972 and 1974 Recommendations were extended by 1989 OECD Council Recommendations on the Application of the PPP to Accidental Pollution to require operators of hazardous installation to bear the cost of reasonable measures to prevent and control accidental pollution. C(89)88 (Final), 28 ILM 1320 (1989); Appendix Guiding Principles Relating to Accidental Pollution, para.4.

effects of such pollution, costs resulting from the imposition of an injunction to eliminate any further release of harmful substances and the cost of establishing a special pollution fund. Recognizing the need to internalize such pollution control costs, in 1991 the OECD Council, adopted guidelines on the use of economic instruments "to introduce more flexibility, efficiency and cost-effectiveness in the design and enforcement of pollution control measures in particular through a consistent application of the PPP."<sup>181</sup>

Following the OECD example, the wider international community came to recognize that pollution involves a social and financial cost which must be addressed in rules governing civil and state liability for pollution prevention and control. Formally codified as Principle 16 of the Rio Declaration, the PPP enjoins state authorities to promote the internalization of environmental costs using economic instruments to ensure that the polluter bears the cost of his pollution activities without causing distortions in the marketplace. At the international level and within the context of combating global environmental issues, the principle is highly invoked as a guiding principle to encourage environmentally friendly investments and measures. For example, the Convention on the Protection of the Alps (Alps Convention) enjoins state parties to "pursue a comprehensive policy for the preservation and protection of the Alps by applying various principles including the PPP.<sup>182</sup> A more comprehensive obligation is contained in the Convention for the Protection of the Marine Environment of the North-East Atlantic, which requires states to apply the precautionary principle and the PPP as the basis for imposing costs of

 <sup>&</sup>lt;sup>181</sup> Regis Chemain, "The "Polluter Pays Principle" in James Crawford, Allain Pellet & Simon Olleson, eds *The Law of State Responsibility*, (New York: Oxford University Press, 2010) 877 at 880.
<sup>182</sup> *Ihid*
pollution prevention, control and reduction measures on the polluter.<sup>183</sup> In addition, the 1990 Oil Pollution Preparedness Convention and the 1992 Industrial Accidents Convention espouse the PPP as 'general principle of international environmental law' while the 1992 UNECE Transboundary Waters Convention, the 1992 OSPAR convention, 1992 Baltic Sea Convention, 1994 Energy Charter Treaty have all adopted the PPP.

At the Community level, as far back as 1974, the European Economic Council recommended the application of the PPP to the Council stating that:

"In order to take into account the aims of balanced economic growth and to further the efforts to attain the objectives prescribed in the program of action of the European Communities on the environment, the costs associated with environmental protection against pollution must be allocated according to uniform principles throughout the Community so as to avoid distortions in trade and competition which are incompatible with the harmonious functioning of the common market."<sup>184</sup>

The European Commission Recommendation for the European Union and its member states further ensures that, "natural or legal persons governed by public or private law who are responsible for pollution must pay the costs of such measures as are necessary to eliminate that pollution or reduce it so as to comply with the standards or equivalent measures laid down by the public authorities.<sup>185</sup> But it was not until 1987 that the PPP was incorporated into the Single European Act (SEA), which amended the Treaty of Rome. Article 130(r)(2) of the Act specifically states that: "Preventive action should be taken that environmental damage should as a priority be rectified at source, and ...the polluter should

<sup>&</sup>lt;sup>183</sup> Similarly, Article 2(5)(b) of the Convention of the Protection and Use of Transboundary Watercourses and International Lakes restates the PPP as the guiding principle for imposing environmental protection costs on the polluter.

<sup>&</sup>lt;sup>184</sup> Council Recommendation 75/436/EURATOM, ECSC, EEC of 3 March 1975, Annex, para.2; OJ L169, 29 June 1987.

<sup>&</sup>lt;sup>185</sup> Council Recommendation 75/436/EURATOM, ECSC EEC of 3 March 1975, Annex, para.2; OJ L169, 29 June 1987.

pay.<sup>186</sup> On the basis of SEA, environmental protection and the PPP are part and parcel of European Union (EU) policies.<sup>187</sup> Moreover, EU member states have also accepted the PPP and implemented it within their domestic environmental policies. For example, the United Kingdom adopted the 1990 Environment Protection Act (EPA), which makes it obligatory for corporations to pay for the environmental consequences of their activities.<sup>188</sup> France has also implemented stricter application of the PPP industry wide to clean up pollution.<sup>189</sup> In the United States as well, various federal environmental laws containing mandatory compliance standards, coupled with enforcement and penalty provisions, have been passed to encourage the polluting enterprise to internalize the cost of pollution as part of its production process.<sup>190</sup>

### 3.1.6. What "Private" Environmental Controls?

While the previous section looked at state-driven action, at the industry level, the PPP is also often invoked as a rationale for various regulatory measures to internalize pollution costs in production processes. The aim of such measures ostensibly is to encourage

<sup>&</sup>lt;sup>186</sup> Single European Act 1986. It is notable that the PPP also serves as the basis of Envionmental Liability Diorective which is based on the Precautionary Principle. Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage.

<sup>&</sup>lt;sup>187</sup> European Communities Council Recommendations on the Application of the Polluter-Pays Principle, November 7, 1974, reprinted in 14 T.L.M. 138. This has given the EEC the opportunity to develop environmental directives calling for a uniform application of the PPP. In fact the Environmental Policy for EU States instituted by Article 174 (2) of the Treaty Establishing the European Community is founded on the PPP. See also Joseph O Downey, "Comment, International Pollution: The Struggle Between States and Scholars Over Customary Environmental Norms: The Hazy View After Chernobyl and Basel" (1987) 12 S III U L J 247 at 263.

 <sup>&</sup>lt;sup>188</sup> United Kingdom Environment Protection Act 1990 Chapter 43 (1 November 1990).
 <sup>189</sup> *Ibid.*

<sup>&</sup>lt;sup>190</sup> Viikari, "*The Environmental Element*" supra note 52. In North America, the Province of Quebec in Canada has amended its Environmental Quality Act to implement the PPP. Quebec Bill 42 of 2009, An Act to amend the Environment Quality Act and other legislative provisions in relation to climate change (the Act) puts in place a provincial greenhouse gas (GHG) cap-and-trade system.

innovation and investment in sustainable methods of production.<sup>191</sup> Though the principle applies across major industry sectors including the oil and gas, nuclear and the aviation industries; I will illustrate its practical relevance by a cursory look at how it is implemented within the aviation industry.

It is evident that the combustion of fossil fuels used in propelling aircraft releases greenhouses gases into the atmosphere. Although pollution from aircraft emissions is estimated to be below 5% of global emissions, the impact is considered a significant contribution to global warming because of the high altitude in which it is released.<sup>192</sup> According to Dempsey, the most serious environmental problems of commercial aviation consist of noise and emissions and the challenge was on how to balance these problems against the commercial economic activity that is a major *raison d'etre* of the industry.<sup>193</sup> Solutions canvassed to arrest pollution by the aviation industry involved improved operating and financial regulatory measures through the imposition of emission taxation and other trading schemes that were based on the PPP.

As one adaptation of the PPP, the Emissions Trading Scheme (ETS) is used in the promotion and achievement of environmental protection goals. Also a market-based policy tool, the ETS creates economic incentives for firms to implement cost-effective measures to meet environmental targets.<sup>194</sup> It adopts a conventional command and control approach by allowing firms that have low-cost emission reduction options to sell surplus emission instruments to firms with high-cost emission options in order to comply with regulatory

<sup>&</sup>lt;sup>191</sup> Quebec Bill 42 has been stated to also present business opportunities for clean technologies. http://www.mondaq.com/canada/x/85926/Qubec+CapAndTrade+System

<sup>&</sup>lt;sup>192</sup> Andrzej Jeziorski, "Exhausting issues" Flight International (June 7, 1995).

<sup>&</sup>lt;sup>193</sup> Paul Dempsey, *Public International Air Law* (Montreal: McGill University Institute and Center for Research in Air & Space Law, 2008) at 416. See also Stanton Eigenbrodt, "Out to Launch: Private Remedies for Outer Space Claims" (1989) 55 J Air L & Com 185.

<sup>&</sup>lt;sup>194</sup> Online: <a href="http://www.icao.int/environmental-protection/Documents/Measures/vets\_report1.pdf">http://www.icao.int/environmental-protection/Documents/Measures/vets\_report1.pdf</a>>.

requirements. Generally, the scheme helps to achieve environmental protection at a reduced cost, provided that the overall mitigation cost savings across all participants is larger than the costs of administering the scheme.

As part of the scheme, the money paid in purchasing allowances is used to implement CO2 control measures and to finance development projects on emissions reduction, avoidance and removal. Borne out of the United Nations Framework Convention on Climate Change (UNFCCC) aimed at achieving the stabilization of greenhouse gas (GHG) concentrations in the global atmosphere, the scheme was adopted at the Rio Earth Summit in 1992. Pursuant to the UNFCCC (supplemented by the Kyoto Protocol of December 1997), industrialized countries in Annex I commit to adopt national policies and implement measures to mitigate GHG emissions that contribute to climate change by at least 5% below their 1990 emission levels in the period between 2008 and 2012. However, because participation is voluntary it has been implemented in only a few countries. In addition, Article 2.2 of the Kyoto Protocol provides that measures for reducing GHG emissions from aviation and marine bunker fuels should be pursued through the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) respectively.

Unsatisfied with the lack of progress within ICAO in developing an international scheme for aviation, the EU to the chagrin of airline operators and ICAO member states embarked on a unilateral ETS which subjects international airlines flying to, from and through the EU to a mandatory ETS implemented by the EU. Although, the unilateral approach by the EU is under fire from several quarters, the obvious point is that a non-

binding approach in mitigating environmental consequences of economic activities is not the most viable solution.

Taken together the goal of environmentally sustainable development practices when coupled with the "precautionary" and "polluter pays" principles indicate a substantial concern for retaining some environmental quality for succeeding generations of mankind. These general principles as I have analyzed them up to this point apply mostly to the general area of environmental law and policy within space. Could they be extended to regulation of activities in outer space? Are the principles suitable for the imposition of such regulations? Speaking specifically, how appropriate would they be for the regulation of space debris generation? These are some of the questions that engage my attention in the next section.

### 3.1.7. Space Debris In the Mix: The lex specialis conundrum

Although it is not possible to formulate protection rules that apply similarly to the earth and space environments, it is also not prudent to ignore the gap in the protection of the two frontiers especially when their interconnectedness cannot be denied. While there seems to be considerable concern for the earth environment evidenced by the convergence of a range of private and public international agreements and efforts, there seems to be less enthusiasm in confronting similar concerns as they affect the space environment. It is unclear why this is so. But one could speculate that individual state interests seem to be trumping the need to create a safe outer space. Five international agreements primarily regulate outer space activities. These are: (1) the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (1967 Outer Space Treaty); (2) the Convention on International Liability for Damage Caused by Space Objects (Liability Convention); (3) the Convention on Registration of Objects Launched into Outer Space (Registration Convention); and (4) the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty)<sup>195</sup> and the Return and Rescue of Astronauts Agreement.

The Outer Space Treaty (OST) provides a general framework for conducting activities in outer space and speaks of the required mutual relationship among spacefaring nations in preserving space as the common heritage of mankind.<sup>196</sup> There is ongoing debate on whether the treaty covers past activities or only concerns activities that occurred subsequent to its promulgation. Some have argued that legal liability exists for activities that occurred previous to the treaty.<sup>197</sup> Similarly disputed would be the view that since the Treaty does not specifically exclude non-functioning space objects from its provisions this could be viewed as including orbital debris within its purview.<sup>198</sup>

The Liability and Registration Conventions reflect the most serious attempts at regulating the space environment. However, they appear to be generally ambiguous, limited in scope and conflicting.<sup>199</sup> The combined operation of the Conventions is to confer the benefit of jurisdiction and control over a space object to the launching state in

<sup>&</sup>lt;sup>195</sup> Delbert D Smith, *The Technical, Legal, and Business Risks of Orbital Debris*, 6 NYU Env L J 50 at 54, citing Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 UNTS 205 [hereinafter Outer Space Treaty]; Convention on International Liability for Damage Caused by Space Objects, opened for signature Mar. 29, 1972, 24 U.S.T 2389 (entered into force Oct. 9, 1973) [hereinafter Liability Convention]; Convention on Registration of Objects Launched Into Outer Space, opened for signature Jan. 14, 1975, 28 UST 695 (entered into force Sept. 15, 1976) [hereinafter Registration Convention]; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, opened for signature Dec. 5, 1979, G.A. Res. 68, UN GAOR, 34th Sess., Supp. No. 46, at 77, U.N. Doc. 1/68 (1979), 18 I.L.M. 1434 (entered into force July 11, 1984).

<sup>&</sup>lt;sup>196</sup> Smith *supra* note 195 at 55.

<sup>&</sup>lt;sup>197</sup> *Ibid* at 55-56 contending that the Outer Space Treaty only covers planned potentially harmful space activities and not the harmful activities, which have already occurred. <sup>198</sup> Ibid at 55-56.

<sup>&</sup>lt;sup>199</sup> Bin Cheng, "Space Objects and their Various Connecting Factors" *supra* note 151 at 208.

exchange for which liability is imposed for any damage caused by the space object in the circumstances set out in the Liability convention.

Although the view exists that the provisions have become customary international law, this cannot be said for all the provisions. Moreover, state practice cannot be held to be the basis for such presumption because not all the state parties to the 1967 OST are parties to the Registration Convention and there is a complete dearth of precedence to be relied on. In effect, their reach and effectiveness is grossly limited.<sup>200</sup> Unless a state ratifies such an agreement, it cannot be bound by its provisions and would exonerate from responsibility countries that use outer space but are not parties to the OST and the Liability Convention.

Article III of the Liability Convention holds a State liable for damage caused by its space objects to another State, if the first State happens to be at fault.<sup>201</sup> But since the Convention does not contain a specific exclusion clause, it could be presumed that the Launching State's liability continues whether or not the space object is functional.<sup>202</sup> The Convention makes a distinction between the liability of the launching State in cases where its space object causes damage on the earth's surface or to an aircraft in flight, and cases in which such an object causes damage to objects in outer space.<sup>203</sup> In the event of the former, the launching state would be held absolutely liable. If the latter is the case, the launching state would be liable only if it is at fault.<sup>204</sup>

<sup>&</sup>lt;sup>200</sup> Delbert D. Smith *supra* note 195 at 57-58, stating customary international law results from a general practice followed by states due to a sense of obligation. Consensus is required; in international law there is no majority rule with respect to the formation of customary law.

<sup>&</sup>lt;sup>201</sup> Ibid at 58.

<sup>&</sup>lt;sup>202</sup> Ibid. Citing Delbert D. Smith, Address at the 1994 DYP London Space Insurance Conference, reprinted in Space Risk Debris and Outer Space Environment, DYP Space Insurance Report 215, 216 (1994).
<sup>203</sup> See Liebility Convention Arts. II, W.

<sup>&</sup>lt;sup>203</sup> See Liability Convention Arts. II-IV.
<sup>204</sup> *Ibid*. Delbert D. Smith *supra* note 195 at 58.

The Registration Convention provides two systems of registration; in a national registry and with the United Nations.<sup>205</sup> Although the issue of liability is not specifically covered by the Registration Convention, the convention assists nonetheless in clarifying the question of the proper identification of space objects and its component parts.<sup>206</sup> Responsibility for registration rests on the launching state, which also shall retain jurisdiction and control over the space object and be liable for any damage it causes to another space object in outer space, to the earth and aircraft in flight.<sup>207</sup> Where identification of the component part of a space object that causes damage cannot be obtained from the registration information, the Convention requires other parties with space monitoring and tracking facilities to assist to the greatest feasible extent in identifying the such object.<sup>208</sup>

Because of the velocity at which objects travel in space, even a speck of paint debris that would be impossible to identify can cause collateral damage. And since the existing law imposes a fault based standard under which a State is responsible only if damage is caused by its space object to that of another State on account of its fault, the identification problem makes this an insurmountable challenge. Thus, the victim state bears an onerous and in some cases impossible burden of proof where the launching state cannot be identified. This is why responsibility for debris should not be based on causation of damage especially where it is impossible to ascertain the launching state. The mere presence of debris should be sufficient to engage the responsibility of all the actors, perhaps not to the extent of requiring compensation. Rather, it should be based on the

<sup>&</sup>lt;sup>205</sup> *Ibid*, at 59, see also Registration Convention Arts. III and IV.

<sup>&</sup>lt;sup>206</sup> Ibid, citing George T. Hacket, Space Debris and Corpus Juris Spatialis 76 (1994).

<sup>&</sup>lt;sup>207</sup> *Ibid*.

<sup>&</sup>lt;sup>208</sup> Ibid.

philosophy that it is the collective responsibility of all the actors to ensure the prevention of debris. By this philosophy both state and non-state actors should contribute towards a fund to be used in developing technologies to mitigate and remediate debris.

# **Chapter Four**

## 4.1.Yoking the Lions: Grounding Space Debris in International Law

### **4.1.1. Introduction**

It is already clear that the phenomenon of space debris is environmentally heavy in its significance. The previous chapter looked at how the principles of international environmental law could be used to formulate a better, more effective regime for its management. This was done by an analysis of the Precautionary Principle and the PPP, which were then related to the concept of sustainable development. This chapter focuses substantially on the manifestation and regulation of space debris. Starting with an examination of the current status of institutional and conceptual protection of the environment under international law, the chapter considers the ostensible protection of souter space domain in the light of the threat caused by the proliferation of space debris.

The aim of the chapter is to advocate a reformulation of the principles governing responsibility for the protection of the outer space environment that conform with already established environmental and human rights protection principles. In order to engage this analysis, the chapter again touches on the concept of mankind as a subject of international law that was discussed as early as 1956<sup>209</sup> and even more recently.<sup>210</sup> The goal is to continue the dialogue in the unsettled understanding about what is conducive to the interests of humankind and the relationship to individual states in the protection of the global commons.

Modern environmentalism is frequently used in reference to the "pragmatic agenda to adjust social and economic priorities by reconciling environmental protection objectives and economic growth."<sup>211</sup> It aims to achieve a compromise between economic interests and goals of environmental protection. This is done by focusing on the resolution of the social conflict engendered by the question: "[W]hether it is more efficient to prioritize devotion of resources to solving critical social problems of poverty, famine and epidemics rather than responding to environmental threats such as climate change?"<sup>212</sup>

Such ethical questions continue to permeate the entire environmental discourse and has manifested in several mutations of environmental justice, distributive justice and intergenerational equity. The environmental/economic tension as well highlights Tarlock's understanding of SD as "the need for humankind to subordinate itself to two communities, neither of which has legal personality: future generations and ecosystems."<sup>213</sup> This assertion echoes many years of legal writings and commentaries on governance of the

<sup>&</sup>lt;sup>209</sup> Andrew Haley, "Basic concepts of Space Law" (1956) 26 Jet Propulsion 951.

<sup>&</sup>lt;sup>210</sup> Michael Mineiro, Space Technology Export Controls and International Co-operation in Outer Space, (New York: Springer Dordrecht Heidelberg, 2012) at 181. <sup>211</sup> See Stallworthy *supra* note 164 at 28.

<sup>&</sup>lt;sup>212</sup> *Ibid* at 29.

<sup>&</sup>lt;sup>213</sup> AD Tarlock "The future of Environmental 'Rule of Law' Litigation" (2002) 19 Pace Env L Rev at 575.

global commons and the recognition of rights of future generations based upon an acknowledgement of interests that may be harmed.<sup>214</sup>

Nevertheless, these seemingly "unorthodox" perspectives have faced challenges under the common law perception of allocation of rights and obligations for identified claimants.<sup>215</sup> In addition to its stated focus, this chapter therefore also examines this debate on allocation of rights and obligations from a very limited perspective. This will be done in the discussion on the formulation of global governance rules of outer space in accordance with its recognition as the *res communis* (global commons). To this end, I would therefore proffer a conception of the global commons and its protection that has already been noted as both "homogenous and heterogeneous; possessible and at the same time unpossessible."<sup>216</sup>

## 4.1.2. Global Governance of the Commons by the Commons: Res **Communis Humanitatis**

Before proceeding, it is useful to first unpack the "Mankind" concept and how it feeds into the analysis. The objective is to support my attempt to construct a normative theory that fully incorporates the idea of law of humanity for humanity (res communis humanitatis) into the utilization and regulation of outer space. As has been rightly postulated "[I]t is difficult [...] in our day to deny the existence of a juridical international community, imperfect and incomplete as it may be."<sup>217</sup>

<sup>&</sup>lt;sup>214</sup> J Feinberg "The Rights of Animals and Unborn Generations" in Feinberg, *Rights, Justice and the Bounds* of Liberty, (Princeton: University Press, 1980); Brown E Weiss, "The Rise and Fall of International Law?" (2000) 69 Fordham L Rev 345. <sup>215</sup> H Steiner, *An Essay on Rights*, (London: Blackwell, 1994).

<sup>&</sup>lt;sup>216</sup> Milun *supra* note 50 at 12.

<sup>&</sup>lt;sup>217</sup> Manfred Lachs 'Quelques reflexions sur la Communaute Internationale' in Le Droit International au Service de la paix de la Justice et du Developpement-Melanges Michel Virally (Paris, Pedone, 1991) 355.

An early space legal scholar and strong advocate of the concept of mankind, Cocca introduced the notion of *res communis humanitatis* with respect to the moon and other celestial bodies as being by virtue of the "[...] Outer Space Treaty of [1967], a law which defends the rights of all humanity beyond the scope of international law."<sup>218</sup> To Cocca, the entire subject of International Space Law is about Humanity as a whole and international law is only a law of procedure, which must secure the application of Space Law."<sup>219</sup> He concludes by stating that: "[W]hat we have called the 'fourth juridical dimension' reduced to simple terms, and brought to the field of positive achievements, is the dimension of Humanity, and in this way Law has surpassed its national and international characters when it is projected towards outer space, in order to reach a higher category, comprehensive of all mankind, thus leaving behind all the international organizations."<sup>220</sup> Expounding on this, another proponent of this school, Lefeber believes that res communis *humanitatis* establishes mankind as the owner of natural resources and as a legal person.<sup>221</sup>

The suggestion that "Mankind" could be a distinct legal personality was first made through a resolution of the UN General Assembly<sup>222</sup> in 1958 as the basis of co-operation in the exploration and use of outer space resources.<sup>223</sup> Thus, the entire framework of international space law is founded on the overriding interest of mankind. This is expressed in various forms throughout the OST. For example, in its Preamble the OST recognizes

<sup>&</sup>lt;sup>218</sup> Aldo Cocca, "Determination of the meaning of the expression "Res Communis Humanitatis" in Space Law" proc. 6th Colloquium on the Law of Outer Space 3 (1963) at 2.

<sup>&</sup>lt;sup>219</sup> *Ibid* at 3.

 $<sup>^{220}</sup>$  *Ibid* at 6.

<sup>&</sup>lt;sup>221</sup> R. Lefeber, "The Exercise of Jurisdiction in the Antarctic Region and the Changing Structure of International Law: The International Community and Common Interest" (1990) 21 NYIL 81-137 at 113.

<sup>&</sup>lt;sup>222</sup> GA res 1348 (XIII), question of the Peaceful Use of Outer Space (13 December 1958)

<sup>&</sup>lt;sup>223</sup> GA Res 1472 (XIV), International Cooperation in Outer Space (12 December 1959) conveys the belief of the global community that the exploration and use of outer space should only be undertaken for the betterment of mankind.

"the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes." It goes further to affirm the belief of states parties that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development.

Article 1 of the OST reiterates the treaty aspiration contained in the Preamble that, "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and *shall be the province of all mankind.*"<sup>224</sup> From the *travaux préparatoire* of the 1967 OST, mankind is used to represent the view held by the US representative, Ambassador Goldberg who summarized the Article provision to be "that outer space and celestial bodies are open not just to the big powers or the first arrivals, but shall be available to all, both now and in the future."<sup>225</sup>

Reading Article 1 of the OST, Hobe deduced that, "[t]his dichotomy sheds light on the meaning and goal of this provision: that the interest of all mankind shall be taken into consideration, not just the interest of specific countries. Moreover it shall be in the interest of all mankind to enable the participation of non-space faring and developing States in the exploration and use of outer space."<sup>226</sup> Therefore, treaty goal for all mankind is that all countries should profit from its exploration and uses. This goal is also reflected in the constitutive documents of the International Telecommunication Union (ITU).<sup>227</sup>

<sup>&</sup>lt;sup>224</sup> Emphasis added.

 <sup>&</sup>lt;sup>225</sup> Stephan Hobe, "Article I" in Stephan Hobe, Bernhard Schmidt-Tedd & Kai-Uwe Schrogl eds, *Cologne Commentary on Space Law Vol. I Outer Space Treaty* (Cologne: Carl Heymans, 2009) at 31.
 <sup>226</sup> *Ibid* at 39.

<sup>&</sup>lt;sup>227</sup> <http://www.itu.int/net/about/index.aspx>

The proposition that the goal of mankind is the profit of all countries was concretely affirmed by the first words uttered by one of the first known envoys of mankind in outer space, Neil Armstrong when he set foot on the moon on July 20, 1969. As he enthused, "that's one small step for a man; one giant leap for mankind."<sup>228</sup>

Literature is replete with commentaries and writings that use the term "mankind" to support the existence of a legal entity; a juridical person distinct from man in general.<sup>229</sup> One such writing defines mankind as the "collective body of people rather than the individuals that make up that body."<sup>230</sup> This would suggest therefore that the rights of mankind relate to the rights of the collective entity and can be distinguished from the rights that belong to individuals and to which they are entitled on the basis of their belonging to the human race.<sup>231</sup>

But because of the dispute over the different understandings of mankind in the context of the OST, mankind is often discussed in relation to "benefits sharing."<sup>232</sup> This suggests a passive scenario in which "mankind" possesses benefits of which it could share even without a clear picture of the extent of the legal right that it has to the stated benefit. Some writers think that this explanation tends to ignore the idea of mankind as a distinct

<sup>&</sup>lt;sup>228</sup> Statement was made at 9:52 P.M. C.D.T.July 20 1969 during the Apollo XI mission to the Moon..

<sup>&</sup>lt;sup>229</sup> For example Harminderpal Singh Rana, "The Common Heritage of Mankind & the Final Frontier: A Reevaluation of Values Constituting the International Legal Regime for Outer Space Activities" (1994) 26 Rutgers L J 225; Ernst Fasan, "The Meaning of the Term 'Mankind' in Space Legal Language" (1974) 2 J Space L 125; Paul Gormley, "The Legal Obligation of the International Community to Guarantee a Pure and Decent Environment: The Expansion of Human Rights Norms" (1990) 3 Geo Int'l Envtl L Rev 85.

 <sup>&</sup>lt;sup>230</sup> Stephen Gorove, "The Concept of "Common Heritage of Mankind: A Political, Moral or Legal Innovation?" (1972) 9 San Diego L Rev 390 at 393 [Gorove, "Common Heritage of Mankind"].
 <sup>231</sup> Ibid.

<sup>&</sup>lt;sup>232</sup> Ram Jakhu & Maria Buzdugan, "The Role of Private Actors: Commercial Development of the Outer Space Resources, Including Those of the Moon and other Celestial Bodies: Economic and Legal Implications" (2008) 6 *Astropolitics* 201-250.

holder of international legal rights that are enforceable.<sup>233</sup> Where the question centres on global environmental protection the discussion often assumes a different dimension. It mutates to the rights of mankind but only in relation to the obligations of nation states to address global environmental problems in a sustainable manner.<sup>234</sup> While discussing the notion of space exploration and use of outer space as a global commons, Gal argued that:

'The anthropothenic character of the law of outer space is the obvious result of man being its sole architect. Far from reducing, this increases his responsibilities. Not only must he see to it that the law be established in the interest of mankind as a whole, and prevent whatever dangers human action in outer space may produce to life and security on our globe, but he is also bound to provide adequate safeguards to ensure that nothing be done to upset the balance of nature or possibly jeopardize non-terrestrial life whether or in whatever the form in which it may exist."<sup>235</sup>

Further in this regard, Baker<sup>236</sup> favors a somewhat bio-centric (life centered) moral construction of mankind, which incorporates both human and non-human biological entities. He bases this perspective on two premises. The first premise refers to the biological nature of humankind while the second concerns the equality of all members of the class of biological entities. The acceptance of a biological equality of all human and non-human living entities also entails a total rejection of the idea that human beings are superior to other living things. Such physical non-human entities are therefore viewed as

<sup>&</sup>lt;sup>233</sup> See Mineiro *supra* note 210 at 182.

<sup>&</sup>lt;sup>234</sup> Janna Thompson, Intergenerational Justice: Rights and Responsibilities in an International Global Polity, (New York: Routledge, 2009), E.Brown Weiss, In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity, (Dobbs Ferry, NY: Transnational Publishers, 1989). D. Clayton Hubin, "Justice and Future Generations" (1976) 6 Phil & Public Aff 70.

<sup>&</sup>lt;sup>235</sup> G Gal, *Space Law* (1969) at 123.

<sup>&</sup>lt;sup>236</sup> Howard Baker, *The Application of Emerging Principles of International Environmental Law to Human Activities in Outer Space* (DCL Thesis, McGill University Institute of Air and Space Law, 1996) [unpublished] at 48-77.

possessing instrumental, intrinsic or inherent value, to the extent that they are useful to the survival and wellbeing of biological entities.

The implications of the bio-centric moral perspective for the human treatment of non-human biological entities are substantial. The constraints on human action toward non-human biological species is derived from three moral duties: [1] A duty not to do harm to any biological entity; [2] A duty to avoid interference with the normal activity and healthy development of biological entities in the ecosystem, and [3] To make restitution in order to preserve or promote the natural existence of biological entities in the ecosystem.<sup>237</sup>

This conceptualization would be very instructive if and when another form of life is discovered in outer space. The value in the present discussion is to preserve the space environment which its vistas and secrets are yet unknown. Bearing this in mind, the protection of the final frontier from the ravaging effects of man's economic activities presents an opportunity to discuss the rights and obligations that should accrue to mankind as a "new" subject of international law. This will substantially fit into the pragmatic and functional manner that similar issues are being tackled on the international arena presently. As I have shown previously, traditional international law that is centered on states shows obvious signs of stress and friction. The failure of states to reach international agreement even up to the level of the United Nations is giving impetus to calls for alternative ways of managing global challenges.

By way of further elaboration, in the absence of state action, other actors and normative regulatory regimes are emerging at the international level to close the gap

<sup>&</sup>lt;sup>237</sup> *Ibid* at 57.

created. This has given rise to what is known as "fragmentation"<sup>238</sup> in international law, which ostensibly provides the oxygen that globalization and transnationalism breathes at the moment. As such, while analyzing the paradigm shift from the traditional state-centered model of international government to a new form of global governance, Meyer advocates for a "new" and emerging concept of "governance by the commons." He in fact suggests the emergence of a "new" discipline of environmental governance fuelled by globalization.<sup>239</sup> While this is unambiguous on face value, it is less clear how this could happen in a practical sense. Would this be organized around international law as it exists presently with its emphasis on priority of states or would it fit better in a private international regulatory regime that does not have the same baggage as conventional international law?

There is a line of scholars who believe that it is possible to recognize mankind as a new legal entity within conventional international law. One of the main proponents of this idea is Cocca. He asserts that the legal subjectification of mankind follows a cyclical process of "MAN-SOCIETY-STATE-INTERNATIONALCOMMUNITY-MANKIND."<sup>240</sup> This cycle culminates to the *res communis ius humanitatis* that is the law of, and for, mankind. This is much different than the international law that governs relations among states. It is rather the law of and for the human race as a whole; the fourth

<sup>&</sup>lt;sup>238</sup> See Mario Prost, *The Concept of Unity in Public International Law* (Oxford: Hart Publishing, 2012); Peer Zumbansen, "Transnational Legal Pluralism" (2010) 1 Transn'l Legal Theory 141; Marti Koskenniemi & Paivi Leino, "Fragmentation of International Law? Postmodern Anxieties" (2005) 15 Leiden J Int'l L 553.

<sup>&</sup>lt;sup>239</sup> Patrick E. Meyer, "Governance by the Commons: Emerging perspectives in global environmental governance" in Johannes Meijer & Arjan der Berg eds. *Handbook of Environmental Policy*, (New York: Nova Science Publishers, 2010) at 115.

 <sup>&</sup>lt;sup>240</sup> Aldo Cocca, "The Advances of International Law Through The Law of Outer Space" J Space L (1981) at
 13.

political dimension of man.<sup>241</sup> Cocca therefore argues that the concept of the welfare of mankind being the beginning and end of all human activity actually originated from the outer space legal regime.<sup>242</sup>

By way of illustration, Cocca's proposition that mankind is the primary beneficiary of international space law has empirical support in reality. The idea for one is backed by the Outer Space Treaty which explicitly establishes mankind as a legal personality strengthened with the terms "prospect", "common interest," "benefits' and "province." In 1967, Cocca proposed that the term "province of all mankind" be replaced with the more meaningful expression "common heritage of all mankind" to signal the commencement of imbibing this entity with concert rights within a specified legal framework.<sup>243</sup> However, this concept is not isolated to the OST. It has also been used in treaties like the UN Convention on the Law of the Sea (UNCLOS) to represent a common ownership of areas not under national jurisdiction.<sup>244</sup> Though the concept of the Common Interest of Mankind (CIM) in the OST can rightly be said to be the precursor to the "Common Heritage of Mankind" (CHM), they have distinct meanings with respect to their areas of application.<sup>245</sup> Whereas the CHM uses 'heritage' to signify that the resources are common heritage and therefore commonly owned this is not so in the case of CIM.

<sup>&</sup>lt;sup>241</sup> *Ibid*.

<sup>&</sup>lt;sup>242</sup> Fasan, *supra* note 193 at 131.

<sup>&</sup>lt;sup>243</sup> Aldo Armando Cocca, "The Supreme Interests of Mankind vis-à-vis the Emergence of Direct Broadcast" (1974) 2 J Space L 83. [hereinafter 'Supreme Interests of Mankind"]

<sup>&</sup>lt;sup>244</sup> United Nations Convention on the Law of the Sea,1833 UNTS 3; 21 ILM 1261 (1982) (entered into force in 1994)

<sup>&</sup>lt;sup>245</sup> Hobe 'Article I'' supra note 225 at 37.

From the *travaux preparatoire*, there was no resistance to the CIM concept when it was adopted in the OST. But its subsequent reincarnation in the Moon Agreement as the CHM was not acceptable to the delegates.<sup>246</sup>

Nonetheless, it would seem that Stephen Gorove, another proponent of mankind as a legal concept discusses it with better clarity. He defined mankind as:

"All human beings wherever they may be found and thus it includes both men and women. However, mankind as a concept should be distinguished from that of man in general. The former refers to the collective body of people, whereas, the latter stands for the individuals making up that body. Therefore, the rights of mankind should be distinguished, for instance, from the so-called human rights. Human rights are rights which individuals are entitled to on the basis of their belonging to the human race, whereas the rights of mankind relate to the rights of individuals making up that entity."<sup>247</sup>

Gorove believes that international law has reached the level where it must move in the direction of recognizing mankind's interests, rights and obligations that are distinct from those of the nation states. To achieve this, he suggested that mankind should have a fully representative international body with appropriate authority to act on its behalf.<sup>248</sup>

But recognition of mankind as a subject of international law is not as simple as ascribing to it rights and obligations.<sup>249</sup> It also requires recognition of those rights, the establishment of mechanisms for their enforcement as well as the guarantee of its right to participate in the creation of law. How easy would it be to reach international agreement

<sup>&</sup>lt;sup>246</sup> This is why the Moon Agreement has only 15 Parties with the recent ratification in 2012 by Saudi Arabia. Also notable is the point that the USA has not a party to UNCLOS or the Moon Agreement for the same reason.

 <sup>&</sup>lt;sup>247</sup> Stephen Gorove, "The Concept of "Common Heritage of Mankind: A Political, Moral or Legal Innovation?" (1972) 9 San Diego L Rev 390 at 393 [Gorove, "Common Heritage of Mankind"].
 <sup>248</sup> *Ibid.*

<sup>&</sup>lt;sup>249</sup> Ibid.

and promulgate a treaty that enshrines this understanding? International consensus on this issue cannot be assumed. These days the more controversial and politically infused a matter is, the less likely the possibility of reaching a consensus among nations. In this context one must review the likelihood that an international agreement could be reached on the regulation of space debris as a 'single agenda' devoid of the political and economic entanglements.<sup>250</sup>

It is instructive though that some commentators hold the view that under international space law, mankind is already a recognized legal entity. Fasan is one of those who believe that mankind has acquired a "special legal status from international space law" because of its recognition as a principal beneficiary of space exploration and use. <sup>251</sup> His approach to Gorove's dilemma of mankind's legal representative capacity is purely pragmatic. According to him,

Subjects of international law can include those legal or physical persons to whom international law grants substantive rights and/or obligations even when such subjects of international law do not necessarily have the capacity of a legal personality to represent themselves on the international plane.<sup>252</sup>

But Fasan's pragmatism does not go far enough in my view. This is because rather than a categorical recognition that mankind is a distinct international legal personality, he concludes instead and in a somewhat anti-climactic fashion that "mankind is undergoing the process of becoming a new legal subject of international law."<sup>253</sup> But Herczeg has a seemingly more cryptic response to Fasan as he submits that "[i]n space law somehow the

<sup>&</sup>lt;sup>250</sup> Maureen Williams, "Space debris as a 'single item for discussion' (2011) Proc. of IISL (Netherlands: Eleven International Publishing, 2011) 327.

<sup>&</sup>lt;sup>251</sup> Ernst Fasan, "The Meaning of the Term 'Mankind' in Space Legal Language" (1974) 2 J Space L 125 at 131.

<sup>&</sup>lt;sup>252</sup> *Ibid.* <sup>253</sup> *Ibid.* 

future of mankind and its conscience lie buried, and this fact by itself will of necessity tend to exert its influence on general international law.<sup>254</sup>

Mineiro on his part brings a completely different strain to the analysis. He is of the view that if one assumed that mankind is a recipient-subject of international space law but does not have representation as an international legal personality; a solution to this representation dilemma could be for humanity to be considered as subsumed into "all countries." But wouldn't this depart from Gorove's definition of mankind? Recall that to him mankind meant "All human beings wherever they may be found...both men and women ... [a] collective body of people." Mineiro's conception rather appears to align with Cocca's perception of the international community as the third political dimension of man, which according to him is not mankind.

What could be the solution to this representation conundrum as it relates to mankind as an international entity? The answer could lie in my suggestion for a Protocol to the Outer Space Treaty on Collective Responsibility for the Protection of the Outer Space Environment between states and incorporating also non-state actors. Rather than continuing to succumb to the idea of state-centric international law, the option of voluntary soft governance that is not state-centered could be a viable alternative in this regard. This proposal is not by any means entirely new. It has been attempted in the area of business and human rights under John Ruggie's mandate on the Draft Norms on Transnational Corporations and Other Business Enterprises. Though not mentioning mankind specifically, the corporations mentioned in Ruggie's mandate are relevant in the context of my foregoing analysis. The norms impose on companies, directly under international law,

<sup>&</sup>lt;sup>254</sup> I Herczeg, "International Space Law and General International Law" Introductory Report, Proc. 16th Colloquium on the Law of Outer Space 3 (1974).

essentially the same range of human rights duties that States adopted for themselves—to respect, protect, promote, and fulfill human rights. The two sets of duties were separated only by the distinction between States as primary while Corporations are secondary duty bearers and by the elastic concept of spheres of influence. Freedom of exploration and use of outer space is conferred primarily on states but this is also available to private entities as secondary beneficiaries of this freedom. Rightly, the secondary freedom transferred to private entities should also be accompanied by a secondary obligation derived from the obligations imposed directly on states.

# 4.1.3. What did John Ruggie Say? The UN Framework on Responsibility to Protect, Respect and Remedy

As an issue of initial concern, I want to pay close attention to the choice of words in Ruggie's Draft Framework (the Framework). The use of the term "responsibility" to respect rather than "duty" would seem to indicate that respecting human rights is not an obligation that current international human rights law generally imposes directly on companies. Rather, it could pass as a standard of conduct acknowledged and expected in virtually every voluntary and soft-law instrument related to corporate responsibility. The UN Economic and Social and Council itself welcomed this paradigm shift when it endorsed the Framework.<sup>255</sup> The corporate responsibility to respect human rights means corporations should refrain from infringing upon the rights of others and address the

<sup>&</sup>lt;sup>255</sup> John Ruggie, "*Engaging Business: Addressing Respect for Human Rights*" Keynote Address at a conference in Atlanta (25 February 2010). Available at: www.hks.harvard.edu/m-rcbg/CSRI/newsandstories/ Ruggie\_Atlanta.pdf>.

adverse impact of infringements should they still occur. It applies to all companies in all situations and it exists even if national laws are poorly enforced, or not enforced at all.<sup>256</sup>

This model of responsibility could be extrapolated to the regime governing the protection of outer space. That would require a Collective Protocol in which States are the primary and Corporations are the secondary obligors. The effect would be that it would not matter whether or not an individual country complies with its supervisory obligation under the OST because both states and corporations could then be held responsible for breach of the Protocol. As significantly, it has to be understood that embedded within the Norm on Business and Human Rights is a concept of Due Diligence as further safeguard. This concept requires companies to conduct due diligence routinely and satisfy themselves that a contemplated transaction has no hidden human rights or other risks.

Starting in the 1990s, companies have added internal controls for the ongoing management of risks to both the company and stakeholders who could be harmed by its conduct. An example would be the requirement of Environmental Impact Assessment (EIA) to prevent environmental damage from corporate activities. The advantage of this model is multifaceted. For the companies, it could be a "game changer" whereby private space actors demonstrate to the global community that they are in compliance with the treaty and protocol provisions. Also, it helps companies lower their legal, business, and operational risks by taking care to avoid the triggers of environmental insecurity through precaution. This would of course generate a ricochet effect by potentially lowering insurance premiums for space projects. For states, it relieves them of the onerous burden of responsibility for the space activities of corporations that may not actually be their

nationals. The gain for the global community would include the reduction of the risk of reentry of debris and threat to manned space missions.

Presently, several countries including Norway, the UK and South Africa utilize the Framework in conducting their own policy assessments.<sup>257</sup> In addition, several global corporations are already realigning their processes based on the Framework.<sup>258</sup> Civil society actors have employed the Framework in their analytical and advocacy work. Other UN Special Procedures have drawn on the Framework in their analysis of corporate issues, as has the UK government in findings under the OECD Guidelines for Multinational Enterprises, which has been updated along the lines of the Framework.<sup>259</sup> I am by no means saying that this framework is a pill that cures all. However, noting Herczeg and in further justification of the framework, I submit that it is only by drawing on the features of tested practices and combining them that space law exerts its influence on general international law and vice versa.

# **Chapter Five**

#### Just a Thin Line Between Responsibility and Liability: Unpacking 5.1. the intermediate duty of due regard

### 5.1.1. Introduction

The previous chapter examined in detail the environmental element in the exploitation and regulation of outer space with particular focus on how international law has responded to the challenges of enforcing safe and sustainable environmental standards in this domain.

<sup>&</sup>lt;sup>257</sup> Ibid. <sup>258</sup> Ibid.

<sup>&</sup>lt;sup>259</sup> Ibid.

The emergence of "Mankind" in general international law and in this specific area was also explored.

Assuming that mankind is accepted as a subject of international law, then the next issue is its representation, rights and obligations in relation to other subjects and objects of international law. Put in its proper context, with mankind as a subject of international law in matters concerning the global commons and its governance, states are to be regarded as public stewards and not sovereigns. This is a stark contrast with municipal law where the state is king and the ideology is that the king can do no wrong.

In this vein, the approach adopted in this chapter is to first consider the philosophical underpinnings of what should be the proper role of states and non-state actors within the normative regime of outer space. Having identified what the role of each actor should be, the chapter proceeds to delimit the precise responsibility content for each actor. It does this by first examining the present discontents in the practice of the current responsibility regime as well as presents the landscape of what the appropriate regime should be. In summary, the chapter looks at the conceptualization of the law of state responsibility and its practice by states as well as the enforcement challenges for environmental irresponsibility. It also considers the prospects of imposing due diligence obligations embedded in the precautionary principle on space actors. Finally, it points to shortcomings in current norm creation at the international level owing to lack of consensus among states and how global governance principles could be applied instead. This is done within the overarching theoretical framework used for the research.

### 5.1.2 Delimiting the Parameters: Responsibility minus Liability

Responsibility and Liability in International Space Law are essentially two sides of the same coin.<sup>260</sup> Although both concepts are geared towards extracting accountability of the various space actors for "exploration and use" of outer space, when '*tossed*' their outcome differ significantly depending on which concept is invoked.<sup>261</sup> Several authors use the terms interchangeably in their writings<sup>262</sup> not recognizing the grave impact of the practical implementation of both concepts at the international and national levels. For instance, Ospina opines that the civil law system does not recognize any distinction between responsibility and liability since the Spanish and French texts of the space treaties use responsibility to signify both terms.<sup>263</sup> Yet other authors have succeeded in separating

<sup>&</sup>lt;sup>260</sup> Responsibility and liability form the bedrock of the Outer Space Treaties (OST) but have a unique application within the OST regime with respect to the space activities of non-governmental entities that differs from the usual application in other areas of international law; Bin Cheng, "Article VI of the Space Treaty Revisited: 'International Responsibility', 'National Activities', and 'The Appropriate State'" (1998) 26 J Space L 7 [hereinafter 'Article VI']; Frans von der Dunk, "Liability versus Responsibility in Space Law: Misconception or Misconstruction?" Proceedings of the thirty-fourth Colloquium on the Law of Outer Space (1992) 363-371 [hereinafter 'Liability versus Responsibility'].

<sup>&</sup>lt;sup>261</sup> The Responsibility minus Liability phenomenon is particularly evident in in-orbit satellite transfers between States where the transferee cannot be held to be a launching state *strictu sensu* even though it bears responsibility for the transferred satellites as part of its national activities. For instance, Netherlands statement and practice that it bears responsibility for the SES satellites transferred in-orbit from France but is not a "launching state" for the SES satellites and therefore cannot be held liable for damage caused by the satellites. This reinforces the popular statement in international space law that 'once a launching state, always a launching state.'

<sup>&</sup>lt;sup>262</sup> I Brownlie, *Principles of Public International Law*, (Oxford: Oxford University Press, 1999) at 461. Kayser Valerie, *Launching space objects: Issues of Liability and Future Prospects* (Boston: Kluwer Academic Publishers, 2001) at 32.

<sup>&</sup>lt;sup>263</sup> S Ospina, "International Responsibility and State Liability in an Age of Globalization and Privatization. A Personal View of (established) Texts and (evolving) Contexts" *Fiftieth Anniversary Celebration Institute* of Air and Space Law, McGill University, April 19-21, 2002 [unpublished] at 7. But see a different view in P. Hannapel, "Privatization of Space Activities" *Fiftieth Anniversary Celebration Institute of Air and Space* Law, McGill University, April 19-21, 2002 [unpublished].

these concepts by deconstructing the (extra) ordinary meaning and philosophical underpinning of responsibility and liability as it applies in international space law.<sup>264</sup>

In their ordinary and "extra" ordinary construction, responsibility and liability have different connotations and legal implications. In the ordinary construction, responsibility means:

[A]nswerability for one's acts and omissions, for their being in conformity with whichever system of norms, whether moral, legal, religious, political or any other, which may be applicable, as well as answerability for their consequences, whether beneficial or injurious. In law, it applies in particular to a person's answerability for compliance with his or her legal duties, and for any breaches thereof. Breaches of one's civil legal duties constitute civil wrongs or civil delicts, and involve an obligation to make integral reparation for any damage caused: *restitutio in integrum*. Responsibility and breaches of obligation do not necessarily involve the payment of compensation, especially when no damage has been caused."<sup>265</sup>

Liability on the other hand connotes an "obligation to bear the consequences of a breach of

a legal duty, in particular the obligation to make reparation for any damage caused, especially in the form of monetary payment.<sup>266</sup> The distinction between the two concepts lies in the requirement of culpability and damage. Most often liability involves a legal obligation of reparation for damage irrespective of any culpability, especially in cases of assumed or imposed liability.<sup>267</sup> The official text of the OST and the Liability Convention draw similar distinction between responsibility and liability. Although Art VII of the OST contains provisions on liability of the launching state for damage caused by its space

<sup>&</sup>lt;sup>264</sup> See Cheng, 'Article VI' *supra* note 260 at 9. Frans von der Dunk, "Liability versus Responsibility in Space Law: Misconception or Misconstruction?" Proceedings of the thirty-fourth Colloquium on the Law of Outer Space (1992) 363-371 [hereinafter 'Liability versus Responsibility'].

<sup>&</sup>lt;sup>265</sup> Cheng *supra* note 260 at 9,10.

<sup>&</sup>lt;sup>266</sup> *Ibid*.

<sup>&</sup>lt;sup>267</sup> See for example Alan Boyle, "State Responsibility and International Liability for Injurious Consequences of Acts not Prohibited by International Law: A Necessary Distinction?" (1990) 39 Int'l & Comp L Q 1 at 5.

objects, these were elaborated in a separate Liability Convention, which makes no reference to responsibility by the 'appropriate state.'

To the extent that state responsibility in international space law does not infer culpability or obligation of reparation for damage caused by the responsible state's space object,<sup>268</sup> it shares some similarities with responsibility in traditional international law. But there are still significant differences.<sup>269</sup>

Political exigencies surrounding the origins of space exploration and use appear to also give rise to an extra-ordinary construction of the concept of responsibility in particular. Contrary to Cheng's definition of responsibility as answerability for one's actions and omissions which constitute a breach of a legal obligation; states bear international responsibility for the activities of non-governmental entities whether or not attributable to the state. Art VI of the OST 1967 provides that:

State Parties to the Treaty shall bear international *responsibility* for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of nongovernmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization, and by the States Parties to the Treaty participating in such organization [Emphasis added].<sup>270</sup>

<sup>&</sup>lt;sup>268</sup> Whereas responsibility rests on the appropriate state under Art VI of the OST, the obligation to make reparation for damage rests on the Launching State under Art VII OST and Art I of the Liability Convention. According to Bin Cheng, there appears to be no clear connecting link between the launching state and the appropriate state. Bin Cheng, "Space Objects and their Various Connecting Factors" *supra* note 151 at 207.

 $<sup>^{269}</sup>$  Responsibility forms the bedrock of the admission of private enterprise in outer space but has a unique application within the OST regime with respect to the space activities of non-governmental entities that differs from the usual application in other areas of international law.

<sup>&</sup>lt;sup>270</sup> 1967 OST Treaty

On the other hand, Art VII of the OST states that:

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 [Emphasis added].<sup>271</sup>

Despite the proximity of the two provisions, there is a sharp dichotomy in the context and content of the obligations. While the subject of the responsibility obligation in Article VI is the appropriate state; the subject of liability in Article VII is the launching state. Article VI imposes on the member states solely responsibilities for all national space activities whether they are carried out by private or public organs and to ensure that the provisions of the treaty are enforced. To this end, activities of non-governmental entities are to be authorized and continuously supervised by the appropriate state to ensure compliance with the treaty provisions. In contrast, Art VII without referring back to Art VI imposes liability on the launching state of a space object for damage caused by such object or its component parts irrespective of whether or not the appropriate state has fulfilled its obligation. It would appear that the responsibility obligation is broader to encompass 'appropriate' states whether launching or not without a specific obligation for reparation. However, the liability obligation is narrower and restricted to 'launching state' with broad obligations of reparation.<sup>272</sup>

It is well settled that states acceptance of obligations under international law is based on their consent. Such consent is usually accompanied by a right to participate in

<sup>&</sup>lt;sup>271</sup> See also *Declaration of Legal Principles*, Principle 8.

<sup>&</sup>lt;sup>272</sup> Another layer of complexity is added by the fact that though there is a definition of 'launching state' there is no definition of the 'appropriate state' and this is left open for determination by national laws that could lead to myriad interpretations and possibilities.

law-making at the international level. Legal personality in international law therefore entails the capacity to enter into legal relations that confer both rights and duties under international law. Such capacity also allows the entity to bring claims for breach of international law, conclude valid international agreements and enjoy privileges and immunities from national jurisdictions. Based on this understanding, private entities are considered not to be subjects but objects of international law. As such, they are therefore not direct beneficiaries of rights or obligations imposed by international law.<sup>273</sup>

The provisions of Articles VI and VII of the OST and the Liability Convention follow from this understanding. Whereas private entities are indirectly bestowed rights to the exploration and use of outer space, in the same manner they are indirectly shielded from the responsibility and liability that accompanies such rights.<sup>274</sup> And because the appropriate state remains directly responsible for their activities, this allows private actors the leverage for irresponsible conduct since the state is in effect a sovereign surety. In the case where the question of the appropriate state is inconclusive, the private entities enjoys I deem to be a form of immunity.<sup>275</sup>

In other areas of international law this notion of non-recognition of private entities as international law subjects is fast dissipating. Progressively, private entities are emerging

<sup>&</sup>lt;sup>273</sup> Depending on the constitutional provisions of each country, treaties may be self-executing and therefore does not require an act of parliament to become part of domestic law. But in certain countries, rights and obligations under international law are usually imposed on private entities through a domestication process requiring a legislative act.

<sup>&</sup>lt;sup>274</sup> Because there is no concise prescription on the form of authorization and supervision, some states inadvertently allow direct access to space use and this informs the rising practice of forum shopping arising from the fact of overregulation and absence of regulation in some states.

<sup>&</sup>lt;sup>275</sup> A relevant example is the case of the Sea Launch Corporation. See the discussion in Mark J Sundahl, *The Cape Town Convention: Its Application to Space Assets and its Relation to the Law of Outer Space*, (Leiden: Martinus Nijhoff, 2013) at 152.

as indirect subjects of international law.<sup>276</sup> In support of this trend, the ICJ has observed that the subjects of law are not exactly identical in any legal system as to the extent of their rights. Their nature depends on the needs of the particular community.<sup>277</sup> This observation is particularly relevant in the area of space law especially in the causation of space debris. For example, during the negotiation of the outer space treaty, the participation of nongovernmental entities was considered and endorsed on the basis that the member state bears responsibility for the activities of their private entities.<sup>278</sup>

I had long discussed the description of outer space as a *res communis*. Recognition of the outer space frontier as a global commons necessitates a legitimate expectation that its exploration and use should be carried out for the benefit and in the interest of all countries and inure to the benefit of all mankind.<sup>279</sup> Infusing mankind with the right to the freedom of exploration and use of outer space in the preamble and substantive provisions of the OST appears to have settled the controversy as to who are the proper beneficiaries of these rights and the obligors. The next section examines the conceptualization of responsibility under general international law (including environmental law) as 'lex generalis" and international space law as "lex specialis" to see whether there is room within the two domains currently to allocate responsibility to private entities in the

<sup>&</sup>lt;sup>276</sup> See for example Meja Pentikainen, "Changing International 'Subjectivity' and the Rights and Obligations under International Law - Status of Corporations" (2012) 8 Utrecht L Rev 145; Carlos Vazquez, "Direct vs. Indirect Obligations of Corporations under International Law" (2005) 43 Colum J Transnat'l L 927.

<sup>&</sup>lt;sup>277</sup> KH Bocksteigel, "Legal Implications of Commercial Space Activities" (1981) 24 Colloquium at 1. Non-State Actors as New Subjects of International Law: International Law- From the Traditional State Order Towards the Law of the Global Community in Proceedings of an International Symposium of the Kiel Walther-Schucking-Institute of International Law Rainer Hofmann ed. (Berlin: Duncker & Humblot, 1999).

<sup>&</sup>lt;sup>278</sup> Marboe & Hafner, "Brief Overview over National Authorization Mechanisms in Implementation of the UN International Space Treaties" in Frans G von der Dunk ed. National Space Legislation in Europe: Issues of authorisation of private space activities in the light of developments in European space cooperation (Leiden: Martinus Nijhoff Publishers, 2011) at 30. <sup>279</sup> Aldo Cocca "Supreme Interests of Mankind" *supra* note 243 at 83.

generation of space debris. In doing this it also presents the nature of the responsibility on these actors presently and what should be their appropriate roles.

## **5.1.3. Attribution and Collective International Responsibility for Space Debris under General International Law**

This section is set out thematically prefaced on the doctrines of state responsibility said to be about where responsibility should lie, what it should consist of and to whom it should be owed.<sup>280</sup> An understanding of the peculiarities of space debris within the concept of responsibility in international space law necessitates at the least, a cursory glance at the concept of responsibility within general international law. Based on foregoing discussion on the distinction between liability and responsibility and the segregation achieved in the Outer Space Treaties, the discussion in this section will address responsibility only as an obligation of conduct excluding liability and damage to the extent practicable.

Reuter in his writing describes responsibility to be at the heart of international law and to constitute an essential part of what may be considered the Constitution of the international community.<sup>281</sup> This could well stem from the interconnectedness of responsibility with sovereignty and jurisdiction. To explain, the status of statehood is conferred on the basis of territorial sovereignty represented by jurisdictional power over the nationals and foreigners within its territory. However, the powers of statehood is also accompanied by the responsibility of the state to protect these persons within its territory as well as to seek redress for these persons for any harm done to them by another state. It is

<sup>&</sup>lt;sup>280</sup> Martti Koskenniemi, "Doctrines of State Responsibility" in James Crawford, Alain Pellet & Simon Olleson eds. *The Law of International Responsibility* (New York: Oxford University Press, 2010) at 51.

<sup>&</sup>lt;sup>281</sup> P Reuter, 'Trois observations sur la codification de la responsabilite international des Etats pour fait illicite' in Le droit international au service de la paix, de la justice et du developpement de l'ordre juridique international-Ecrits de droit international (Paris: Economica, 1995) at 574.

this interconnectedness that makes the influence of responsibility so profound to the extent that no responsibility, no international law and ultimately no remedy.<sup>282</sup> Without remedy the quintessence of any legal norm affirmed by the maxim; *'ubi jus, ibi remedium'* the legitimacy of the whole legal order is questionable. Remedy in this sense is used here not to signify reparation but acceptance of the responsibility. Therefore, a core attribute of state sovereignty is to incur responsibility and be able to invoke the responsibility of others because the correlative of rights is a duty to discharge corresponding obligations. Hugo Grotius in his writings refers to this obligation as arising by the Law of Nature.<sup>283</sup>

The Law of State Responsibility in general international law has been progressively codified in the Draft Articles on State Responsibility of States for Internationally Wrongful Acts<sup>284</sup> adopted by the International Law Commission (ILC) in 2001. As a starting point, Article 1 espouses the principle that "every internationally wrongful act of a state entails the international responsibility of that state."<sup>285</sup> Although this principle is contained in a non-binding instrument it has been established as a customary rule of international law.<sup>286</sup>

<sup>&</sup>lt;sup>282</sup> Alain Pellet, "The Definition of Responsibility in International Law," in James Crawford, Alain Pellet & Simon Olleson eds *The Law of International Responsibility supra note* (New York: Oxford University Press, 2010) at 4.

<sup>&</sup>lt;sup>283</sup> But see D Anzilotti, 'Cours de droit international public' (Paris: Pedone, 1998) at 407.

<sup>&</sup>lt;sup>284</sup>International Law Commission, *Draft Articles on Responsibility of States for Internationally Wrongful Acts*, UNGAOR, 2001, Supplement No. 10, UN Doc A/56/10, chp.IV.E.1.[*Draft Articles on Responsibility*].; See Ian Brownlie, *Principles of Public International Law, supra* note 262 at 420.

<sup>&</sup>lt;sup>285</sup> *Ibid.* Article 1 of the ILC Draft Articles. The incorporation of the principle in the Draft Articles is to recognize existing practice of states following seminal cases where the ICJ laid down the principle. *Case of the S.S. "Wimbledon" (United Kingdom, France, Italy & Japan v. Germany)* (1923) PCIJ (Ser A) No 1 at 30. *Phosphates in Morocco (Italy v. France)* (1938) PCIJ (Ser A/B) No 74 at 28 [*Phosphates in Morocco*]. *The Corfu Channel Case (United Kingdom of Great Britain and Northern Ireland v Albania)* Merits, [1949] I.C.J. Reports 4 at 23 [*Corfu*]. *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America)* Merits, [1986] ICJ Reports 14 at 142, 149 [*Nicaragua*].

<sup>&</sup>lt;sup>286</sup> Edith Brown Weiss, "Invoking State Responsibility in the Twenty-First Century" (2002) 96 Am. J. Int'l L. 798-816.

But there are issues raised within the provision that are still unsettled.<sup>287</sup> To determine the elements of an internationally wrongful act by a State, Article 2 provides a guide that this is when an act (or omission): (*a*) is attributable to the State under international law; and (*b*) constitutes a breach of an international obligation of the State.<sup>288</sup>

Evidently, two crucial elements; attribution and breach must co-exist in the conjunctive sense to engage state responsibility without necessarily involving injury/damage or intent/fault.<sup>289</sup> It is conceivable that the rationale for this is that unlike breach and attribution that are easily discernible, 'damage' and 'fault' are not. In most cases, responsibility is found in the objective sense that it arises from an act or omission and not as a result of subjective conduct of an international person.<sup>290</sup> Moreover, it is against the spirit of maintaining international security and peaceful co-existence among states to ascribe fault, a mental element to an abstract entity such as a state.

The significance of attribution as the link between 'State' and 'Responsibility' is traceable to the doctrine of '*pacta sunt servanda*,' which simply means that a state is bound to keep promises it has made pursuant to a treaty or agreement reached after negotiations with other state parties. By its nature, the entity called state is an abstraction

<sup>&</sup>lt;sup>287</sup> As the discussion of the elements of what constitutes an internationally wrongful act, breach of that act, or act of a state is set out in several chapters of The Law of International Responsibility a cursory look will be undertaken here.

<sup>&</sup>lt;sup>288</sup> Article 2 Draft Articles on Responsibility. See also Case Concerning United States Diplomatic and Consular Staff in Tehran (United States of America v Iran), [1980] ICJ Rep 3 at 29 [Tehran]; Dickson Car Wheel Company (U.S.A.) v. United Mexican States (1931) 4 UNRIAA 669 at 678 (American-Mexican Claims Commission); Phosphates in Morocco, Preliminary Objections, (1938) PCIJ (Ser A/B) No 74 at 28.

<sup>&</sup>lt;sup>289</sup> Brigitte Stern, "The Elements of An Internationally Wrongful Act" in James Crawford, Alain Pellet & Simon Olleson eds. *The Law of International Responsibility*, (New York: Oxford University Press, 2010) at 201; where she also discusses the order of the two elements. Other commentators include a third element 'the absence circumstances precluding wrongfulness.' See Luigi Condorelli & Claus Kress, "The Rules of Attribution; General Considerations" in James Crawford, Alain Pellet & Simon Olleson eds. *The Law of International Responsibility*, (New York: Oxford University Press, 2010) at 224.

<sup>&</sup>lt;sup>290</sup> Determination of the existence of the two elements is to be done solely by the international legal order. See also the *Phosphates in Morocco, Preliminary Objections,* (1938) PCIJ (Ser A/B) No 74 at 28.

of a collection of individuals existing within a specified spatial area. It is therefore reasoned that a state does not have the physical attributes to enter agreements or carry out actions but depends on individuals to perform its function. Such dependence or reliance underlies the concept of "Attribution."

To Condorelli & Kress, attribution refers to "the body of criteria of connection and the conditions which have to be fulfilled, according to the relevant principles of international law, in order to conclude that it is a State (or other subject of international law) which has acted in the particular case. In that case (and only for that purpose), the actual author of the act, that is, the individual, is as it were, forgotten, and is perceived as being the means by which the entity acts, a tool of the State (or other subject of international law) in question."<sup>291</sup>

As part of the rules of attribution, the ILC stipulates that an act or omission is attributable to a state when its by government agents and organs,<sup>292</sup> whether exercising executive, legislative or judicial power, or within territorial units or subdivisions<sup>293</sup> or as public or private entities exercising 'delegated' governmental authority, even when the act is *'ultra vires*<sup>294</sup> provided that the entity is acting in that capacity at the particular instance.<sup>295</sup> Attribution can also be extended to entities exercising *de facto* governmental authority,<sup>296</sup> insurgents<sup>297</sup> and armed bands contributed by another state.<sup>298</sup>

<sup>&</sup>lt;sup>291</sup> Luigi Condorelli & Claus Kress, "The Rules of Attribution: General Considerations" *supra* note 289 at 221.

<sup>&</sup>lt;sup>292</sup> Article 4 *Draft Articles on Responsibility*.

<sup>&</sup>lt;sup>293</sup> *Ibid*.

<sup>&</sup>lt;sup>294</sup> Land and Maritime Boundary between Cameroon and Nigeria (Cameroon v Nigeria: Equatorial Guinea intervening), ICJ reports 2002, p. 303, 430 (para 265).

<sup>&</sup>lt;sup>295</sup> Article 5 Draft Articles on Responsibility.

<sup>&</sup>lt;sup>296</sup> Article 9 Draft Articles on Responsibility.

<sup>&</sup>lt;sup>297</sup> Article 10 Draft Articles on Responsibility.

<sup>&</sup>lt;sup>298</sup> Article 6 Draft Articles on Responsibility.

In its reasoning in the *Bosnian Genocide* case, the ICJ stated two hypotheses for a determination of attribution; whether the act (or) omission is committed by an organ whose conduct is ordinarily attributed to the government as 'tools' of its action and whether the act (omission) is committed by persons who are not organs but are under the direction or control of the government.<sup>299</sup>

In relation to state responsibility for the causation of space debris, several issues are raised with respect to the tripartite elements in Article 1 of the ILC Articles. First is the task of establishing that the causation of debris is wrongful, because there is no definitive prohibition, this is an uphill task. Then is the question of attribution. Where this is clear in the case of a governmental entity, it is not so clear for non-governmental entities. It could be argued that Article VI of the OST is sufficient to connect the space object of a non-governmental entity to the appropriate state but this is easier said than done. Several examples have been cited earlier about differences in licensing regimes where they exist at all that it would be an uphill task to effectively attribute a space object owned by an MNC to one state. A follow-up question is whether there has been a breach. Because there are no clear obligations with respect to the duties imposed for causation of debris, it becomes even harder to allege a breach. The next condition on absence of circumstances precluding wrongfulness could be successfully argued by a state that its space activities are in the interest of its national security.

Whereas the provision that the state bears responsibility for the acts of its governmental entities clearly aligns with general international law the basis and parameters of state responsibility for the space activities of non-governmental entities are unclear.

<sup>&</sup>lt;sup>299</sup> Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v Serbia and Montenegro), Judgment, 26 February 2007, para 384.
One interesting question is what role if any attribution plays in this regard within international space law; a possible line of inquiry is whether the appropriate state's obligation of authorization and supervision of the activities of private entities means that the actions and omissions of these entities are attributed to the state even when these do not fit within the conditions for attribution.

Crawford's view on attribution is that, 'the rules of attribution play a key role in distinguishing the "State Sector" from the "Non-state sector" for the purposes of responsibility.<sup>300</sup> Writing on the same issue of attribution of acts of individuals to the state, Vattel emphasized that, "it is impossible for the regulated state, or for the most vigilant and absolute sovereign, to model at his pleasure all actions of his subjects, and to confine them on every occasion to the most exact obedience, it would be unjust to impute to the nation or the sovereign every fault committed by the citizens. We ought not then to say in general that we have received an injury from a nation, because we have received it from one of its members."<sup>301</sup>

From Vattel's vantage point, the concept and the rule is deciphered that the state should not be held responsible for acts committed by private persons particularly a legal person endowed with sovereignty (by act of incorporation) that equates to that of the state at the international level. By consenting in a treaty to attribute the responsibility of their non-state entities to each other, states succeeded in eroding any motivation for non-state space actors to be environmentally responsible. Hertzfeld captured this vividly:

<sup>&</sup>lt;sup>300</sup> J Crawford, First Report on State Responsibility, ILC Yearbook 1998, Vol II (1), 1, 33-34. (para 154).

<sup>&</sup>lt;sup>301</sup> E Vattel, "The Law of Nations or, Principles of the Law of Nature Applied to the Conduct and Affairs and Nations and Sovereigns" in B Kapossy and R Whatmore eds, Indianapolis, Liberty Fund, 2008; 2 Vols, Vol 1, 309ff; Book II, ChapterVI, para 73.

If a nation takes all due care, abides with all international space norms, has a strict and comprehensive licensing regime, requires compliance reports and oversees the space mission, and an accident occurs because a private operator acts unpredictably and independently, [recklessly]. Should that nation be held [responsible] liable for damages? According to the OST Article VI and VII, the answer today is, yes.<sup>302</sup>

In most space activities, it is the ensemble of international and domestic law that define the rights and obligations of private individuals.<sup>303</sup> However, private contractual agreements for the manufacture and launch of satellite systems co-exist and operate in parallel and sometimes in conflict with the space treaties. Such conflict challenges the entire status quo of state responsibility as reinforcing immunity for private enterprise from irresponsible conduct in outer space. As a necessary consequence, satellite procurement and launch contracts are predominantly international agreements governed and subject to multiple national laws not based on the philosophy underlying the space treaties.<sup>304</sup>

The OECD in its report<sup>305</sup> affirms that the cocktail of national laws operating in any given commercial satellite procurement, launch and insurance contract when stirred with the space treaties would produce unexpected and unwelcome indigestion for the private parties and ultimately the 'appropriate' state responsible for their activities. Because of the 'sovereign surety' provided under Article VI, manufacturers are at ease not to offer post-

<sup>&</sup>lt;sup>302</sup> Henry Hertzfeld, "A Road Map to Sustainability" George Washington University (2011) Online: <http://www.gwu.edu>. Hertzfeld posits that this is analogous to the common law concept of vicarious liability whereby because of the close relationship between two parties, for instance parent/child, employer/employee, liability attaches to the responsible party under the reasoning that that party should take reasonable measures to prevent the incident.

<sup>&</sup>lt;sup>303</sup> Christian Tomuschat, "The Responsibility of Other Entities: Private Individuals" in James Crawford, Alain Pellet & Simon Olleson eds. *The Law of International Responsibility*, (New York: Oxford University Press, 2010) at 317.

<sup>&</sup>lt;sup>304</sup> OECD, Space 2030: tackling Society's Challenges. (OECD Publishing, 2005) at 180.

<sup>&</sup>lt;sup>305</sup> OECD, *Space 2030: tackling Society's Challenges*. (OECD Publishing, 2005) at 180. Reference is made to the variety of licensing practice under the national laws.

launch warranties while at the same time insisting on waivers of the subrogation rights of insurers.

In the regulatory regime of the terrestrial environment, state responsibility for environmental harm is an established principle of customary international law and binds all States. Although these obligations are usually set out in several treaties or customary obligations; there is a general responsibility imposed on states to ensure that its activities do not cause damage to the environment of any other state including areas beyond the jurisdiction of any state. The nuclear test and oil pollution treaties contain responsibility and liability provisions for both states and private operators and also have several obligations attached. The most cited obligation is the duty of due diligence requiring that states and corporations take measures to prevent the occurrence of pollution. By this, the state is not an absolute guarantor of the prevention of harm. Rather, the obligation of conduct applies to all actors.

## 5.1.4. International Responsibility of Non-State Actors

Classically described as 'objects' of international law; the basis of international responsibility of transnational enterprises (TNEs) has long been a subject of scholarly discourse. Prominent among the rationale proffered for the responsibility of TNEs is the need to hold them accountable for their wrongful acts<sup>306</sup> and to recognize their rights to invoke the responsibility of other subjects in the international arena.<sup>307</sup> In Klein's view, 'from the moment that [organizations/corporations] exercise legal competencies of the same type as those of states, it seemed logical that the same consequences should attach to

 <sup>&</sup>lt;sup>306</sup> Particularly in the area of environmental practices and human rights protection.
<sup>307</sup> Normally seen in the area of foreign direct investment by TNCs and pursued in Investment Arbitration.

the actions of both one and the other.<sup>308</sup> Zacklin agrees that there should be mechanisms of responsibility applicable to organizations and corporations similar to states and those that apply specially to these actors because of their unique nature.<sup>309</sup>

The beginning of commercial space age marked a paradigm shift in the focus of outer space. In addition to exploration as a signal of national prestige, private interest in commercial use of outer space for profit maximization became part of the space ideology. Invariably, the predominant concern in commercial space projects became allocation of costs. Equally important is the fact that because states are no longer the sole actors, the space treaties were no longer the sole legal instruments that govern space activities. As afore mentioned; private contractual agreements for the manufacture and launch of satellite systems became common. Sometimes there is compatibility and convergence and sometimes there is conflict in the provisions. Moreover, instead of two states there are now forty-nine spacefaring states and even more states with space technology capabilities. Besides space activities do not occur only in outer space but includes financing, mission planning, preparation of Environmental Impact Assessment as well as operation of the Telemetry Tracking and Control center or Earth stations. All these are items to be subjected to authorization and control.

In contemporary international law, individuals and corporations can be held directly accountable under international law for breach of *erga omnes* norms, being norms from which no derogation is permitted because they convey values shared by the whole

<sup>&</sup>lt;sup>308</sup> Increasingly, the lines between public and private space activities is blurred with private space systems hosting government payloads and applications thereby making the continued exclusion of private actors in the governance of outer space questionable.

<sup>&</sup>lt;sup>309</sup> R Zacklin, 'Responsabilite des Organizations Internationals' in SFDI, La Responsabilite dans le Systeme International (Paris, Pedone, 1991), 91. A. Pellet, "Syllabus, Responsibility of International Organizations', Report of the ILC, 52<sup>nd</sup> Session, ILC Yearbook 2000, Vol II(2), 135.

international community.<sup>310</sup> This class of international obligations is considered to be so essential to humanity that their breach attracts a regime of aggravated responsibility certainly more apparent than the "ordinary responsibility incurred by states for 'normal' internationally wrongful act."<sup>311</sup> Under this category, the ICJ has found individuals to be subjects of international law with criminal responsibility for crimes against humanity.<sup>312</sup> Inspired by this prerogative for protection of humanity against egregious criminal acts, the Draft Code of Crimes against the Peace and Security of Mankind was adopted by the ILC in 1996 and included in the Rome Statute for the International Criminal Court.<sup>313</sup> Similarly, following incessant threats by terrorists to global peace and security, the UN Security Council pursuant to its competence under Art VII of the UN Charter has introduced an international practice whereby the assets of persons or groups associated with terrorist activities can be frozen and their travel privileges withdrawn.

Apart from the criminal field, increasingly, international civil responsibility of corporations and individuals has been incorporated into several treaties for instance on investment and human rights. In addition, under Art 3 of the OECD Paris Convention on Third Party Liability in the Field of Nuclear Energy<sup>314</sup> the operator of a nuclear facility

<sup>&</sup>lt;sup>310</sup> The second phase of work on the ILC Draft Articles on state responsibility led by Ago responded to the severe criticism levied against the work of Garcia Amador Committee by reflecting the existence of 'peremptory norms' and 'obligations owed to the international community as a whole' but without connecting them to any specific responsibility regime.

<sup>&</sup>lt;sup>311</sup> Pellet, "The definition of international responsibility" *supra* note 282 at 14.

<sup>&</sup>lt;sup>312</sup> With the establishment of the Nuremberg and Tokyo War Crimes Tribunals and conclusion of the Convention for the Prevention and Punishment of the Crime of Genocide, 9 December 1948, 78 UNTS 277; several individuals have faced criminal prosecution for war crimes as crimes against humanity.

<sup>&</sup>lt;sup>313</sup> Draft Code of Crimes against the Peace and Security of Mankind, ILC Yearbook 1996, Vol II (2), 15. Rome Statute of the International Criminal Court, 17 July 1998, 2187 UNTS 90, arts 5-9.

<sup>&</sup>lt;sup>314</sup> OECD Paris Convention on Third Party Liability in the Field of Nuclear Energy 956 UNTS 251. By the operation of a joint protocol to the Application of the Vienna Convention on Civil liability for Nuclear Damage and the Paris Convention on Third Party Liability in the Field of Nuclear Energy (Vienna, 21 September 1988), 1672 UNTS 301) the liability limit was increased from 5 to 300 million Special Drawing Rights.

bears responsibility for damage caused in the course of its operations. In the Environmental field, under the 1969 International Convention on Civil Liability for Oil Pollution Damage, the vessel owner incurs international responsibility for oil spills.<sup>315</sup>

The whole idea behind subjects of law is to identify the entity responsible for breach of an obligation in order to ascribe liability. Erstwhile, states were held to be the sole subjects of international law but the status quo is being challenged internally and externally. Internally, there is pressure to recognize the importance of private entities because of their financial, technical, and political influence. Externally, the multiple nationalities of corporations fuelled by increasing globalization and its impact on the increased mobility of persons and goods is adding such pressure on international legal and institutional framework that it cannot be ignored.

Presently, the participation of private entities in space is colossal, and the extent of public-private partnerships in space activities has increased in complexity.<sup>316</sup> Moreover, private actors have since risen to be vast reservoirs of technical expertise and innovation in space and wield the financial influence, if not the political power, to forge new paths in space. Such operational, technical, financial and political influence should no longer be overlooked in articulating governance rules, particularly as it relates to the preservation and protection of the global commons.

In sum, one could argue that private freedom of exploration cannot be effectively balanced against limited international state responsibility. The lack of a specific non-state

<sup>&</sup>lt;sup>315</sup> Similar provisions are contained in the 1971 Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material 974 UNTS 255; and the 1996 International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances by Sea (1996) 35 ILM 1406.

<sup>&</sup>lt;sup>316</sup> See Nina Tannenwald, "Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space" (2004) 29 Yale J Int'l L 363.

responsibility can also not be justified in the face of expanding contribution of the private sector to the proliferation of space debris.<sup>317</sup> Manufacture and launch of more than 70% percent of the satellites in space are procured under private contractual arrangements and in several cases without government oversight. There is no compulsion to comply with mission requirements either because they are voluntary in the license requirements or are not applicable at all. The majority of satellites abandoned in Geo are traceable to private entities because of the costs of implementing disposal requirements. Moreover, insurance contracts do not resolve the issue of who is responsible (if at all) for disposal of a 'failed' satellite.

## 5.1.5. (Dis)Contents of Responsibility

While analyzing the regime of state responsibility for non-state actors, Hermida proposes two hypotheses.<sup>318</sup> First is that the regime calls for risk allocation because of the enormous burden placed on states and the need for them to protect themselves. Usually states achieve this through a system of indemnity. The second hypothesis is that it calls for risk management to permit the fulfillment of states space policy objectives. In most cases, states employ licensing under national space legislation as the tool to ensure that private entities carrying out space activities comply with international space law. However, criticisms levied on the inadequacy and in many cases absence of licensing regimes point to the need for alternative mechanisms for securing compliance with the authorization and continuing supervision obligations under the space treaty.

 <sup>&</sup>lt;sup>317</sup> James Moltz, "The Past, Present, and Future of Space Security" (2008) 14 Brown J World Aff 187.
<sup>318</sup> Julian Hermida *supra* note 56 at xiii.

# 5.2. International Responsibility Content: Status of State Authorization, Supervision, and Compliance with COPUOS Debris Guidelines

#### UN Committee On Peaceful Uses of Outer Space

The UN Committee on the Peaceful Uses of Outer Space (COPUOS) was established in 1959, two years after the launching of the first satellite (the Sputnik) with the mandate to "consider the activities relating to the *peaceful* uses of outer space, international cooperation and legal problems which might arise in programmes to explore outer space and organizational arrangements to facilitate these activities."<sup>319</sup> Over time two subcommittees, the Science and Technical Subcommittee (STSC) and the Legal Subcommittee (LSC) were also created.

Though space debris is apparently ignored as a concern by current international law it nonetheless is a stubborn issue in matters relating to outer space even though not in a strictly normative sense. It was only in 2009 that space debris was formally introduced in the UN Legal Subcommittee of UN COPUOS.<sup>320</sup> As Stubbe intimates, "this formal introduction cannot hide the fact that an examination of the implications of space debris pollution under international law did not yet find its way into COPUOS."<sup>321</sup> Since its introduction in 2009 space debris has gained traction as a perennial agenda item in the meetings and consultations of both the LSC and STSC of UN COPUOS.

<sup>&</sup>lt;sup>319</sup> UNGA Resolution 1472 (XIV) on International Co-operation in the Peaceful Uses of Outer Space.

<sup>&</sup>lt;sup>320</sup> Prior to 2009, the STSC had in 1996 invited IADC to work on debris mitigation guidelines which IADC presented in 2000 in the form of IADC Debris Mitigation Guidelines- document A/AC105/C.1/L.260.

<sup>&</sup>lt;sup>321</sup> Peter Stubbe, "Common but Differentiated Responsibilities: New Impetus for Legal Appraisal for Outer Space Pollution" (March 2010) ESPI Perspectives No 31 Online: ESPI <a href="http://www.espi">http://www.espi</a>.

# 5.2.1. Dealing with the Definitional Problem of Space Debris

The fact that space debris is not specifically addressed in the space legal regime does seem to make the issue far more complex. This is even more so when it is added to the already complicated situation of state responsibility for private commercial activities in outer space.<sup>322</sup> The starting point of the debate within COPUOS to address the problem of space debris was therefore to resolve the question whether the extant regime contained normative provisions that could support the design of an effective solution. On the question itself there are various conflicting views. A conservative view contends that the space debris phenomenon is not covered by the current space regime and therefore requires the development of a specific regime targeted at it.<sup>323</sup> But a more democratic view approaches the matter from the perspective that the definition of space objects includes space debris as component parts of a space object.<sup>324</sup>

What is less clear is whether the interpretation of space objects covers only whole, un-breached space materials. If this interpretation is accepted then to the extent that space debris consists of broken materials, it would not be covered by this interpretation. On the contrary if the interpretation takes into account broken space materials as forming part of space objects that the definition has in contemplation, then one could argue that the issue is already covered. As a way out of this quagmire the UN COPUOS Debris Mitigation Guidelines has proffered a definition, which brings this phenomenon within the existing

<sup>&</sup>lt;sup>322</sup> See Richard Berkley, "Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space" (1996-1997) 15 Wisc Int'l L J 421.

<sup>&</sup>lt;sup>323</sup> Lawrence D. Roberts, "Addressing the Problem of Orbital Space Debris: Combining International Regulatory and Liability Regimes," 15 (1992) B.C. Int'l & Comp. L. Rev. 51.

<sup>&</sup>lt;sup>324</sup> G Lafferranderie, "Maintaining the Space Environment," Commentary Paper Proceedings of the Workshop of Space Law in the 21st century, UN Office for Outer Space Affairs 2000.

legal regime.<sup>325</sup> Nevertheless, it is necessary to point out the inadequacies of the current regime in tackling this important and urgent issue. As importantly though is the question of the nature of legal responsibility incurred for the generation of space debris under this regime. To these questions, there are no definitive answers.

# **5.2.2. The Work of the Scientific and Technical Subcommittee of UN COPUOS**

The STSC was principally to concern itself with information exchange on scientific and technical issues related to the use of space technology and the outer space environment. In its initial work on space debris, it began with considering the scientific and technical characteristics of space debris, which led to the adoption of the Technical Report on Space Debris.<sup>326</sup> Following the recommendations in the Report, the next phase of work veered into norm setting when the STSC commissioned the IADC in 2001 to develop a set of voluntary Guidelines.<sup>327</sup>

The IADC submitted its work to the STSC in 2002<sup>328</sup> in the form of IADC Space Debris Mitigation Guidelines, which was adopted by the subcommittee in 2004<sup>329</sup> and eventually by UNCOPUOS in 2007.<sup>330</sup> The seven Guidelines adopted by the UN COPUOS are based on a two pillar approach (instead of a 3-pillar approach of Mitigation, Remediation and Removal in the IADC Guidelines) to resolve the problems of space debris by requiring all space actors to: [a] Limit debris released during normal operations;

<sup>&</sup>lt;sup>325</sup> Comm. on the Peaceful Uses of Outer Space, Scientific & Technical Subcomm., Rep. on its 32d Sess., Feb. 6–16, 1995, para. 95, U.N. Doc. A/AC.105/605 (Feb. 24, 1995)

<sup>&</sup>lt;sup>326</sup> Technical Report on Space Debris, UN doc. A/AC.105/720 (New York: United Nations, 1999)

<sup>&</sup>lt;sup>327</sup> Report of the Scientific and Technical Subcommittee on its 38<sup>th</sup> Session 2001 para. 130.

<sup>&</sup>lt;sup>328</sup> Inter-Agency Space Debris Coordination Committee Space Debris Mitigation Guidelines (UN Doc. A/AC.105/C.1/L.260)

<sup>&</sup>lt;sup>329</sup> It took three years after the submission by IADC for the STSC to adopt the Guidelines because of the problem of consensus in the subcommittee. The same problem is largely evident in COPUOS and has hindered the adoption of programs and definitive agreements since the adoption of the Moon treaty.

<sup>&</sup>lt;sup>330</sup> Report of the Scientific and Technical Subcommittee on its 44th session 2007.

[b] Minimize potential for break-ups during operational phases; [c] Limit the probability of accidental collision in orbit; [d] Avoid intentional destruction and other harmful activities; [e] Minimize potential for post-mission break-ups resulting from stored energy; [f] Limit the long-term presence of spacecraft and launch vehicle orbital stages in LEO after the end of their mission, and [g] Limit the long-term interference of spacecraft and launch vehicle orbital stages with GEO region after the end of their mission.<sup>331</sup>

As the title indicates, the Guidelines are guidance on practical measures that could be applied by space actors towards the two-pillar approach to *enhance* the long-term sustainability of space. However, Jakhu has pointed out inherent limitations of the Guidelines to be that:<sup>332</sup>

- COPUOS Guidelines are not legally binding under international law
- COPUOS Guidelines are general recommendations to be implemented by States primarily through national legislation, regulations, and/or policy directives therefore incorporation of the Guidelines into domestic policy and/or regulatory procedures, mechanisms varies according to each State, its level and type of space activity
- COPUOS Guidelines do not outlaw a certain space debris creation activity, nor do they impose sanctions on the violators
- COPUOS Guidelines are not designed as a comprehensive approach for the space debris problem
- COPUOS Guidelines do not deal with the disposal of the debris currently orbiting in space

<sup>&</sup>lt;sup>331</sup> *Ibid.* Annex IV, para.4

<sup>&</sup>lt;sup>332</sup> Ram Jakhu, "Towards Long Term Sustainability of Space Activities": Overcoming the Challenges of Space Debris (15 February 2011) Online: OOSA <a href="http://www.oosa.unvienna.org/pdf/pres/stsc2011/tech-35.pdf">http://www.oosa.unvienna.org/pdf/pres/stsc2011/tech-35.pdf</a>>

- COPUOS Guidelines cannot stabilize the space debris environment and do not give guidance to liability and insurance
- COPUOS Guidelines do not address the generation of space debris in a nonpeaceful context

Since the adoption of COPUOS Guidelines in 2007, the international community has adopted a new program of work on Space Sustainability aimed at: (i) Developing tools of governance in the reduction and removal of orbital debris, (ii) Promoting of international civil space situational awareness as a way to improve knowledge and transparency, and (iii) Preventing intentional destruction of spacecraft by debris-causing anti-satellite (ASAT) weapons.

By 2011, the STSC set up a Working Group (WG) on the "Long Term Sustainability of Outer Space Activities" (LTSOSA). The objective of the working group is to: (a) reduce the risks to space activities for all space actors and (b) ensure that all countries are able to have equitable access to limited natural resources of outer space.

Towards the stated objective, the WG terms of reference includes the following identified aspects of space exploration and use: (a) Sustainable space utilization supporting sustainable development on Earth; (b) Space debris; (c) Space weather; (d) Space operations; (e) Tools to support collaborative space situational awareness; (f) Regulatory regimes; and (g) Guidance for actors in the space arena.

The last submission of Expert Groups B and  $D^{333}$  made to the STSC in June 2013 show an emerging attempt at achieving greater participation of private entities in developing governance structures for space debris:

<sup>&</sup>lt;sup>333</sup> UN Doc.A/AC.105/1041/Rev.1. Available at <a href="http://www.unoosa.org">http://www.unoosa.org</a>>.

### 5.2.3. Conference on Disarmament (CD)

In the meantime, discourse on space governance also covering space debris matters which has been ongoing for several decades at the Conference on Disarmament and Non-Proliferation of Nuclear Weapons met a deadlock in March 2012 because of the politicization of the issues as bordering on security and national interests of the states. The deadlock was caused primarily by the bifurcation of the issues and the emergence of two factions pursuing two distinct agendas: [1] A Code of Conduct (CoC) based on transparency and confidence building measures (TCBMs) in the conduct of space activities spearheaded by Europe and the USA; and [2] Prevention of the Placement of Weapons in Outer Space Treaty (PPWT) spearheaded by China and Russia.

In the light of the history of discussions on the subject matter of proliferation of weapons at the CD, the present deadlock does not come as a surprise. In my opinion, there is a lack of good faith among the states particularly as it relates to the subject of debris, testing and use of ASAT weapons. I base my opinion on two main reasons. First, though the CoC contains debris provisions, it does not hold any better hope in the current situation because it is completely voluntary and states could opt in to be part of the discussion. The USA that is spearheading discussions has severally indicated through policy and practice that it would not endorse any regime "soft" or 'hard' that would inhibit its national interest and space policy. On the other hand, the PPWT supported by China and Russia does not contain any debris provisions and there is the likelihood that it never will, if China continues to have its way.

In a move to revitalize the discussions on non-proliferation of nuclear weapons, during its sixty-seventh meeting in November 2012, the General Assembly adopted a draft decision on a proposal by Netherlands, South Africa and Switzerland titled: Revitalizing the work of the Conference on Disarmament and taking forward multilateral disarmament negotiations to continue discussing the matter of the deadlock at the CD during its sixty-eighth session.<sup>334</sup> UNGA has also considered establishing an open-ended working group to develop proposals to take forward multilateral nuclear disarmament negotiations outside the framework of the CD but this met with opposition from several states on the grounds that this move could jeopardize the entire architecture of United Nations disarmament machinery for the achievement and maintenance of a world without nuclear weapons.

# 5.2.4. National Licensing Regimes and UN COPUOS Debris Guidelines Compliance

The question of whether Art VI mandates enactment of specific national laws to regulate space activities has been examined elsewhere.<sup>335</sup> What remains incontrovertible is that states are obligated under the OST to establish a system of authorization and continuing supervision of the space activities of private enterprises but they may choose the text and context of the system. Even though authors argue that interpretation of treaties is a sovereign right of states,<sup>336</sup> it is submitted that there should be common denominators applicable across board to discourage forum shopping and encourage a level playing field

<sup>&</sup>lt;sup>334</sup> UN document A/C.1/67/L.31.

<sup>&</sup>lt;sup>335</sup> V Kayser, 'Commercial Exploitation of Space: Developing Domestic Regulation, (1992) 12 Annals of Air and Space Law at 190. Julian Hermida *supra* note 56 at 29-32. Ronald L. Spencer, "International Space Law: A Basis for National Regulation" in Ram Jakhu ed. *National Regulation of Space Activities* (New York: Springer, 2010) at 1-21.

<sup>&</sup>lt;sup>336</sup> Imre Anthony Csabafi, *The Concept of State Jurisdiction in International Space Law* (Hague: 1971) at 122. Henry J Glazer, "Domicile and Industry in Outer Space" (1978) Colum J Transnat'l L 67 at 100. Frans G Von der Dunk, "Public Space Law and Private Enterprise" in Institute of Air and Space Law of the University of Cologne/German Aerospace Center (ed.), Proceedings of the Project 2001 Workshop on Privatization, Cologne 1999, 12 at 15.

in the use of outer space by private entities. To this end, three building blocks identified as the minimum requirement in a national space regulation system are: (1) Authorization and Supervision [licensing scheme], (2) Prevention of Damage and Indemnification (3) National Registration.<sup>337</sup>

The first two building blocks are within the purview of this thesis. However, the point to be made about registration is that Article VIII of the OST provides that the state of registry retains jurisdiction and control of an object launched into outer space while that object is in space. Whether this translates to an obligation to remove the object at the end of its life and when it is no longer operational is still unclear. Invariably, this creates a leeway for satellite owners to abandon satellites in orbit while export control laws make it realistically impossible for another state or entity to intervene by its removal.

In a licensing regime, the objective of prevention of damage and indemnification in relation to the protection of outer space environment should involve a three-pronged approach:<sup>338</sup> (1) Prevent environmental harm from occurring in the first place (Precautionary Principle); (2) Internalize costs of pollution into the polluter's sphere (PPP); (3) To provide an important back-up system should environmental harm occur notwithstanding the regulatory efforts of the underlying protective regime (Space fund contributions).

No harm principle reflected in the duty of due regard has been codified in the OST as part of the corpus of international law applicable to space activities. Therefore, within

<sup>&</sup>lt;sup>337</sup>Michael Gerhard, "National Space Legislation-Perspectives for Regulating Private Space Activities" in Marietta Benko & Kai-Uwe Schrogl eds. *Space Law: Current Problems and Perspectives for Future Regulation*, (Netherlands: Eleven International Publishing, 2005) at 76.

<sup>&</sup>lt;sup>338</sup> Jutta Brunee, "Of Sense and Sensibility: Reflections on International Liability Regimes as Tools for Environmental Protection" (2004) 53 Int'l Comp L J 351at 365.

the context of space law, state responsibility for breaches of the principle should normally arise. Embedded within the principle as articulated in the *Corfu Channel Case* is a Due Diligence Duty (DDD). This implies a duty of care and due diligence as well as the application of precautionary measures to avoid causing damage. Jakhu, recognizes the importance of this duty. He notes that the existing international legal framework governing space activities must be considered both with regard to legal obligations and rights. This will require states to take preventive measures addressing the risks posed by space debris as well as to the legal consequences where such risks materialize.<sup>339</sup>

Article IX of the OST contains several clauses to suggest an effort to entrench the precautionary principle in the outer space regime but it has been previously stated that it does not cover the necessary baseline conditions for a comprehensive space sustainability regime. Research in this area reveals that the following issues should be covered for a more comprehensive mechanism for space debris: [1] Space debris and collisions [2] Lack of international space situational awareness [3] Purposeful interference (such as jamming) and unintentional harmful interference [4] Effects of space weather and radiation [5] Aggressive action/behavior and their geopolitical causes [6] Human error and lack of capacity as a substantial cause of risk [7] Failure to meet societal needs and reduced space budgets.<sup>340</sup>

<sup>&</sup>lt;sup>339</sup> Ram Jakhu, "Towards Long Term Sustainability of Space Activities: Overcoming the Challenges of Space Debris" *supra* note 332.

<sup>&</sup>lt;sup>340</sup> Timiebi Aganaba, "Towards Space Sustainability: Lessons from Environmental Liability Regimes" (2011) LLM Thesis, McGill University [unpublished] at 24.

# **5.2.5. UN COPUOS Debris Guidelines Interpretation in Comparative** Context

It would seem that a subjective interpretation of the space treaties by states has led to disparities and diversification in national systems resulting in complex regulation,<sup>341</sup> under-regulation<sup>342</sup> and absence of regulation<sup>343</sup> in many countries. In this section I will clarify this claim by briefly analyzing the practices of a few jurisdictions notably the United States, Canada and China.

# **United States of America**

The United States was not only the first country to establish a licensing regime for private entities but it is also the country with the most comprehensive and complex licensing regime.<sup>344</sup> The Commercial Space Launch Amendments Act (CSLAA) of 2004<sup>345</sup> makes a license mandatory for launch activities. A separate licensing regime for satellite operations administered by the Federal Administrative Agency (FAA) is also responsible for ensuring that due diligence is met and that other licenses necessary for the operations of a satellite are obtained.

To support the launch industry by maintaining the price of insurance at an affordable level, the US has put in place a liability indemnification regime. Under the regime, the liability of US launch operators licensed by the FAA in case of accident is

<sup>&</sup>lt;sup>341</sup> For instance, the USA has the most extensive and complicated regulatory regime for space activities.

<sup>&</sup>lt;sup>342</sup> Canada's space regulatory regime has been described as still evolving. Ram S. Jakhu, *Regulation of Space* Activities in Canada in Ram S. Jakhu ed. National Regulation of Space Activities (Dordrecht: Springer, 2010) at 81.

<sup>&</sup>lt;sup>343</sup> China is the third world space power after the USA and Russia but its space regulatory regime is sparse and still very closed being restricted to the government.

<sup>&</sup>lt;sup>344</sup> The US law for commercial space launch activities is set out in 49 USC 70101 Commercial Space Launch Amendments Act 2004. Other relevant provisions for space activities are contained in NASA Act, 1958; Commercial Space Launch Act, 1984; Commercial Space Launch Amendment Act 1988, Communications Satellite Act, 1962; Land Remote Sensing Policy Act, 1993, Commercial Space Act 1998, Commercial Space Transportation Competitiveness Act, Commercial Space Launch Amendment Act 2004.

See 49 U.S.C. § 70104(a) (2006); see also 14 C.F.R. § § 415.31, 431.3 (2009).

limited. Launch operators are required to purchase insurance to cover the first USD 500million of any third-party claims in the event of a launch mishap while the government will offset further claims up to USD 1.5 billion. Till date no claims have been made under these provisions.

In its 2010 space policy statement, the US declared that as part of its strategy, it would lead the development and adoption of standards/policies to minimize debris (like the UN COPUOS Guidelines). So far, the United States has also implemented to some extent the UN COPUOS Debris Mitigation Guidelines. The Department of Transportation (DOT), the Federal Communications Commission (FCC) and the FAA implement debris measures through licensing mechanisms. Other government departments like the Department of Defense (DOD) and NASA (Technical standard 8719.44) conduct their debris measures inhouse. In the face of objections by large private commercial satellite operators, in 2012, the FCC mandated that all US-licensed satellites launched after 18 March 2002 should be placed into graveyard orbits (between 200 km and 300 km) when they are no longer operational. Furthermore, the Secretary of Defense has been empowered to provide satellite tracking and space surveillance data analysis services to foreign entities under the Commercial and Foreign Entities (CFE) Program.

The CSLA Amendment in 2004<sup>346</sup> sets out a specific regime for the commercial development of reusable suborbital rockets. The regime makes provisions for experimental and commercial flights. It allows the Associate Administrator for Commercial Space Transportation (AST) in the FAA to issue experimental permits for an unlimited number of flights for a particular vehicle design. The FAA is mandated to work closely with

<sup>&</sup>lt;sup>346</sup> Commercial Space Launch Amendments Act of 2004, H.R. 5382

applicants on a case-by-case basis to determine what modifications may be made to a suborbital rocket without changing the vehicle design to an extent that would invalidate a permit.

## Canada

Even though Canada is not acclaimed as one of the major space powers, its foray into space began in 1962 as the third country to design and build its indigenous satellite, the Alouette 1. Aside from the fact that its regulatory regime is still underdeveloped, Canada is presented as a case study for two reasons. First is that it was the first country to feel the brunt of space debris back in 1972 when the Russian spy satellite Cosmos 954 crashed into its Northern territory and deposited radio-active material that cost about six million dollars to clean up. Canada's experience is mostly referred to as a precedence of the practice among states of the responsibility and liability provisions contained in the 1967 Outer Space Treaty and the 1972 Liability Convention to which both Canada and Russia are signatories. The second reason will have more significance in identifying how to begin the long and winding journey of obtaining consensus for the recommendations proposed later. By this, reference is made to Canada's extraordinary display of brevity in the adoption of Ottawa Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction within a two and half year period against the average 10 year time frame for the adoption of a treaty.<sup>347</sup>

In Canada, the federal parliament's powers to legislate over space matters derives from its exclusive competence over foreign policy and national defense and its exclusive residual authority over matters not within the exclusive jurisdiction of the provincial parliaments. In fulfillment of

<sup>&</sup>lt;sup>347</sup> Available at http://www.international.gc.ca/mines/index.aspx

Canada's obligations under the 1967 outer space treaty, the federal parliament has passed several laws with respect to the regulation of space activities and its incidental applications in telecommunications and broadcasting. The regulatory provisions are contained in the Broadcasting Act, Telecommunications Act, Telesat Canada Act, Teleglobe Canada Act and the Canadian Space Agency Act.

In Canada, there is a license requirement for the launch and operations of a remote sensing satellite but not for communications satellites for domestic services (though license is required for international services). For the present purposes, the most relevant regulations containing space debris provisions are the Canadian Remote Sensing Space System Act (implemented by the Department of Foreign Affairs and International Trade) and Radiofrequency license requirements (under the administration of *Industry Canada*). Remote Sensing Act makes provisions for postmission disposal and de-orbiting plans for Canada's remote sensing satellites, the RADARSAT series consistent with COPUOS Guidelines 5 and 6 respectively. A Radiofrequency License requires a licensee to comply with the International Telecommunication Union (ITU) regulations as well as Canada's spectrum utilization policies for licensed radio frequency bands.

As part of its spectrum utilization policy, ITU Recommendation (ITU-R) S.1003 on Environmental Protection of the Geo-orbit re-states COPUOS Guideline 1 on limitation of debris released during launch and system disposal plan which requires that a geostationary satellite at the end of its life be transferred, before complete exhaustion of its propellant, to a super synchronous graveyard orbit. These license obligations continue even after the termination of a license and oblige a former licensee to maintain any guarantee arrangements under the license and ensure observation of the disposal plans.

The Canadian example regulation can be described as a fair attempt at discharging its responsibility obligations but it is still far from comprehensive. For instance, it has been identified that mitigation without remediation cannot resolve the persisting presence of debris. But Canada's regulatory regime does not make any provisions for remediation/removal of current space debris population. In addition, the regime does not provide for recovery from non-governmental entities of payments made by the government upon the occurrence of damage caused by the space object operated by a non-governmental entity to another state. In this way, Canada's space laws shields private space operators from responsibility, which can be argued to be against the spirit of the PPP. It is suggested that the basis of recovery may be founded on either a contract of indemnity between the government and the private entity (where one has been concluded prior to the event) or in tort for breach of the duty of care. Normally, liability in tort can be upheld where three conjunctive elements are present: First, there must be in existence, a duty of care owed by the space entity, a breach of that duty and, resulting damage. It is imagined that the existence of these three elements can only be determined under Canadian law, thereby infusing more complexity to the already deeply fragmented scenario of engaging state responsibility for space activities.

To explain, an attempt to find the existence of a duty of care owed to a foreign entity by a Canadian private entity under Canadian law while operating in a global space may meet with stiff resistance. Rather, it would be more acceptable to make such queries for an existence of a duty of care within a normative framework that includes such a foreign entity as would be the case within the framework of a Protocol for collective responsibility endorsed by the states and non-state space operating entities. This would not only provide jurisprudential precedence that is presently non-existent but will be useful to crafting uniform standards for the protection of outer space. Already, Canada has expressed reservations in its submissions to COPUOS against foreign competitors that are not subjected to the same rigorous license regulations, which it perceives as competitively disadvantageous. Similar reservations have been made in other quarters and it may not long before these protestations are formalized into retaliatory policies.

#### China

After joining the space race in 1970 with the launch of its first satellite the DFH-1 onboard a Long March Vehicle, ten years later China formally became a member of UN COPUOS. Acclaimed as the third world space power, China is also held as the largest contributor to the space debris population in LEO arising from its deliberate destruction of its defunct weather satellite, *Fengyun 1c* in 2007. It is interesting to note that in the same year 2007, China signed the UN COPUOS Guidelines on Space Debris Mitigation even though the Chinese National Space Administration (CNSA) has been part of IADC since 1995 and must have played a role in the development of the IADC Guidelines from which COPUOS Guidelines is derived.

Like India, there is no private launch provider in China. Launch services are wholly provided by China Great Wall Industry Corporation (CGWIC) as the sole organization authorized to provide domestic and commercial satellite space launches.<sup>348</sup> Until 2007 when it launched its first commercial communications satellite export, NigComSat 1 procured by the Government of Nigeria, China's launch segment has primarily catered to

<sup>&</sup>lt;sup>348</sup> Y Zhao, "Regulation of Space Activities in the People's Republic of China" in Ram Jakhu ed. *National Regulation of Space Activities* (Dordrecht: Springer, 2010) at 253.

its domestic market. Since 2007, China has successfully launched other satellites including Venesat 1 and 2. Still China does not have dedicated national space legislation.

From 2001 to 2010, China enacted three Department rules mentioning space debris mitigation.<sup>349</sup> Most notable is the 2010 *Interim Procedure of Space Debris Management and Mitigation* department rule. Article 1 without referring to the international obligation in COPUOS Guidelines maintains that the purpose of the rule is "to guarantee the normal operation of spacecraft and to protect the space environment.' Although the definition of space debris in Article 1 is consistent with the COPUOS Guidelines, there are no definite provisions for prevention and mitigation of space debris. Rather, the focus of the rules is to facilitate information dissemination to its relevant organs about space debris and on prescription for debris avoidance as well as shielding mechanism for spacecraft. It is safe to conclude that debris mitigation efforts in Chinese policies are still notional and does not qualify China as an implementer of COPUOS space debris guidelines.

Spacecraft	Owner	Re-orbited	IADC Guideline	Dedicated
		above Geo	compliance?	space law?
Apstar 2R	China	257 × 345km	Yes	No
Beidou 3	China	135 × 145km	No	No
Zhongxing-22	China	835 × 860 km	Yes	No

(Table on state and non-state compliance with Art VI OST and Guidelines)

<sup>&</sup>lt;sup>349</sup> Procedure of Space Objects Registration and Management, Order No. 6 of the Commission of Science, Technology, and Industry for National Defense and the Ministry of Foreign Affairs, 8 February 2001; *Interim Procedure of Licensing Civil Space Launch Programs* Order No. 12 of the Commission of Science, Technology, and Industry for National Defense, 21 November 2002.

Eutelsat W1	EUTELSAT	564 × 631km	Yes	Yes
Telecom 2D	France	449 × 591km	Yes	Yes
AsiaSat 2	Hong Kong	247 × 299km	Yes	Yes
Insat 2E	India	149 × 198km	No	No
Cakrawatra	Indonesia	Remains in geo	No	Yes
Palapa C1	Indonesia	156 × 227km	No	Yes
Inmarsat 2 F-4	Inmarsat	635 × 697km	Yes	Yes
Intelsat VI F-2	Intelsat	336 × 382km	Yes	Yes
Amos/Intelsat 24	Israel/Intelsat	867 × 950km	Yes	No
GOES 7	USA	121 × 89km	No	No
USA 111	USA	422 × 443km	Yes	No

In summary although a number of basic components of the legal framework are in place in some countries, major gaps remain. First, a number of countries still do not have national space laws. This is a source of uncertainty for space actors, especially private ones. Second, because international space law is a public regime, it is not well suited to business transactions. Third, existing national space laws are not always business-friendly, as they were often developed with a view to security and strategic considerations, rather than with business in mind. The primary reason proffered for non compliance with COPUOS Guidelines is said to be cost.<sup>350</sup> Fears have been expressed that the compliance figures could well be reversed if other states fail to take onboard the guidelines. Fears have been expressed that the compliance figures could well be reversed if other states fail to take onboard the guidelines. The rationale for such fears is reasoned because if some operators are implementing the guidelines at substantive costs and others are not, there would be no level playing field. Apart from the competitive advantage (dis)advantage, any substantive success could be wiped out because even single debris is capable of causing colossal damage in space.

# 5.2.6. The role of states and non-states in a global governance regime: Theory and Praxis: Public Trust Doctrine and Global Governance to the Rescue

The Secure World Foundation (SWF) defines Space Sustainability as "*ensuring* that all *mankind* can *continue* to use outer space for peaceful purposes and socioeconomic benefit."<sup>351</sup> According to Markoff, it was in international space law that "for the first time in history mankind was recognized in positive law by the international legal order as a

<sup>&</sup>lt;sup>350</sup> Theresa Hitchens, "Space Debris: Next Steps presentation to "Safeguarding Space for All: Security and Peaceful Use" (Geneva, 24–25 March 2004).

<sup>&</sup>lt;sup>351</sup> [emphasis added].

subject of this order and considered as the main beneficiary of the results of the research, exploring and use of outer space.<sup>352</sup> Although the legal personality of mankind is in a limited sphere, and even though passive, it still has to be acknowledged.<sup>353</sup>

On the other hand, a majority of authors do not accept the theory of legal personality of mankind. Opponents of this view base their argument on the fact that every subject of international law must meet the required criteria and have an organ competent to represent it in international relations. Without an independent state-organization, mankind could act in outer space only by a trustee, otherwise the legal personality of mankind would hardly be accepted.<sup>354</sup> On this premise, it is my view that in assigning states the role of gate-keeping space access by private actors, Article VI of the OST conveys the notion that states are to be regarded as *Trustees* of Mankind in the context of international space law. This view is also canvassed extensively elsewhere.<sup>355</sup>

A trustee is a legal term, which in its broadest sense refers to any person who holds property, authority, or a position of trust or responsibility for the benefit of another.<sup>356</sup> Public trusteeship (or the Public Trust Doctrine – PTD) over Earth's natural resources is an ancient legal doctrine traceable to Roman law<sup>357</sup> but it has been undergoing a phenomenal comeback in modern environmental law since the past forty years.<sup>358</sup> By the 19<sup>th</sup> century

<sup>&</sup>lt;sup>352</sup> M G Markoff, *Traité de droit international public de l'espace*, (Fribourg, 1973) at 272.

<sup>&</sup>lt;sup>353</sup> K Nagy, "Nemzetközi jog - International Law" Budapest 1999 at 17.

<sup>&</sup>lt;sup>354</sup> S Courteix: L'accord régissant les activités des États sur la lune et les autres corps célestes. Annuaire Francais de Droit Public XXV 1979 at 221.

<sup>&</sup>lt;sup>355</sup> Kemal Baslar *supra* note 48 at 150.

<sup>&</sup>lt;sup>356</sup> Black's Law Dictionary, Fifth Edition (1979), at 1357.

<sup>&</sup>lt;sup>357</sup> For further discussion see JC Cooper, "Roman Law and the Maxim '*Cujus est solum*' in International Air Law" in IA Vlašić ed., *Explorations in Aerospace Law: Selected Essays by John Cobb Cooper 1946-1966* (Montreal: McGill University Press, 1968) 33-102 at 70-73.

<sup>&</sup>lt;sup>358</sup> Peter H Sand, "The Rise of Public Trusteeship in International Environmental Law" Third International Haub Prize Symposium, Murnau 2013.

the US courts took the doctrine onboard and expanded its scope by applying it to environmental resources (fisheries, forests, and wildlife).<sup>359</sup>

To ensure rights of access over the high seas, the doctrine confers fiduciary rights and duties on the Sovereign, the State.<sup>360</sup> The interpretation of the PTD by reference to a state's fiduciary rights over natural resources – a sort of guardianship for social purposes reverberates with Max Huber's conception of statehood and sovereignty.<sup>361</sup> As Huber perceives it, "statehood is the highest authority under international law within the territorial limits of its jurisdiction. But such territorial sovereignty should not reinforce its negative side of excluding the activities of other states but should be viewed in its spatial context as a space where the minimum protection of the rights of individuals is guaranteed under the guardianship of international law."<sup>362</sup>

To legitimize the acceptance of the PTD, the Constitution of Uganda,<sup>363</sup> jurisprudence from India's Supreme Court,<sup>364</sup> and legislation on the environment in South

<sup>&</sup>lt;sup>359</sup> See M.J. Bean and M.J. Rowland, *The Evolution of National Wildlife Law* (Westport, CT: Praeger, 3rd edition 1997), at 14. For opposing views see W.D. Brighton and D.F. Askman, "The Role of Government Trustees in Recovering Compensation for Injury to Natural Resources", in P. Wetterstein (ed.), *Harm to the Environment: The Right to Compensation and the Assessment of Damages* (Oxford: Clarendon Press, 1997), pp. 177-206, at 193-197.

<sup>&</sup>lt;sup>360</sup> Ward v Creswell, 125 Eng. Rep. 1165 (C.P. 1741); Gann v. Free Fishers of Whitstable, 11 Eng. Rep. 1305 (H.L. 1865).

<sup>&</sup>lt;sup>361</sup> Peter H Sand, "The Rise of Public Trusteeship in International Environmental Law" Third International Haub Prize Symposium, Murnau 2013.

<sup>&</sup>lt;sup>362</sup> Max Huber in Palmas case quoted by Muller LJ in Island of Palmas Case (1928), RIAA II 829.

<sup>&</sup>lt;sup>363</sup> Article 237(2) of Constitution of Uganda (8 October 1995) states that "...Government shall hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves, game reserves, national parks and any land to be reserved for ecological and touristic purposes for the common good of all citizens." This was relied on by the Kampala High Court in *Advocates Coalition for Development and Environment (ACODE) v. Attorney General* (2005), Misc. Cause No. 0100 of 2004, p. 10.

<sup>&</sup>lt;sup>364</sup> The Indian High Court made the following statement in the case of *Mehta v. Kamal Nath et al*: "The state is the trustee of all natural resources which are by nature meant for public use and enjoyment. The public at large is the beneficiary of the sea-shore, running waters, forests and ecologically fragile lands. The state as trustee is under a legal duty to protect the natural resources." (13 December 1996), [1997] 1 S.S.C. 388. See also MR Anderson, "International Environmental Law in Indian Courts" (1998) 7 Rev Eur Comm & Int'l Envtl L at 29; R Deepak Singh, "Response of Indian Judiciary to Environmental Protection: Some

Africa<sup>365</sup> contain elements of the PTD. Also, the French Administrative Law concept of *domaine public* invests the state with guardianship and not ownership over inalienable natural resources.<sup>366</sup> In addition, the work of Joseph Sax elevated the PTD to another level.<sup>367</sup> Not only did Sax broaden the scope of public trusteeship from its narrower historical origins to the full spectrum of environmental resources, he also identified civil societies as the ultimate beneficiaries of the trust with the power to enforce the trust through citizens' suits by virtue of their status as members of the public.<sup>368</sup>

Further more, there is empirical evidence that the PTD is widely recognized and accepted in national and transnational environmental governance regimes as illustrated by the UNESCO World Heritage Convention,<sup>369</sup> the Antarctic regime and the Seabed regime of the Convention on the Law of the Sea.<sup>370</sup>

Working on a project on "innovation in international law" sponsored by the United Nations University, Edith Brown Weiss elaborated the dimension on intergenerational

Reflections", (1999) 39 Indian J Int'l L at 458; J Razzaque, "Application of Public Trust Doctrine in Indian Environmental Cases", (2001) 13 J Envtl L 221.

<sup>&</sup>lt;sup>365</sup> Article 2(4)(o) of National Environmental Management Biodiversity Act (NEMBA) No. 107 of 1998 provides that "[t]he environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest, and the environment must be protected as the people's common heritage." See E. van der Schyff, "South African Natural Resources, Property Rights and Public Trusteeship: Transformation in Progress", in D Grinlinton and P Taylor (eds.), *Property Rights and Sustainability: Toward a New Vision of Property* (Leiden: Nijhoff Brill, 2011), pp. 323-340.

<sup>&</sup>lt;sup>366</sup> J.P. Lebreton, *Le domaine public* (Paris: Documentation Française, 1988) at 19.

<sup>&</sup>lt;sup>367</sup> J.L. Sax, *Defending the Environment: A Strategy for Citizen Action* (New York: Alfred Knopf, 1971), JL Sax, "Liberating the Public Trust Doctrine From Its Historical Shackles" (1980) 14 U Cal Davis L Rev185.

<sup>&</sup>lt;sup>368</sup> JL Sax, "Emerging Legal Strategies: Judicial Intervention", (1970) 389 Annals Am Aca Pol & Soc Sci 389 (1970), at 71-76; JL Sax, "Environmental Citizen Suits: Three Years' Experience under the Michigan Environmental Protection Act" (1974) Ecology Law Q 4 1-62. But see recent resistance by way of more restrictive interpretations of citizen standing rights by the US and Michigan Supreme Courts examined in H Terry, "Still Standing But Teed Up: The Michigan Environmental Protection Act's Citizen Suit Provision After *National Wildlife Federation v. Cleveland Cliffs*" *Mich S L Rev* [2005] at 1297-1324.

<sup>&</sup>lt;sup>369</sup> UNESCO Doc. SHC/MD/18/Add.1 (1972); see R.L. Meyer, "*Travaux Préparatoires* for the UNESCO World Heritage Convention" *Earth Law Journal* 2 (1976) 45 at 48.

<sup>&</sup>lt;sup>370</sup> AC Kiss, *Introduction to International Environmental Law* (Geneva: United Nations Institute for Training and Research, 1997) at 109. AC Kiss and D. Shelton, *International Environmental Law* (Ardsley-on-Hudson, NY: Transnational Publishers, 1991) at 19-20, 249.

trusteeship first formulated in 1984 in an essay on "The Planetary Trust: Conservation and Intergenerational Equity."<sup>371</sup> Her principles of intergenerational trusteeship with regard to the Earth's natural and cultural resource base including the rights and obligations derived under these principles provided the normative framework for implementing the global goal of environmentally sustainable development that was expressed in the 1987 Brundtland Commission Report.<sup>372</sup> Since then several proposals have been expressed extending the PTD to the global commons.<sup>373</sup>

# 5.2.7 Application of Public Trust Doctrine in International Space Law

Having analyzed the environmental consequences of space debris proliferation and located the phenomenon within the context of my chosen theoretical framework as anchored on transcendental humanity and state non-territoriality, the PTD doctrine serves to further acknowledge or reinforce the pillar upon which space regulation is built at the international level. This conclusion is inevitable especially if taking into account the argument for the recognition of humanity as a distinct international legal entity in this area. It also follows the language of the Outer Space Treaty.

Elements of the PTD are easily identifiable in the space treaties as it relates to the governance of the final frontier as a *res communis*. Apart from Arts I, VI and IX of the OST, which have already been extensively discussed, Art II espouses the principle of non-

<sup>&</sup>lt;sup>371</sup> E. Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (New York: Transnational Publishers, 1989).

 $<sup>^{372}</sup>$  E. Brown Weiss, "Our Rights and Obligations to Future Generations for the Environment" (1990) 84 Am J Int L 198-207.

<sup>&</sup>lt;sup>373</sup> S. Borg, "The Trusteeship Council as a Keeper of the Global Commons for Future Generations, and the Role of Diplomacy in Implementing Effective Environment Protection", in D.J. Attard (ed.), *Colloquium on the Legal Protection of the Environment Beyond the Limits of National Jurisdiction* (Malta: Mediterranean Academy of Diplomatic Studies, 1992). H. Cleveland, "The Global Commons: A Global Commons Trusteeship Commission is Needed to Guide our Use of the Oceans, Antarctica, the Atmosphere, and Outer Space", (1993) 27 *Futurist* 3, at 9-13.

appropriation of outer space by means of use or occupation. In addition, Art X refers to the equality of states in obliging requests received from other member states to observe launches. Article XI advocates information sharing not only among states but also with the international scientific community without any reference to governmental restrictions on the basis of national security or interest. The Rescue Agreement, Liability Convention and to a greater extent, the Moon Agreement build on the PTD in their prescriptions on the nature of the frontier vis a vis the rights and obligations of the states as trustees of mankind. By these provisions, the interest of the international community is given priority over national interest or security.

# Conclusion

International space law is hinged on non-territoriality, that is, the understanding that outer space belongs to all humanity and that its exploitation has to be conducted in a manner that takes this into account. If outer space belongs to all mankind it will be contradictory of any state or group of states to claim exclusive territorial control over it. Whether or not equality of claim can be maintained given the diversity in country-specific readiness and potential to act in outer space should be an entirely different question. That there are countries that may not have the resources or technical means to conduct any meaningful activities in outer space should not detract from their rights as equal beneficiaries in its use and exploitation.

This latter point is at the crux of contemporary efforts not only to regulate activities in outer space but also to manage the environmental consequences such as the issue of space debris. This study has shown that terrestrial environmental concern is now considered within space activities conducted on earth, for instance in Environmental Impact Assessments. But even more significant in this regard is that the same legal and political challenges of managing environmental challenges on earth are as well reincarnated in various guises in outer space regulation. At least in one such area the similarities in the challenges posed could not be any starker.

There are only a handful of countries that have the capabilities of conducting meaningful scientific activities in outer space. Those also happen to be among the world's richest countries. Their use of outer space is carefully marked by the intersection of self-centered national interests and the freedom of their private entities to put that domain to profitable commercial use. They are able to generate for themselves national and commercial benefits but are not willing to accept responsibility for the environmental damages that their activities precipitate. These countries also have the political clout in the international arena to set the agenda for international regulation and often rig the consultation and decisions in their own favor.

A casual observer would not fail to notice a parallel in the way the world powers respond to international concerns about their environmentally deleterious activities in both the earth and outer space. One area where this is most evident and which I will use for purposes of illustration is with respect to the debate about climate change and greenhouse gas emissions. The states that I have described above in relation to the exploitation of outer space are also disproportionately responsible for the environmental catalysts of climate change. But not only do they deny the reality of climate change they have used every rule in the book to thwart all efforts to reach an international agreement on combating it.<sup>374</sup>

And as many questions often beg for answers in relation to the climate change debate so also in relation to outer space management as we have seen. In fact it has been offered that international space law is in some sort of conundrum.<sup>375</sup> As with climate change, this has been brought about by gaps noticeable in the international legal regime which lack of consensus at the international level prevents a resolution. In the absence of agreement among states for the best way forward, attention shifts increasing to what is known generally as private global governance or regulatory regimes and "soft law" to cover the gaps that exist. The same question is raised in the context of governance of outer space and the problem of space debris.

Although both COPUOS and IADC Debris Guidelines address some of the regulatory challenges, they do not cover all. To minimize the risks posed by space debris, a three-pillar approach has been suggested as an imperative condition for an effective environmental space regime. The three pillars are debris mitigation, debris removal and space traffic management.<sup>376</sup> Practical efforts like Active Debris Removal (ADR) and On-Orbit Servicing (OSS); are being spearheaded by the private actors towards tackling this problem. ADR is used to remove objects in LEO whereas OSS is typically aimed at GEO-

<sup>&</sup>lt;sup>374</sup> For example, the United Nations Framework Convention for Climate Change of 1997, otherwise known as the "Kyoto Protocol" was voted down by the United States Senate by a vote of 95 to 0. See "The Governance of Climate Change: Prospects for a Regional Initiative" Online: <a href="http://csis.org/files/publication/111028">http://csis.org/files/publication/111028</a> Hills GovernanceClimateChange.pdf> at 6.

<sup>&</sup>lt;sup>375</sup> See Gerardine Meishan Goh, "Softly, Softly Catchee Monkey: Informalism and the Quiet Development of International Space Law" (2008) 87 Neb L Rev 725 at 726. See also Nina Tannenwald, "Law Versus Power on the High Frontier: The Case for a Rule-based Regime for Outer Space" (2004) 29 Yale J Int'l L 363.

<sup>&</sup>lt;sup>376</sup>Brian Weeden, Space Sustainability: To Preserve and to Protect, *Satmagazine* (17 March 2009), online: Satmagazine <a href="http://www.satmagazine.com">http://www.satmagazine.com</a> at 25.

based objects by either refueling operational satellites to increase their lifetimes or to safely lift dead, redundant or failed satellites to graveyard orbits. With the current conundrum arising from failure to reach agreements at the international level, private regulatory approaches and soft law might prove useful in the design of solutions.

The removal of space debris is probably one of the most challenging issues in sustainable space management. Not only does it require extensive capital injection it also faces the legal conundrum caused by Article VI of the OST. A recommendation for right of salvage is advocated and proposes that if an object or vehicle placed in orbit becomes derelict, abandoned, or reaches the end of lifetime due to breakdown or runs out of fuel, any third party could be permitted to salvage the object without the explicit permission of the original owner. But there are still bureaucratic implications because such a private venture requires the authorization and supervision of a government through one or more agencies, which bear responsibility for such a private entity.

With my analysis up to this point as background, I join the call to move beyond the Outer Space Treaty and all other state-centered regulatory frameworks because of the underlying political undercurrents that seem to stress norm generation and enforcement and utilize the resources of private regulatory regime within the rubric of global governance to facilitate a new regime. The first issue is to extend responsibility for the generation of space debris to non-state actors such that they can no longer hide under the protection of states to conduct unacceptable environmental practices in outer space. Using the PTD doctrine to advance the guardianship of states, there is a case to unify all space actors under one normative framework for a safe, sustainable use of the final frontier in the interest of all mankind.

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With that particular issue out of the way, the next challenge is to decide on the most viable governance model to employ. One thing is clear already. There is a public/private dimension to the exploitation of outer space especially in the development of useful technological tools for various industry sectors. This is at the level of resource generation and maximization of capital. However, in terms of assigning responsibility for the consequences of such resource generation activities it is less clear whether that public/private link exists.<sup>377</sup> This has great implications for effective regulatory and governance measures. There is therefore a great need to clearly recognize the public/private synergy in designing a governance regime that takes into account the realities of the moment.

Pelton states that nearly half the world's models with regard to space activities involve the effective and cost-efficient use of commercial management techniques.<sup>378</sup> This would suggest that a public only governance arrangement would face serious challenges from the start. He therefore suggests a hybrid public/private approach that has better possibility of producing "better overall results than trying to operationalize service under a national space agency."<sup>379</sup> While Pelton's suggestion targets national space operations, it would have considerable implications as well for the global effort to harness the resources of outer space.

Space debris is a reality that stares international space regulation in the face. In various parts of this thesis there is a clear understanding that current regulations leave far too many gaps and are therefore inadequate. There is a feeling that they have to be updated

<sup>&</sup>lt;sup>377</sup> N Jasentuliyana, "Space Debris and International Law" (1998) 26 J Space L 139 at 143.

<sup>&</sup>lt;sup>378</sup> Joseph N Pelton, "Organizing Large Space Activities: Why the Private Sector Model always Wins" (1992) Space Pol'y 233 at 243.

<sup>&</sup>lt;sup>379</sup> *Ibid*.

to keep pace with the same intensity that outer space activities are being conducted. And it has to be a holistic arrangement that accounts for the actions of all actors as well as accord recognition to mankind as the major beneficiary of space utilization. There is also a need to allocate responsibility among all the space actors as a way to provoke a behavioral change in practices that endanger the last frontier.

All said and done, the stark reality is that despite analogous regimes on environmental responsibility that are in existence, and in some cases applicable to the regime governing outer space, the proliferation of space debris persists. It calls to question the possibility of ever attaining a regulatory regime in this regard. The task herein is two-fold:

1. Obtaining the consent of states:

The point has been made earlier about the consent of states being the basis for imposition of responsibility in international law. The other mechanism is where a practice has attained the status of customary international law to suggest practice informed by consent of a majority of states. With the current low level of adherence, any chance of the UN COPUOS Guidelines acquiring the status of customary international law is still far in sight. This is also true for a number of reasons. The major space-faring States have placed priority on the freedom to conduct weapon testing over and above debris prevention and control. In addition, the practical reality is that because of the protection accorded space technology generally, a satellite is worth more dead than alive; so any coherent remediation action is still notional.

### 2. Acceptance by Non-State (Private Entities)

The "Occupy" movement that appeared briefly in the last two or so years ago to protest corporations "race to the bottom line" demonstrates that what occupies the heart of

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corporations is money. Money is said to be the value of all things. Cost is blamed for low compliance with the UN COPUOS Guidelines by non-state entities. Put simply, there has to be economic incentives in order to get the non-state entities to buy-in to a regulatory regime that affects their bottom line.

In view of the foregoing, given that the path to a debris free environment is present, the question is how to change the political will that is currently absent. Put simply, the question of how the acceptance or buy-in of the states can be achieved is one that cannot be resolved in the present time. However, it will suffice to state that a catastrophic event like what occurred in the Titanic incidence, the PanAm Air shooting disaster and Sept 11 could be where the answer to this question lies. Perhaps, upon the occurrence of a cataclysmic event will States find value in a thesis like the present one.

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