To Infinity and Beyond: The Adequacy of Current Space Law To Cover Torts Committed in Outer Space

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I. INTRODUCTION

On January 11, 2007, a Chinese missile test destroyed an aging Chinese weather satellite, leaving in its wake a field of debris that could endanger other satellites or the international space station.[1] This debris will take over twenty years to dissipate, leaving objects in space in danger.[2] Thus far, no action has been taken against the Chinese for testing the weapon, and no damage has been reported. But the danger of their action raises the question of whether current treaties are adequate for imposing liability for this or similar actions.

Three treaties, the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty), the 1972

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1. Mark Carreau, *China's Missile Test Has Its Price: Satellite's Destruction Hurt Potential Cooperation with NASA, Experts Say*, Jan. 29, 2007, http://www.chron.com/disp/story.mpl/headline/world/4506382.html.

2. *Id.*

Convention on International Liability for Damage Caused by Space Objects (Liability Convention), and the 1975 Convention on Registration of Objects Launched into Outer Space (Registration Convention), regulate conduct in space specifically as it relates to space debris colliding with satellites already in orbit.[3] None of these treaties has been updated since 1975, which poses the question of whether they are sufficient for our technologically advanced society with thousands of commercial and governmental satellites. Space law has been compared to admiralty law because the seas and space, generally, are viewed to be for the use and benefit of all countries. However, admiralty law is much more developed than space law with respect to torts. As the world uses space more, space law must be further developed.

In Part II of this Comment, I will discuss the history and development of Space Law. Part III will focus on the current space treaties as they relate to the treatment of torts committed in outer space. Part IV will examine the manner in which admiralty laws deal with torts on the seas and will discuss how those laws could be adapted in order to update current space law. Part V will look at how the outer space treaties could deal with the Chinese missile test debris and other space debris. Part VI will propose possible changes that should be made in order to better adapt current space law to deal with the growing problem of space debris, and, specifically, torts committed when this debris collides with objects in space.

II. HISTORY OF SPACE LAW

The beginning of space exploration caused a wave of diplomatic issues as nations scrambled to define what space was and to whom it belonged.[4] The United States and its Western allies submitted proposals to the United Nations in 1957 that would have reserved the use of outer space for peaceful purposes. The Soviet Union resisted these measures because it was about to launch the world's first satellite and test its first intercontinental ballistic missile.[5] In 1958, the United Nations formed the U.N. Ad Hoc Committee on the Peaceful Uses of Outer Space

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3. Adelta Legal, The Space Treaties, http://www.spacelaw.com.au/content/definitional.htm (last visited Sept. 4, 2007).

4. W. MCDOUGALL, THE HEAVENS AND THE EARTH: A POLITICAL HISTORY OF THE SPACE AGE, *reprinted in* GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 5-6 (1989).

5. Arms Control Ass'n, Arms Control Association Fact Sheet: The Outer Space Treaty at a Glance, Sept. 2003, http://www.armscontrol.org/factsheets/outerspace.asp.

(COPUOS).[6] COPUOS became a permanent U.N. body in 1959 and enabled the United Nations to act as the principal body for the development of outer space law.[7] In 1962, the United Nations created the Office for Outer Space Affairs (OOSA) to complement COPUOS.[8] OOSA is responsible for assisting developing countries in using outer space technology and providing technical service and information to Member States.[9]

Beginning in the early 1960s, the United Nations began working to create and implement a system of space law that could coincide within the existing framework of international law.[10] So far, five major international treaties have been negotiated and ratified.[11] The five main space treaties are the Outer Space Treaty; the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement); the Liability Convention; the Registration Convention; and the 1979 Agreement Governing the Activities of States on the Moon and other Celestial Bodies (Moon Agreement).[12] The focus here will be on the Outer Space Treaty, the Liability Convention, and the Registration Convention.

The United Nations has continued to hold conferences addressing ways to help developing nations implement space projects,[13] but has not updated the original five treaties.

III. CURRENT TREATIES

A. The Outer Space Treaty

The Outer Space Treaty entered into force on October 10, 1967.[14] It represents the basic legal framework of international space law.[15]

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6. Julie C. Easter, *Spring Break 2023—Sea of Tranquility: The Effect of Space Tourism on Outer Space Law and World Policy in the New Millennium*, 26 SUFFOLK TRANSNAT'L L. REV. 349, 353 (2003).

7. *Id.* at 353-54.

8. *Id.* at 355.

9. *Id.*

10. Adelta Legal, *supra* note 3.

11. *Id.*

12. *Id.*

13. Easter, *supra* note 6, at 355-58.

14. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

15. Lloyd Axworthy, *Prevention of an Arms Race in Outer Space*, A DISARMAMENT AGENDA FOR THE 21ST CENTURY, DDA OCCASIONAL PAPERS NO. 6 (U.N. Dep't for Disarmament Aff., New York, N.Y.), Oct. 2002, at 106, *available at* http://disarmament.un.org/ddapublications/op6contents.htm.

However, the political, social, and economic conditions during the development of the treaty were quite different from the current international environment.[16] Russia launched Sputnik one year prior to the formation of the committee that drafted the Outer Space Treaty, and most nations who participated in the space program did so with the sole purpose of showing their technological superiority over other nations.[17] At the time, private companies did not see their place in the space race and had not contemplated launching commercial satellites.[18] "The Outer Space Treaty was ratified by more than ninety nations and signed by twenty-seven, including the United States."[19] Due to its overwhelming support in the international community, the Outer Space Treaty is considered international law.[20]

The Outer Space Treaty developed from the idea of the "common heritage of mankind" (CHM) principal which states that "no one person or State owns designated international 'common heritage' regions."[21] Generally, the CHM principal revolves around common heritage areas not being subject to appropriation and States sharing in the resource management and benefits derived from those areas.[22] Additionally, common heritage areas may only be used for peaceful purposes.[23]

The treaty begins by addressing common goals and interests of the parties to the treaty, including the common interest of all mankind in the progress and use of outer space for peaceful purposes, the notion that the benefits of space exploration should be for all people irrespective of their economic or scientific development, and the desire for space exploration to strengthen friendly relationships between nations and peoples.[24] Article I of the treaty addresses the opportunity for equality of use by all people, stating, in part: "Outer space . . . shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies."[25] Article III states that all activities in outer space should be carried out in accordance with international law and the Charter of the United Nations "in the interest of maintaining

16. Jonathan Thomas, *Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation*, 1 INT'L L. & MGMT. REV. 191, 198 (2005).
17. *Id.*
18. *Id.*
19. *Id.*
20. *Id.*
21. *Id.* at 196.
22. *Id.*
23. *Id.*
24. Outer Space Treaty, *supra* note 14, proclamation.
25. *Id.* art. I.

international peace and security and promoting international co-operation and understanding."[26]

Article VI introduces the concept of liability which will later be addressed by the Liability Convention. This article indicates that parties to the treaty shall bear international responsibility for their nation's activities, both private and public, in outer space.[27] It also provides that nongovernmental activities are subject to the proper authorization and approval from their respective governments.[28] Article VII furthers the concept of liability by stating:

> 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.[29]

Article IX lays out the principle of cooperation and mutual assistance to be shared by all users of outer space.[30] This cooperation includes the understanding that exploration and use of outer space should be conducted so as to avoid harmful contamination and adverse changes in the environment.[31] If a party believes that an activity could be harmful, it should consult with the appropriate international organizations before proceeding with such activity.[32] Article XI states the procedure for reporting activities to be conducted in space to the Secretary-General of the United Nations.[33] Upon receiving the information, the Secretary-General should be prepared to disseminate it immediately and effectively.[34]

B. The Liability Convention

The Liability Convention was entered into force on September 1, 1972.[35] The parties to this treaty recognized that although precautionary measures had already been taken through other treaties, the inevitable

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26. *Id.* art. III.
27. *Id.* art. VI.
28. *Id.*
29. *Id.* art. VII.
30. *Id.* art. IX.
31. *Id.*
32. *Id.*
33. *Id.* art. XI.
34. *Id.*
35. Convention on International Liability for Damage Caused by Space Objects, *opened for signature* Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S 187 [hereinafter Liability Convention].

collision between space objects required guidelines to ensure prompt compensation to damaged parties.[36] Article I of the Liability Convention begins by defining several terms.[37] It defines damage as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations."[38] Launching under article I includes an "attempted launching"; a launching State is defined as a State who launches or a State from which an object is launched.[39] The term "space object" is defined to include both "component parts of a space object as well as its launch vehicle and parts."[40] Article II establishes that the launching State shall be absolutely liable for damage "caused by its space object to the surface of the Earth or to an aircraft while it is in flight."[41] Article III provides that, should damage be caused somewhere outside the surface of the Earth, the launching State will only be liable "if the damage is due to its fault or the fault of persons for whom it is responsible."[42]

Article IV deals with the complicated situation of damage caused by two launching States to a third launching State.[43] The two damaging launching States are to be jointly and severally liable to the damaged State.[44] If the damage is caused on the surface of the Earth, the liability to the third State will be absolute, but if the damage occurs anywhere else, it will be based on fault.[45] Article IV also notes that in the case of joint and several liability, compensation for the damages shall be apportioned according to fault.[46] If the proportion of fault cannot be established, each State at fault will be equally liable.[47] However, the above-mentioned apportionment does not exclude the right of the damaged party to pursue the entire compensation from either liable launching State.[48]

Article V states that "whenever two or more States jointly launch a space object, they shall be jointly and severally liable for any damage

36. *Id.* preambulatory clauses.
37. *Id.* art. I.
38. *Id.* art. I, § a.
39. *Id.* art. I, §§ b-c.
40. *Id.* art. I, § d.
41. *Id.* art. II.
42. *Id.* art. III.
43. *Id.* art. IV.
44. *Id.* art. IV, § 1.
45. *Id.* art. IV, § 1(a).
46. *Id.* art. IV, § 2.
47. *Id.*
48. *Id.*

caused."[49] It also provides that a launching State that has paid compensation has the right to file a claim for indemnification from any other participants in a joint launching.[50] Article VI allows for exoneration from absolute liability if it can be established that the damage was caused by either gross negligence or an omission with intent to cause damage.[51] However, article VI also states that no exoneration is available "where the damage has resulted from activities conducted by a launching State which are not in conformity with international law," particularly the Outer Space Treaty.[52]

Article VII prohibits claims for damage when the damage caused by a launching State occurs to nationals of that launching State or foreign nationals involved in the operation of the damaging space object.[53] Article VIII simply states that "a State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage."[54] Article IX provides that such a claim for compensation should be presented through diplomatic channels.[55] If the damaged State does not have diplomatic relations with the launching State, then the claim can be presented through another State or through the Secretary-General of the United Nations.[56]

Article X notes that a claim for compensation for damages must be presented to the launching State within one year of the damage occurrence.[57] If a State does not know of the damage within one year, it has one year from the date that it learns of the damage to file a claim.[58] The one year time limit applies even if the full extent of the damage is not known until after the year has passed.[59] Article XI provides that in order to claim damages under this treaty, local remedies do not have to be exhausted.[60] However, this treaty does not prevent a damaged party from seeking compensation through local means.[61]

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49. *Id.* art. V, § 1.
50. *Id.* art. V, § 2.
51. *Id.* art. VI, § 1.
52. *Id.* art. VI, § 2.
53. *Id.* art. VII.
54. *Id.* art. VIII, § 1.
55. *Id.* art. IX.
56. *Id.*
57. *Id.* art. X, § 1.
58. *Id.* art. X, § 2.
59. *Id.* art. X, § 3.
60. *Id.* art. XI, § 1.
61. *Id.* art. XI, § 2.

Under article XII, compensation "shall be determined in accordance with international law and the principles of justice and equity" and should restore the damaged party "to the condition which would have existed if the damage had not occurred."[62] Article XIII provides that the compensation shall be paid in the currency of the claimant State unless the claimant State requests the currency of the paying State.[63] Article XIV provides:

> If no settlement of a claim is arrived at through diplomatic negotiations as provided for in article IX, within one year from the date on which the claimant State notifies the launching State that it has submitted the documentation of its claim, the parties concerned shall establish a Claims Commission at the request of either party.[64]

Under article XV, the Claims Commission must be composed of three members including one appointed by the claimant State, one appointed by the launching State, and a Chairman to be chosen by both parties jointly.[65] If the parties cannot agree on a Chairman within four months, they may request the Secretary-General of the United Nations to appoint one.[66] Article XVI provides that "[i]f one of the parties does not make its appointment within the stipulated period, the Chairman shall, at the request of the other party, constitute a single-member Claims Commission."[67] All decisions by the Commission shall be by majority vote.[68] If more than one launching State is involved in a claim, the number of members on the Claims Commission does not increase under article XVII.[69] Instead, the parties collectively appoint the members in the same fashion as earlier addressed by this treaty.[70] Article XVIII establishes the Claims Commission's role to decide "the merits of the claim for compensation and determine the amount of compensation payable, if any."[71]

Under article XIX, the Commission's decision is final and binding unless the parties have agreed otherwise.[72] If the parties have agreed otherwise, the Commission's recommendation shall be considered by the

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62. *Id.* art. XII.
63. *Id.* art. XIII.
64. *Id.* art. XIV.
65. *Id.* art. XV, § 1.
66. *Id.* art. XV, § 2.
67. *Id.* art. XVI, § 1.
68. *Id.* art. XVI, § 5.
69. *Id.* art. XVII.
70. *Id.*
71. *Id.* art. XVIII.
72. *Id.* art. XIX, § 2.

parties in good faith.[73] Additionally, this article provides that the Commission should give its decision within one year and that the decision should be made public with a certified copy delivered to the Secretary-General of the United Nations.[74] In article XX, the treaty provides that the expenses of the Claims Commission should be distributed equally between both parties unless otherwise decided by the Commission.[75]

Article XXI offers additional assistance to injured parties "[i]f the damage caused by a space object presents a large-scale danger to human life or seriously interferes with the living conditions of the population or the functioning of vital centres."[76] In this case, the launching State should consider offering immediate assistance to the damaged party.[77] This additional relief option does not limit other remedies provided in the treaty.[78]

Article XXII defines the parties to whom this treaty applies.[79] Any reference to States is meant to apply to "any international intergovernmental organization which conducts space activities."[80] It qualifies this statement by requiring such organizations to accept both the Liability Convention and the Outer Space Treaty.[81] Article XXIII cautions that this treaty should not affect relations between parties concerning other relationships and agreements.[82] Article XXIV opens this treaty to all States for signature.[83] States can also accede to this treaty at any time.[84] Additionally, under this article, if States accede to this treaty after it is entered into force, it shall be entered into force on the date of ratification.[85]

Article XXV offers the opportunity for any party who has signed this treaty to offer suggestions for amendments to the treaty.[86] According to article XXVI, ten years after this treaty is entered into force, it will automatically be placed on the United Nations agenda to consider

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73. *Id.*
74. *Id.* art. XIX, §§ 3-4.
75. *Id.* art. XX.
76. *Id.* art. XXI.
77. *Id.*
78. *Id.*
79. *Id.* art. XXII.
80. *Id.* art. XXII, § 1.
81. *Id.*
82. *Id.* art. XXIII, § 1.
83. *Id.* art. XXIV, § 1.
84. *Id.*
85. *Id.* art. XXIV, § 4.
86. *Id.* art. XXV.

revisions.[87] However, at any time after the treaty has been in force for five years, if one-third of the parties agree, the treaty can be considered for revision.[88] Article XXVII offers any party to this treaty the opportunity to withdraw one year after notification of withdrawal has been submitted.[89]

C. The Registration Convention

The Registration Convention was entered into force on September 5, 1976.[90] The main focus of the treaty is to establish a mandatory registry of all objects launched into outer space to be kept by the Secretary-General of the United Nations.[91] Article I begins by defining "launching State" and "space object" the same way in which they were defined in the Liability Convention.[92] The Registration Convention defines "State of registry" as "a launching State on whose registry a space object is carried in accordance with article II."[93]

Article II stipulates that "[w]hen a space object is launched into earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain."[94] The launching State is to inform the Secretary-General of the United Nations when such a registry is established.[95] If more than one State is involved in a launching, they are to jointly determine which one of them should register the object in accordance with this agreement.[96] Article II also notes that "[t]he contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned."[97] Article III provides that the Secretary-General of the United Nations shall maintain the information provided to him in a registry that shall be open to the public.[98]

Article IV reveals the information that is required to be disclosed for the registry.[99] Such information includes the names of the launching

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87. *Id.* art. XXVI.
88. *Id.*
89. *Id.* art. XXVII.
90. Convention on the Registration of Objects Launched into Outer Space, *opened for signature* Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].
91. *Id.* preambulatory clauses.
92. *See id.* art. I, §§ a-b; Liability Convention, *supra* note 35, art. I, §§ c-d.
93. Registration Convention, *supra* note 90, art. I, § c.
94. *Id.* art. II, § 1.
95. *Id.*
96. *Id.* art. II, § 2.
97. *Id.* art. II, § 3.
98. *Id.* art. III.
99. *Id.* art. IV, § 1.

States, an appropriate designator of the space object or its registration number, the date and location of the launch, basic orbital parameters, and the general function of the space object.[100] After a launching State provides the initial information, it is free to update the information on the registry.[101] Additionally, if an object previously registered leaves Earth's orbit, the launching State should notify the Secretary-General of the United Nations.[102]

Article VI states that if a party to this treaty is not able to identify a space object "which has caused damage to it or to any of its natural or juridical persons, or which may be of a hazardous or deleterious nature," other States, particularly those possessing space monitoring equipment, should offer their assistance in identifying the potentially damaging object.[103] Like the Liability Convention, article VII defines "State" as any international intergovernmental organization that conducts activities in space and that accepts the terms of the space agreements.[104]

Article VIII offers parties who have not yet signed this treaty the opportunity to sign it at any time.[105] When new parties do sign, the Secretary-General shall report this information to all other signing parties.[106] Article IX opens the floor for all signing parties to suggest amendments to this treaty.[107] Article X establishes that after ten years, this treaty shall automatically be considered by the United Nations General Assembly for revision.[108] It also offers the opportunity for expedited revision consideration after five years if a majority of the parties to this treaty deem it necessary.[109] Article XI allows parties to withdraw from this treaty one year after it has been in force.[110] Such withdrawal is effective one year after it is submitted.[111]

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100. *Id.*
101. *Id.* art. IV, § 2.
102. *Id.* art. IV, § 3.
103. *Id.* art. VI.
104. *See id.* art. VII, § 1; Liability Convention, *supra* note 35, art. XXII, § 1.
105. Registration Convention, *supra* note 90, art. VIII, § 1.
106. *Id.* art. VIII, § 5.
107. *Id.* art. IX.
108. *Id.* art. X.
109. *Id.*
110. *Id.* art. XI.
111. *Id.*

D. Analysis of Treaties

When the space treaties we have discussed were originally drafted, they were deemed adequate for that day and time.[112] Today, however, we have moved to an age of space exploitation and exploration, where any legal problems arising from space use will likely "be immense in scope and complexity."[113] Just one example of this complexity is the use of geostationary orbit for communication satellites.[114]

Ambassador Arthur J. Goldberg told the United Nations on December 17, 1966, that the Outer Space Treaty was never intended to provide "for every contingency that might arise in the exploration and use of outer space, many of which are unforeseeable."[115] Instead, the treaty was meant "to establish a set of basic principles."[116] In other words, the Outer Space treaty does not provide solutions to every problem.[117]

Article VI of the Outer Space Treaty imposes general international responsibility for space activities while article VII says the launching State should be internationally liable for damages.[118] These terms are vague and not necessarily indicative of a legal liability but instead more declarative of policy.[119] This proposition can be rebutted by articles I and III using the term "international law."[120] Many, but not all, of these gaps and vagaries were corrected by the Liability Convention.[121]

Five years after the Outer Space Treaty, the Liability Convention attempted to mend the situation by doing two things.[122] It first sought to "create, define, and illustrate several concepts of legal liability."[123] It then attempted to apply the concept of legal liability by providing for a Claims Convention, if and when the disputants could not reach an agreement on their own.[124] The same argument regarding vague language that was

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112. Sylvia Maureen Williams, *Dispute Settlement According to the Conventions on Inmarsat and Intelsat*, *in* SETTLEMENT OF SPACE LAW DISPUTES: THE PRESENT STATE OF THE LAW AND PERSPECTIVES OF FURTHER DEVELOPMENT 63, 63 (Karl-Heinz Böckstiegel ed., 1980).

113. *Id.*

114. *Id.*

115. MORRIS D. FORKOSCH, OUTER SPACE AND LEGAL LIABILITY 41 (1982).

116. *Id.*

117. *Id.* at 54.

118. *Id.* at 55.

119. *Id.*

120. *Id.* at 56.

121. *Id.* at 69-70.

122. *Id.* at 69.

123. *Id.*

124. *Id.*

made for the Outer Space Treaty can be made for the equally ambiguous Liability Convention.[125]

Several questions arise after reading the somewhat nebulous language of the Liability Convention.[126] The first question involves determining exactly who may bring a claim under the Liability Convention.[127] As noted above, article VIII of the Liability Convention allows a State which suffers damage, whose residents suffer damage, or whose territory suffers damage, to bring a claim.[128] The Liability Convention further stipulates that the term "State" applies to any international intergovernmental organization which conducts space activities.[129] A problem arises when "international intergovernmental organization" is substituted into the treaty language in place of the word "State."[130] Because the treaty language uses the phrase "State of nationality," when "international intergovernmental organization" is substituted in, it leaves an *international* intergovernmental organization of *nationality* which seems a bit paradoxical.[131] By nature, an international organization hardly has any nationality.[132] It can be argued that the physical premises occupied by the international organization is its territory, but that overlaps the claim of the State.[133] Regardless, the question remains as to who should bring the claim, or more importantly, who should receive the damages: the international intergovernmental organization or the State in which such organization is located.[134]

Another question arises in the case of individuals as well as private or public organizations who are not international intergovernmental organizations but who wish to file a claim.[135] It appears from the language of the treaty that the only option for members of this category is to file a claim through the respective State.[136] Again, it is unclear who would receive the damages for such a claim or whether a State would even be willing to bring such a claim on behalf of individuals,[137] because

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125. *Id.*

126. Stephen Gorove, *Dispute Settlement in the Liability Convention*, *in* SETTLEMENT OF SPACE LAW DISPUTES: THE PRESENT STATE OF THE LAW AND PERSPECTIVES OF FURTHER DEVELOPMENT, *supra* note 112, at 43, 45.

127. *Id.* at 45.

128. Liability Convention, *supra* note 35, art. VII.

129. Gorove, *supra* note 126, at 45.

130. *Id.*

131. *Id.*

132. *Id.*

133. *Id.* at 46.

134. *Id.*

135. *Id.*

136. *Id.* at 44, 46.

137. *Id.* at 44.

there would surely be political ramifications that may not be feasible in the case of an individual. In short, individuals have no legal standing on their own.[138]

Another problem arising from the text of the Liability Convention is the effectiveness of the Claims Commission.[139] Article XIV establishes that if no diplomatic settlement can be reached, a Claims Commission "shall" be formed.[140] However, article XI provides that a claimant does not have to exhaust local remedies.[141] These two articles seem to contradict each other, as article XIV seems to nullify article XI.[142] It would seem however, that because the drafters included the provision for local remedies, they indeed wanted claimants to have that option.

Continuing down the trail of ambiguity, we come to the interpretation of the term "damage."[143] Damage is initially defined in article I of the Liability Convention as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations."[144] Article XII then provides that compensation will be paid for in accordance with international law.[145] Thus, it is not clear which damage provision prevails: the damages provided for in article I or damages as provided for in international law.[146] Commentators have speculated that the reference to international law was meant to analogize provisions in the law of the sea to space law, but this intent is not clearly indicated in the treaty.[147]

It is important to distinguish private tort law from the international liability established in the aforementioned treaties.[148] The Liability Convention was meant to settle disputes between rival States, not private individuals.[149] Current international space laws are little more than broad, agreed upon principles that have rarely been put into practice.[150] Private

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138. *Id.* at 50.
139. *Id.*
140. Liability Convention, *supra* note 35, art. XIV.
141. *Id.* art. XI.
142. Gorove, *supra* note 126, at 46-47.
143. FORKOSCH, *supra* note 115, at 70.
144. Liability Convention, *supra* note 35, art. I.
145. *Id.* art. XII.
146. FORKOSCH, *supra* note 115, at 70.
147. *Id.*
148. OFFICE OF TECH. ASSESSMENT, SPACE STATIONS AND THE LAW: SELECTED LEGAL ISSUES 44-50 (1986), *reprinted in* GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY, *supra* note 4, at 258-59.
149. *Id.* at 258.
150. *Id.* at 259.

individuals also have the option to pursue remedies through their own national tort law.[151]

Although one could interpret the language of the Liability Convention to indicate that individuals do have an option for pursuing damages, the logistics and feasibility of such actions are questionable.[152] Both the Liability Convention and the Outer Space Treaty lack provisions that establish a cause of action, courts, rules of procedures, and methods of enforcing actions for individuals.[153] Individuals' claims are left to be pursued through diplomatic measures or the uncertain workings of a Claims Commission.[154]

The possible problems of current space law can be debated almost endlessly. Fortunately, due to the apparent lack of cases and/or claims invoking these treaties, it has yet to be truly tested.

IV. COMPARISON TO ADMIRALTY IN THE TREATMENT OF TORTS

The similarities between the seas and space can easily be seen because both are viewed as belonging to everyone. Before the discussion begins in comparing admiralty law to outer space law, it must be noted that these two fields of law are comparable, not identical.[155] Problems do arise in the comparison, including the uncertainty in defining where space begins.[156] Admiralty law does not face this challenge, because it is relatively clear where the sea begins.

The Third United Nations Conference on the Law of the Sea (U.N. Conference) set forth to adopt a new and comprehensive plan for effective dispute settlement.[157] The participating States in the U.N. Conference regarded an effective dispute settlement system as an "indispensable and integral part" of the law of the sea.[158]

The U.N. Conference provided for a compulsory judicial settlement.[159] This judicial settlement includes submission to an

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151. *Id.* at 259-61.

152. *Id.* at 261.

153. *Id.*

154. *Id.*

155. S. Roy Chowdhury, *Rules and Experiences in Comparable Fields of the Law*, *in* SETTLEMENT OF SPACE LAW DISPUTES: THE PRESENT STATE OF THE LAW AND PERSPECTIVES OF FURTHER DEVELOPMENT, *supra* note 112, at 85, 85.

156. *See id.*

157. Günther Jaenicke, *Solutions for Dispute Settlement Procedures Elaborated by the Conference on the Law of the Sea*, *in* SETTLEMENT OF SPACE LAW DISPUTES: THE PRESENT STATE OF THE LAW AND PERSPECTIVES OF FURTHER DEVELOPMENT, *supra* note 112, at 113.

158. *Id.* at 115.

159. *Id.* at 113, 116.

international court or tribunal, but is limited by a few exceptions.[160] This sort of mandatory adjudication could be beneficial to outer space law as an effort to strengthen the now optional Claims Commission. The application of a compulsory judicial settlement presupposes establishment of the law that will be applied to disputes.[161] The text of the U.N. Conference leads one to believe that although the provisions of the U.N. Conference allow both the treaty provisions and international law provisions, a clear preference is established for the treaty over general international law.[162] The Liability Convention similarly allows for both treaty provisions and international laws to be used, but a lack of preference contributes to its overall ambiguity.

The question of whether private individuals or companies can bring a claim under the U.N. treaties on admiralty law arises just as it does concerning outer space law. It seems from the language of admiralty law that should a nongovernmental party need to file a complaint, it should do so through its country's means.[163] This channel for dispute resolution seems to be adequate for damages that occur on the sea, but the treaty makes no mention of the ability of a nongovernmental party to bring a claim against a State.[164] The silence is similar to the silence on the matter in the Outer Space Treaty.

It seems the only substantial difference between outer space law and admiralty law is the definiteness of the adjudication process under international admiralty conventions. A definite adjudication process similar to this applied to outer space law could calm disputes over the effectiveness of the Liability Convention's Claims Commission. Both space law and admiralty law indicate that the best way for a nongovernmental entity to bring a claim against a State is through the nongovernmental party's State. Once again, the feasibility of this occurring is questionable, as such a claim would surely cause waves among international relations.

V. CHINESE MISSILE TEST PROBLEM DEBRIS AND OTHER DEBRIS IN SPACE

Now we turn to the probability that any of the three aforementioned space treaties will indeed be invoked and the effectiveness of the current

160. *Id.* at 116.
161. *Id.* at 124.
162. *Id.* at 125.
163. *See* J.N. SINGH, OUTER SPACE, OUTER SEA, OUTER LAND AND INTERNATIONAL LAW 158, 158 (1987).
164. *See id.*

treaties to reconcile these problems. Some view Earth's orbit as one big dump including old spacecraft, spent motor casing, pieces of solid propellant, insulation, and paint flakes.[165] As of December 29, 2004, there were 9233 objects in Earth's orbit that were large enough to be tracked and catalogued by the USSTRATCOM Space Surveillance Network.[166] A major contributor of this space debris is the fragmentation of large objects already in orbit.[167] One known example of this fragmentation occurred in October 2004, when a single Russian Proton Block auxiliary motor broke up, leaving in its wake more than sixty pieces of space junk.[168]

On January 17, 2005, two pieces of rocket collided high above the Earth.[169] Involved in the collision were a discarded U.S. Thor Burner and a piece of a Chinese launch vehicle.[170] Because both objects were regarded as junk, no real damage occurred, and therefore no claim was filed under the outer space treaties. After this collision one commentator noted, "As the number of objects in Earth['s] orbit increases, the likelihood of accidental collision will also increase."[171]

Although the Chinese missile test has not yet caused any outer space collisions, the possibility is real. Some experts have speculated that the debris from the missile test could reach the space station, which is currently manned by two Americans and a Russian.[172] Additionally, it has damaged relations between NASA and China for future co-operation in space.[173] NASA spokesman Jason Sharp stated, "The U.S. believes that China's development and testing of such weapons is inconsistent with the constructive relationship our presidents have outlined."[174]

As a hypothetical, imagine the Chinese missile debris collided with an object in outer space. First, before the launch even took place, it should have been registered according to the Registration Convention.[175]

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165. Leonard David, *Orbital Overload: Space Debris Crowds the Not-So-Friendly Skies*, Feb. 2, 2005, http://www.space.com/businesstechnology/technology/orbital_debris_050202.html.

166. *Id.*

167. *Id.*

168. *Id.*

169. Leonard David, *U.S.-China Space Debris Collide in Orbit*, Apr. 16, 2005, http://www.space.com/news/050416_debris_crash.html.

170. *Id.*

171. *Id.*

172. Carreau, *supra* note 1.

173. *Id.*

174. *Id.*

175. Registration Convention, *supra* note 90, art. II.

China did not register the object, clearly violating the Registration Convention.[176]

China arguably also violated several articles under the Outer Space Treaty. Article I proposes that the use of outer space should be for the benefit of all mankind.[177] It could be argued that testing a missile in space does not further this goal. China's launch also violates article III, which notes that space activities should be conducted in accordance with "maintaining international peace and security and promoting international co-operation and understanding."[178] Blatantly violating U.N. agreements and testing weapons in space surely cannot be considered furthering international peace, security, cooperation, and understanding. If the Chinese-created debris collided with one of the many satellites in space, China would be responsible for the resulting damage under article VII.[179] China would have violated several articles of the Outer Space Treaty and would be responsible for any damage caused by the launch.

If China has responsibility under the Outer Space Treaty, we must examine what sort of liability is placed on China by the Liability Convention. Article II of the Liability Convention clearly indicates that China shall be absolutely liable for any damage caused by its space objects.[180] Under this convention, there seems to be no question that a State could bring a claim for damage.[181] What does not seem clear is whether a nongovernmental party has any cause of action. Article VIII explicitly states: "A State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage."[182] From this article, we can reason that a nongovernmental entity can bring a claim through its government.[183] Realistically, governments might be reluctant to bring such action on behalf of private parties due to the fear that it could disturb intergovernmental relations between the two countries.

This is evidenced by the fact that no such claims have been brought in this manner. Of course, each country's tort law is still an avenue for relief, but, as mentioned before, the uncertainty and variance between these laws does not seem very promising.

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176. *Id.*
177. Outer Space Treaty, *supra* note 14, art. I.
178. *Id.* art. III.
179. *Id.* art. VII.
180. Liability Convention, *supra* note 35, art. II.
181. *Id.* art. III.
182. *Id.* art. VIII, § 1.
183. *Id.*

VI. POSSIBLE CHANGES THAT SHOULD BE MADE TO THE TREATIES

Although the Chinese missile debris has not yet caused any damage, the possibility that this debris or similar debris could indeed cause such damage is real. However, the certainty of what will happen to compensate the damaged party is hardly clear. There are far more nongovernmental than governmental objects in space, which makes the possibility that the damaged party will be a nongovernmental party quite great. Unfortunately, the U.N. treaties and current tort law may not offer any relief to such parties. Changes should be made to eliminate the uncertainty for these parties.

The Vienna Convention on the Law of Treaties (Vienna Convention) recognizes that States are not to be bound to a treaty if there has been a substantial change in circumstances surrounding the treaty.[184] Specifically, article 62 explains:

> A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty unless: (a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and (b) the effect of the change is radically to transform the extent of the obligations still to be performed under the treaty.[185]

This principle is commonly regarded as customary international law.[186] The International Court of Justice has addressed this principle and concluded that a treaty should not be abandoned if the changes were foreseeable.[187] Additionally, the change in circumstances must be closely linked to the goals of the treaty.[188]

Under the Vienna Convention principle, a substantial change in circumstances has occurred since the current outer space treaties were adopted. Most likely, when the treaties were enacted and space exploration had just begun in the late 1960s and early 1970s, no one could imagine the technological advances that have occurred to bring us to the present time of space tourism.[189] During these drafting decades, the primary goal of space law was to protect astronauts in space and establish the liability of space-capable nations, a goal reflected in the treaty

184. Thomas, *supra* note 16, at 213.
185. *Id.*
186. *Id.*
187. *Id.*
188. *Id.* at 213-14.
189. Easter, *supra* note 6, at 371.

language.[190] As we have seen, the current treaties do not cover all the possible damages that could occur in space. One solution regarding the gap in liability coverage is to invoke the Vienna Convention and abandon the treaties, or at least the Liability Convention, altogether and attempt to make a modern treaty to solve modern problems. International legislators must devise a set of standards that outer space investors and nations can look to as technology continues to advance.[191]

Completely redrafting the current space law may seem a bit extreme. The effectiveness of these treaties could be greatly impacted simply by clarifying some key provisions. All three of the treaties we have discussed have a provision that allows for nations who have signed the treaties to propose changes and amendments to the treaties. Some commentators have called for a more explicit liability provision to be included in the Outer Space Treaty.[192] The Liability Convention offers some relief to this proposition, but many of its provisions are seen as vague and unenforceable. One change that could be beneficial would be to make the decisions of the Claims Commission final and binding rather than the current limitation of only "if the parties have so agreed."[193] The Claims Commission should also be subject to clear procedure, which is currently lacking in the Liability Convention.[194] The overall non-obligatory nature of the Claims Convention should also be changed in order to give the Convention validity and force within the international community.[195] The lack of enforceability has been attributed to the fact that the United Nations is a political organization focused on promoting international harmony rather than a judicial body focused on resolving disputes.[196]

The Claims Commission is not the only part of current space laws that should be changed. As a principle of legal security, "the execution of sentence, award, or decision should be ensured."[197] Parties will likely be hesitant to bring a claim if the damages they receive are questionable, and the methods of receiving those damages are unclear. This is not to say that the current system does not provide for damages, but that the

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190. *Id.* at 371-72.

191. *Id.* at 372.

192. Aldo Armando Cocca, *To What Extent Are Further Procedures for the Settlement of Space Law Disputes Considered Necessary? in* SETTLEMENT OF SPACE LAW DISPUTES: THE PRESENT STATE OF THE LAW AND PERSPECTIVES OF FURTHER DEVELOPMENT, *supra* note 112, at 137, 137-38.

193. *Id.* at 139.

194. *Id.*

195. *Id.*

196. *Id.*

197. *Id.*

certainty of those damages and the method of receiving them is not elaborate enough. Additionally, the applicable law that will be used in the settlement of any disputes should be clearly determined, so the parties to the treaty can abide by this law.[198]

In conclusion, our current treaties offer a broad framework of liability when it comes to space issues. Should a collision in space cause serious damage, the methods and likelihood of recovering damages are uncertain. As technology continues to advance, this uncertainty will only increase. If our current treaties are not completely overhauled, clarification as to who may bring claims, the ability of nongovernmental parties to bring claims, the procedures of the Claims Convention, and the enforcement of damages must be addressed in order to ensure that responsible parties are indeed held liable.

198. *Id.*