

## State Liability for Private Satellites and Ways to Limit Exposure

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### Abstract

States have a liability for private space activities launched from its territory under the existing liability regime. Under the existing legal regime States face the existing international regimes when insurance is inadequate. There are some options for States who wish to limit their fiscal liability.

### Introduction

When the Convention on International Liability for Damage Caused by Space Objects was adopted in 1972 the signatories only knew a world where nation states were space actors.<sup>1</sup> So adopting a policy of strict liability for the State if their space object caused damage to a non-national was a rational policy. Much has changed since 1972, especially the entrance of private participants as space actors<sup>2</sup> making it difficult to identify the responsible state party, much less determine their liability. With the increased space activity and deorbiting occurring every year the possibility of an incident is increasing. An assessment of the potential liability of a State who has any connection to private participants in a space activity becomes important with the increased potential for damage from space objects.

Much has been written about launch and space debris liability, in this paper my focus is on damage that occurs from satellites during a controlled or uncontrolled deorbiting or accidental reentry.<sup>3</sup> Less attention has been given to the liability a State incurs at the end of the useful life of a satellite, especially if that satellite is not just abandoned as space junk, but deorbited. Given the proliferation and increased concern over space debris the option of deorbiting a satellite after its useful life is increasing in appeal.<sup>4</sup> For instance, Iridium, a private actor controlling a global network of satellites, is currently considering deorbiting its 66 satellites after its proposed global cellular communication network went bankrupt.<sup>5</sup> Satellite systems that occupy lucrative orbits are the most attractive to deorbit to make room for the next generation of technology.<sup>6</sup>

The deorbiting or reentry liability of a State, who has participated in any stage of the satellite's life, is an issue that has not been extensively considered. As deorbiting becomes an attractive alternative for obsolete satellite systems States should become aware of their potential liability for accidents that could occur when satellites reenter the atmosphere and develop strategies to limit this liability. In this paper I will discuss the treaties that would identify which States are liable for damage by a satellite during deorbiting or reentry and the extent to which the States may be

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liable. Then I will look at some of the government's procedures for limiting their liability and for trying to exercise some authority over this stage in the satellite's life. Finally I will discuss some ways that a State can limit its liability.

#### Identifying the relevant provisions of the Convention for end of life coverage

In the Convention on International Liability for Damage Caused by Space Objects [ hereinafter the International Liability Convention] the launching State assumes strict liability for all damage caused by its space object on the earth's surface or to vehicles in flight.<sup>7</sup> There are also provision about the liability to other craft once the satellite or vehicle is in space.<sup>8</sup> However no specific mention is made about liability at the end of the useful life of the space object. So if an accident involving reentry occurs after orbit is achieved or when the satellite is deorbited the assignment of liability is less clear. Article I defines the launching State as the State that procures the launch or the owner of the territory or facility from which the launch occurs.<sup>9</sup> While there is no specific provision discussing damage done after the satellite's useful life expires the later provisions do specifically show that negotiators were concern about ensuring compensation for accidents that occurred after the launch phase. The treaty's purpose is to ensure that all potential harm to third parties is compensated, so there is no reason to assume that reentry would be excluded since the potential for damage still exist.<sup>10</sup> And it is a reasonable interpretation of the International Liability Convention that liability incurred at any stage in the life of the

space venture will not end when that stage ends. The fact that the International Liability Convention currently has no provision for the end of liability for a space object once it is launched suggest such a conclusion. Such continued liability is necessary to promote the treaty's goal of compensation. So, even if the launching State does not control orbital behavior, Art V. paragraph 3 specifically gives the launching State "participant status" for purposes of this treaty to ensure that a party is liable for the space object at all times.<sup>11</sup>

States may not be the only actors to incur liability under the International Liability Treaty. Parts of the International Liability Convention suggest it is meant to cover all space actors, not just States. One such provision is Article XXII, which extends coverage to intergovernmental organizations.<sup>12</sup> In this section the Convention does not specifically name INTELSAT<sup>13</sup>, but leaves the stage open for other multinational organizations which might conduct space activities. The provision is for joint and several strict liability among the organization and the member governments with all claims to first be submitted to the organization.<sup>14</sup> This provision was intended to provide for all space activities to be the responsibility of the governments who directly participate or enable the organizations which participate in the space activity.<sup>15</sup> In this paper the assumption is limited to the idea that any liability that the private parties cannot compensate for will be incurred by the States that enable them to participate in the space activities. Whether the company is enabled by a State's action, which allows the

company to exist as a legal entity or by authorizing the launch and services provided by the space object, each State shares responsibility.

#### The shortcomings in the Convention's provisions

In the modern environment of space activity identifying the State responsible for a satellite has become more complicated.<sup>16</sup> A reasonably foreseeable scenario could be a British company to provide communication service to Canada and the United States launching from an Australian facility. There are myriad issues which arise from this simple scenario. First is whether Britain incurs liability under the convention simply because the company is an entity created under and recognized by British law. The company would not exist but for the recognition given it by the British government, so it is arguable that under the International Liability Convention the private company substitutes for actions the British government could have taken directly. This situation is unusual in international law, but many governments already contemplate incurring this type of liability. It is rare that governments accept strict liability for activities which they later allow private citizens to conduct with no direct government authorization or oversight. Therefore some States have made it criminal for citizens to launch in other States without a special license.<sup>17</sup> Such a law implies that those States believe that they have a legal responsibility for the activities of their nationals regardless of the State's role in the space activity. However Britain only requires a license for launches in territories within its authority, implying it does not feel a legal responsibility for its nationals'

space activities conducted outside of Commonwealth territory.<sup>18</sup> When States act due to a legal obligation they can create customary international law or shape the interpretation of ambiguous treaty provision.<sup>19</sup> The mixed message of how different States regard their liability for the extraterritorial space activities of their nationals indicate that this is an unsettled matter in international law. Since the main concern of the International Liability Convention was to ensure compensation for any damage done by space activities then the broadest interpretation of liability would be the most successful in ensuring that compensation is available and complete. So even if a State does not assume liability they may still be found liable. Britain is taking a risk in not taking steps to limit its potential liability in this hypothetical.

The second potential for incurring liability depends upon who registers the satellite the company will use. Under the Convention on Registration of space objects procedures a State must register the satellite which will eventually occupy the orbital slot, but it need not be the country of citizenship.<sup>20</sup> In the scenario above the registering State could be Britain, Canada, the United States or France. The State that supports the registration of the satellite will probably be considered a participant in the launch<sup>21</sup> and therefor incur strict liability in the case of an accident.

Another issue is the liability of a State who authorizes the satellite to provide service. Most authorizations include mandatory service requirements that affect the parameters of the satellites construction, positioning and function, all factors that affect the

potential for damage. Mandatory service requirements can affect positioning and management of the system once in orbit. Since these States dictate satellite requirements does that make them one of the States which is "procur[ing] the launching of the space object..."<sup>22</sup> In the International Liability Convention there is no definition for procuring State. The extension by Article XXII to include the member states of the international organization suggests that a remote connection to the venture could be grounds for inclusion as a participating party.<sup>23</sup> The INTESAT member states could influence the development of the system, even if they cannot control all aspects of the satellite's design and management, but this was enough to extend liability. The service requirements when spectrum is allocated are similarly tenuous and provide similar grounds for classification as the procuring State.

The fourth area of potential liability involves the launching State. Clearly the launching State is liable for the launch activities, but does their liability end when their participation ends. Nothing in the International Liability Convention suggest that their liability ends when the launching stage is complete. In fact many articles analyzing the space debris problem have argued that liability under the International Liability Convention does not end, even when the space object is no longer functional.<sup>24</sup> However when dealing with launch insurance regulations that require insurance for reentry the focus is on launches involving reusable space vehicles, not reentry at the end of the satellite's life or due to a malfunction once in orbit. So

the launching State could face a claim for damage done later in the space objects life. There are some provisions which would provide for the States to allocate responsibility among themselves on a fault basis, so the launching State could recover any damages it might have to pay from the other participants.<sup>25</sup> Therefore the problem of strict liability is not serious if all the actors have deep pockets, but to settle such issues could be time consuming and involve extensive litigation. The International Liability Convention only provides a quick process for the initial claimant, not for allocation proceedings among the liable parties.<sup>26</sup>

Global networks raise the possibility that several States will be involved in different launches to form one system. To create a global network permission to provide service must be obtained from many States and often the number of satellites launched will mandate the use of several launching services. Depending on how service requirements will affect the satellite is key to determining the extent to which all the authorizing States could be considered part of the network venture. If there are no requirements affecting the design or launch decisions of the satellite then it is likely the State authorizing services would not be considered a launching party. But as discussed above there is an argument that the authorizing State is liable if more requirements are made.

The existence of multiple authorities for a single satellite is a liability issue, but, when there are different parties with authority over the different satellite in a system the assessment of liability becomes more problematic. If different States have

authority then management problems can occur and result in different risk assessments for the individual satellites.<sup>27</sup> Such shared responsibility would have greater impact on the ability and method used for insuring the system and the components of the system than on coordinating the different services.<sup>28</sup> But the insurance scheme can indicate the extent to which a State has authority over the system once it is in orbit. Minimizing liability under these systems can be very difficult for a State involved with the launch or management of several satellites in the network system.

Consider the case of Iridium, a company with a network, which was launched by several States and had authorization to provide service in many countries to create a global network.<sup>29</sup> Now when faced with deorbiting what States should give authorization and does anyone authorizing deorbiting incur liability? The definition of participating States could provide cover for those States involved with the Iridium system, who were not consulted when a decision to deorbit the system was made.<sup>30</sup> If the decision to deorbit directly leads to an accident then it could be the fault of States who approved. However, the entire deorbiting process was overseen by States through a voluntary review, no required authorization, so any State involved could claim they were not actually an authorizing State.<sup>31</sup> Another factor is that the Iridium system was designed so it could be deorbited at the end of its useful life. This attempt to minimize the space debris caused by the 66 satellite system was purposeful, so it could be argued by anyone that deorbiting a system designed to be deorbited is not negligent. Since the system was designed to be deorbited

those who approved the original design might have some responsibility during the deorbiting.<sup>32</sup>

Another network issue relates to the fact that more networks are using low-earth orbiting (LEO) satellites.<sup>33</sup> Many of these satellites are at the cusp of where space begins. There is no legal definition of space, and as more "space vehicles" are operating in low orbits the lack of demarcation makes it harder to identify low orbiting space objects from high atmosphere objects. A lawyer would be remiss if when defending against a claim under the International Liability Convention for damages caused by a LEO if they did not make the argument that these satellites are not covered by the treaty since they are not technically in space. Since most space treaties apply only to space objects some of these borderline orbits could be beyond the treaties. It will become increasingly important that the beginning of space be determined or chosen in the near future. And while this argument about LEOs being outside the scope of the International Liability Convention may not be successful, it is interesting and should be made in the appropriate case.

#### State's Current Attempts to Limit Exposure

Many States have attempted to limit their liabilities as they perceive them to exist in the current treaty structure and under customary international law. All States require insurance for launch licenses which will indemnify them in case of an accident. As mentioned some States, like Australia, require their nationals to get a license even when launching outside of their territory.<sup>34</sup> Other States do not perceive this to be a situation in which

they incur liability, so there is no requirements if the activities are all extra-territorial. Even with the launch insurance requirements there are no insurance requirements for the remainder of the satellite's life and only about half of the satellites have in-orbit insurance.<sup>35</sup> The in-orbit policies focus on equipment malfunctions or at most space debris collisions nothing is considered about potential reentry accidents.<sup>36</sup> Therefore accidents during reentry are often not covered by insurance; even if a policy exist for the satellite in orbit many questions surround the coverage by insurance for the deorbiting or accidental reentry of a satellite. It is hard to assess the risk of deorbiting when comparing it to leaving a satellite in a high orbit, especially while liability is uncertain for space debris. As long as liability for late in life accidents remain unclear then there is little incentive for companies to pay for insurance, especially when the States retains primary strict liability to prevent the companies from having to worry about paying if there is an accident.

If the insurance does not provide enough coverage to shield States from claims then more problems occur in two major forms. First the insurance policy could be of an inadequate amount if the damage is extensive or if the policy does not cover the type of accident that occurs. This is likely since the policies focus only on the cost of replacing the satellite when setting premiums and any semi-serious accident, like one in an urban area, could exceed the limits. If the premiums do not cover the risk of terrestrial damage then the industry, or more specifically the insurance companies involved with the accident, could be under-funded to meet the pay-

out required if there is an accident. Several insurance industry insiders have already expressed concerns that the satellite insurers are charging premiums that will not suffice to cover even the satellite replacement cost if there is an accident on space.<sup>37</sup> If the insurance is not accounting for all the potential liabilities then the policies may not be protecting the companies much less the governments from fiscal liability. The general in-life policies should cover any damage cause terrestrially and if they don't the States should require the policy to include this type of coverage. Unfortunately the unclear liability make in-orbit accidents a difficult risk to assess and adequately calculate the necessary insurance premium.<sup>38</sup>

The second way that insurance could fail to protect a State from a claim is more complicated. Under the International Liability Convention countries are liable for the entirety of damage with no limits on types of claims.<sup>39</sup> Punitive damages are unlikely unless a State was directly involved in a negligent decision which caused the accident or was grossly negligent in its failure to oversee the activities of the private company after the public was assured it was conducting such oversight.<sup>40</sup> Still personal injury and property damage could be significant given the types of accidents likely to occur from a failing satellite. Often insurance companies will offer a settlement to claimants that are less than the total damages in exchange for avoiding the hassle of preparing case. These settlements will eliminate the remainder of the private companies liability and possibly that of the State which required insurance for that stage of the satellites life. But there is no

guarantee that all the States who are possibly liable would be included in the indemnity provision of the settlement. A claimant could take the settlement and then pursue the remainder of the damages under the treaty against the other liable States, who are jointly and severally liable for the entirety of the damage.<sup>41</sup> One obvious way to close this loophole is for a State who has any authority over the private company to require that all insurance policies provide for them to be included in any indemnity settlements.

#### Possibilities for Limiting Liability

Many reasons exist for States to limit their liability and some for industry to push States to define the limits of the liability. Currently States are competing for the growth of the space launch and development industry. Several new space ventures in the past decade occurred because of government action to develop launch industries in their territories.<sup>42</sup> Developing an industry is good for the country, but it leads to exposure to future liability for the satellites being launched. While there are incentives for governments to promote the space industry, incurring unlimited liability for objects once they are beyond the launch stage, where insurance is not required, may not be the best way for a government to promote the space industry. Not requiring in-orbit insurance is fiscally irresponsible if private insurance policies are available and may not be beneficial for the industry in the long run. If the industry does not have to assume liability for their space objects beyond the launch stage then decisions will be affected. While no company would intentionally cause an accident that would result in harm to people, decisions based on cost

that the company will not have to incur can result, inadvertently, in harm. In fact the problem with space debris is in part caused by the lack of responsibility required at the end of a space objects useful life. If the industry remained liable for their space objects then there would be an appropriate financial incentive to move the object to where it could do no harm instead of abandoning it.<sup>43</sup>

Uniform laws will also help companies who own satellites systems and those insuring such systems. The current mishmash of regulations makes it difficult for companies to do business. After meeting launch requirements the responsibility to different States can make compliance a problem. When Iridium was considering deorbiting their system there was no certain process. In the end they did voluntary discussions about deorbiting with several States and while the States may have seriously addressed the issue like their permission was necessary publicly they shunned taking definitive responsibility.<sup>44</sup> Defining the responsibility of the States for space objects once they are in orbit and at the end of their useful life will make private decision clearer. It will also help companies determine how much insurance and what types they need to carry to ensure their space activities are being conducted in a responsible manner.<sup>45</sup> Insurance companies have trouble deciding allocate the risk and then competing with other insurance companies who allocate the risk with less regard for the long term dangers.<sup>46</sup> Uniform laws will help companies by making it clear whose regulations they must comply with and prevent the potentially conflicting regulations.

One of the first ways States can limit their liability exposure is through the insurance requirements. Almost every State has an insurance regulatory scheme if they authorize satellite services or launches.<sup>47</sup> Most are only concerned about the part of the satellite's life span which they are directly involved in while they should be looking at the adequacy of insurance for the entire venture.<sup>48</sup> Another common feature is an indemnity requirement, though again this varies in scope requiring broad or limited indemnification.<sup>49</sup>

States require insurance for service and launch approval to minimize liability exposure. By shifting fiscal liability States inadvertently acknowledge that they believe themselves to be the natural parties to a suit should an accident occur. In the most basic international law determination a State acting out of a sense of legal obligation establishes the precedent for customary international law or customary interpretations of an international treaty.<sup>50</sup> Therefore the insurance requirements support the premise that the different State granted authorizations create State liability under the International Liability Treaty for the space activities of the private entities to which the States give authorization.

Renegotiating the International Liability Convention to acknowledge the role of private actors and clarify the liability for space objects after their useful life is a potential solution to many of the problems discussed in earlier sections. Two decades after the original negotiations a new treaty would be appropriate. But this is an unlikely occurrence. The States that would

benefit are the most active in launching and authorizing new systems. Most States prefer to have strict liability available in case their citizen get injured by another State's space activities. With the maximum possible benefit assured there is no incentive for many States to renegotiate and even less to give up strict liability. It is also a public relations problem for a State to try to justify taking less responsibility for the activities they authorize private actors to conduct in space. Many States will be reluctant to openly acknowledge they have responsibility for objects which currently are not insured and still might lead to future claims. Adjusting States' liability for private actor's space activities would be a major undertaking and is not likely to occur any time soon.

Another option is withdrawing from the International Liability Convention. A State can withdraw from a treaty with proper notice<sup>51</sup>, but would have a public relations problem disclaiming responsibility. It is plausible that after the first significant accident, where the treaty results in a large damage award, the concern about public image may be overcome in a rush to withdraw. If private insurance is inadequate or a settlement leaves a State exposed to claims under the Convention it is likely that the convention will lose political support in States with similar liability. This could provide the political impetus to withdrawal.<sup>52</sup>

A stop gap measure could be several bilateral or a multilateral treaty among very active States to provide for total indemnification in all insurance. The agreements should also apportion responsibility for the after launch stages and specifically address the situation of reentry or deorbiting. A beneficial



provision would address insurance requirements for satellites in the case of reentry or deorbiting. Bilateral or multilateral treaties would insure that those States most likely to face a claim have provided some measure of limitation to their total liability. A bonus to this approach is that it involves an insurance requirement, so it is less likely to present a public relations problem, since most people have little interest in insurance requirements for satellites. In fact depending on the number of States which would join the treaty such arrangements could replace the International Liability Convention, which has a limited number of signatories and exist mostly as international common law.<sup>53</sup>

For States that don't want to deal with treaties domestic regulations can limit the potential liability for authorized space activities. A State which authorizes launch services or communication services can add insurance requirements. One insurance requirement should be to require proof of insurance for the lifespan of the satellite system including provisions to cover incidents in the case of purposeful or accidental reentry. There should also be a requirement that any insurance settlement regarding the satellite or the satellite system will include a provision ending the State's liability even if their role is not related to the accident. Finally domestic regulations should define criteria to help companies determine when it is appropriate to deorbit and how to mitigate potential reentry accidents. Total lifetime management for all satellites will help identify the parties responsible for space objects at all times.

States are liable for many of the satellites that private companies have launched into space, even after the useful life is over. Current insurance practices and State regulations do not address this liability. Partly because the international treaties that define liability for space objects are not clear on how to apportion liability for activities not totally conducted by State actors. As satellite activity by private actors increases it will be important for States to agree on how liability will be assigned and managed, so that if there is an accident involving a third party appropriate compensation is available.

<sup>1</sup> 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* International Liability Convention]. See also Amy Ochet, *Space Law Lifts Off for a New Odyssey (Third UN Conference on the Exploration and Peaceful Use of Outer Space)*, UNESCO COURIER, June 1, 1999.

<sup>2</sup> Up to about a decade ago almost all satellite systems outside the US were state owned or the State was a partner in the company. The proliferation of totally private actors has been a relatively recent phenomenon. See Chris Bulloch, *End of the road: For the big LEOs?*, INTERAVIA, Volume 55, Issue 644, Saturday, July 1, 2000; see also Ochet, *supra* note 1.

<sup>3</sup> The deorbiting can be controlled or uncontrolled depending on how much operational power is left at the end of the satellite's life and whether the location of reentry can be controlled. Iridium is planning a controlled reentry to try and land the satellite parts that survive in the ocean or remote areas with few people. See Kathy Sawyer, *Hanging Up on a Network of Satellites; Motorola's Plan For 'Deorbiting' May Mean Rain*, WASH. POST, Aug. 29, 2000 at A03.

<sup>4</sup> The United States has recently adopted a policy encouraging companies to deorbit defunct space objects from orbit within 25 years in order to minimize the growing accumulation of old rocket bodies and other detritus. See *id.*; see also *Mandatory Practices for Reducing Space Debris*

*Sought by Some*, COMM. DAILY, Feb. 20, 1997.

<sup>5</sup> See, Sawyer, *supra* note 3.

<sup>6</sup> Low-earth orbit satellites, the ones closest to the earth and most likely to reenter the atmosphere, are the most inexpensive to replace and therefore the most expendable. See Bill Coffin, *Lost in Space (insurance for artificial satellite)*, BEST'S REV. – PROPERTY-CASUALTY INSURANCE ED., Vol. 98, No. 7, ISSN:0161-7745, Nov. 1, 1997.

<sup>7</sup> See International Liability Convention.

<sup>8</sup> See *id* at Art. III, Art. IV.

<sup>9</sup> See *id* at Art. I.

<sup>10</sup> See Smith, Delbert, *The Technical, Legal and Business Risk of Orbital Debris*, 6 NYU ENVTL. L. REV. 50, 64 (1997).

<sup>11</sup> See International Liability Convention at Art. V, para. 3.

<sup>12</sup> See *id* at Art. XXII.

<sup>13</sup> In 1972 INTELSAT was the main intergovernmental organization conducting space activities. The next generation of space actors generally were companies that involved States as a major investor or as a controlling interest in the company. It is a coincidence of history the other large organization were not intergovernmental but multinational corporations.

<sup>14</sup> See International Liability Convention at Art. XXII.

<sup>15</sup> There is an argument that the treaty would make commercial parties strictly liable to third parties that would be another paper. The intention of the Convention can be inferred from the preamble and the later provisions covering the different stages of space activity which were thought to be important at the time of the Convention's negotiations. Space debris and the end life of a satellite was not important that early in the space race. See *e.g.* International Liability Convention, preamble.

<sup>16</sup> See Ochet, *supra* note 1.

<sup>17</sup> One such law is in Australia where they require a special permit called an Overseas Launch Certificate. See Space Activities Act, 1998 (Austl.). The United States requires all US companies or foreign companies where a US national has controlling authority to get FAA permission. 49 U.S.C. §701.04 (a) (1994).

<sup>18</sup> See Outer Space Act, 1986 (UK). The British have one of the least restrictive schemes for licensing in regard to who they require to gain a license.

<sup>19</sup> See Vienna Convention of the Law of Treaties, May 23, 1969, Art. 31(3).

<sup>20</sup> Convention on Registration of Objects Launched Into Outer Space, opened for signature Jan. 14, 1975, 28 U.S.T. 695 (entered into force Sept. 15, 1976). Only 40 States have signed the Convention, so this is not the best source of international law, but all in the hypothetical have signed.

<sup>21</sup> This assumption is based upon the notion that by registering the satellite the country assumes international responsibility for the satellite.

Assigning responsibility for objects in orbit was one of the primary goals of the Registration Convention, even though it is a treaty not signed by many states and not followed by all the States who have signed. See *id.*

<sup>22</sup> See International Liability Convention at Art. I.

<sup>23</sup> See *id* at Art. XXII.

<sup>24</sup> See *e.g.* Delbert Smith, *supra* note 10; see also Ochet, *supra* note 1.

<sup>25</sup> See *id* at Art. IV paragraph 2.

<sup>26</sup> See *id* at Art. XIII-XX.

<sup>27</sup> Iridium had to get permission to discontinue services in several countries before it could take the satellites off-line in late 1999 and early 2000. If these countries had not agreed to allow discontinuation of service then Iridium could have been forced to maintain the system while a new settlement was negotiated. The current system of service licensing can have a substantial impact on the operation of a satellite system, especially towards the end of its functional or useful life.

<sup>28</sup> Meeting service requirements may affect positioning marginally, but will usually affect spectrum allocation and radio frequency used, which has little impact on the orbital functioning of a satellite after it is launched and likely would not contribute to an accident.

<sup>29</sup> The launches for the system occurred in the United States, China and Kazakhstan.

<sup>30</sup> But this is limited protection, especially if the claimant country was involved in another stage of the satellite's life, since they are permanently a joint partner due to that involvement. See International Liability Convention, Art. 1(c), Art. V, Art. VI, Art. VII(b).

<sup>31</sup> Iridium proceeded to decide to deorbit under the assumption they only needed permission from a U.S. Bankruptcy court since it was disposal of assets. Iridium did submit a plan to several U.S. agencies concerning deorbiting and consulted

with several foreign governments. No government had to give formal approval of the plan. The United States only has regulations to license the reentry of reusable vehicles, not satellites. *See* 14 CFR Part 450 (1990).

In fact the U.S. government requested that Iridium not deorbit, but the company is proceeding in spite of this request. *See* Sawyer, *supra* note 3.

<sup>32</sup> This is especially poignant for the United States since the design was conceived in response to the US's new policy of discouraging space debris in the low-earth orbits. *See* Kathy Sawyer, *Hanging Up on a Network of Satellites: Motorola's Plan for Deorbiting May Mean Rain*, Wash. Post, Aug. 29, 2000, at A03.

<sup>33</sup> Since LEOs orbit near the earth they are the space vehicles most likely to reenter the atmosphere or be deorbited by reentry instead of other orbits where satellites are moved to other orbits before being abandoned.

<sup>34</sup> *See* Space Activities Act, 1998 (Austl.).

<sup>35</sup> *See* Smith, Delbert, *The Technical, Legal and Business Risk of Orbital Debris*, 6 NYU ENVTL. L. REV. 50, 64 (1997).

<sup>36</sup> The malfunctions of LEO satellites have increased to ten in 1998 and while these were all service equipment problems a control malfunction that causes a satellite to lose its orbit is just as likely. There are concerns about the quality control in the construction of satellites, since the industry is overburdened with orders for new satellites and works beyond capacity. Currently the focus is on improve the service equipment quality, which leaves room for the problematic construction to switch to satellite control work. *See generally* Coffin, *supra*, note 6.

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*

<sup>39</sup> *See* International Liability Convention, Art. XII.

<sup>40</sup> There are some limits to the types of compensation in that the countries are required to provide compensation that "will restore the person ... to the condition which would have existed if the damage had not occurred." This implies that punitive will not be allowed, since punishment is not the goal only restoration. *Id.*

<sup>41</sup> Jointly and severally liable under the International Liability Convention. *Id.* at V.

<sup>42</sup> *The Advantages of Launching from Australia*, <

<http://www.spacelaw.com.au/content/advantage.htm> >, last visited Sept. 25, 2000.

<sup>43</sup> This movement could be another orbit or following Iridium's lead and planning a way to deorbit the satellite safely at the end of its useful life.

<sup>44</sup> *See* Kathy Sawyer, *supra* note 3.

<sup>45</sup> *See* Delbert Smith, *supra* note 10.

<sup>46</sup> *See* Coffin, *supra*, note 6.

<sup>47</sup> *See e.g.* Space Activities Act, 1998 (Austl.);

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> *See* Vienna Convention of the Law of Treaties, May 23, 1969, Art. 31(3).

<sup>51</sup> International Liability Convention, Art. XXVII.

<sup>52</sup> The other reaction to an accident would be new regulations regarding insurance during the life of the satellite that would include coverage for reentry or deorbiting incidents.

<sup>53</sup> The International Liability Convention has been signed by only 86 countries. That list does include most of the major launch powers and space actors, including Australia, China, ESA, France, Italy, Japan, Russian Federation, the United Kingdom, and the United States.