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SYMPOSIUM ON THE NEW SPACE RACE

COMMERCIAL OPERATOR LIABILITY IN THE NEW SPACE ERA

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Both national and international laws apply to collisions by space vehicles and objects in outer space and with the surface of the Earth. International treaties govern collisions involving commercial operators from different states, while domestic laws govern claims by nationals against national commercial operators. Commercial operators may find themselves as defendants or become plaintiffs when others cause them damage. This essay discusses liability in the new space era from the point of view of these operators, including both outer space and surface liabilities. It examines liability exposure, describes different regimes governing liability, and identifies prospective legal changes.

The Risk of Liability

Outer space activity involving satellites and rockets creates risks of accidents and liability. A well-known incident is the 2009 collision of the Iridium 33 satellite with the defunct Russian COSMOS 2251 satellite. In that case, the debris was identifiable, but no claim was made. Another example is the 1978 crash of the Russian COSMOS 954 into Canadian territory, which resulted in extensive surface contamination from the satellite's nuclear power sources. Canada brought a claim against Russia under both the Convention on the International Liability for Damage Caused by Space Objects (Liability Convention)[1] and customary international law. In negotiations, Russia acknowledged liability by paying US$6 million in damages to Canada. A final example is the 2003 disintegration of the Columbia space shuttle, debris from which fell into U.S. territory (Texas) and caused surface damage.

Prospective growth of satellite and space debris will greatly increase the risk of these kinds of incidents going forward. Thousands of small satellites are projected to enter low-Earth orbit and require frequent replacement. If these satellites do not burn up on reentry or fall into the ocean, they will return to Earth in controlled deorbit or possibly crash into land, as the Columbia space shuttle did. If left uncontrolled, chaos may result, leading to possible foreclosure of access to space.[2]

The advent of reusable space-launch technology, poised to have a significant impact on market competition for launch operators, will also have an impact on the risk of liability. This technology, consisting of rocket stages designed to return to the launch site on land or on floating sea platforms, is being developed by companies such as SpaceX and Blue Origin in the United States to reduce the cost of launches into outer space.[3] These rockets are designed to be reused quickly and repeatedly, with some claiming that they may be reused up to one hundred

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[1] Convention on the International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 UNTS 15 [hereinafter Liability Convention].

[2] Scott Kerr, *Liability for Space and the Kessler Syndrome (Part 2)*, SPACE REV. (Dec. 18, 2017).

[3] *See Reusability*, SPACEX; *New Shepard*, BLUE ORIGIN.

times.[4] Some of the rockets, however, may fail to return as designed. Return of the first-stage rocket is very quick. Return of the second stage after orbital realignment and atmospheric reentry may take up to twenty-four hours. Guiding this stage back to the launch pad is riskier and may involve accidental ground impact elsewhere than on the launch pad. In other words, the use of reusable launch rockets poses less risk because the flight to launch pad is controlled and is thus an improvement from the point of view of a commercial operator as well as to potential victims on the surface. However, there are still liability concerns from the standpoint of commercial operators as discussed below.

National Liability Laws

There are several ways that claimants can seek damages against commercial operators. Domestic tort laws vary and claimants' decision to file claims under national law will be influenced by which law results in the most favorable outcome. Claimants will tend to file claims under U.S. tort laws whenever possible because it tends to be more favorable than other national laws.

First, U.S. tort law applies to outer-space collisions by U.S.-authorized operators with other U.S.-authorized space objects.[5] This law awards compensation for wrongful actions against persons and property. Thus, a domestic commercial satellite operator can be held liable for failure to maintain a reasonable standard of care if there are foreseeable injuries and damages and the claimant can prove fault and proximate cause. Domestic courts may also award punitive damages. In the new space age, U.S. tort law may apply to outer space collisions because most of the satellite operators are U.S.-authorized and much of the existing debris stems from U.S. operators.

Second, looking to the future, U.S. space mining operators can file tort claims against other U.S. operators on the Moon and other celestial bodies. These would likewise be based on U.S. tort law and be subject to U.S. jurisdiction, as provided by Article VIII of the Outer Space Treaty (OST).[6]

Third, claimants can seek to apply U.S. law in cases of surface damage caused by space objects. There is currently no U.S. domestic case law about satellite operator liability for surface damage, but defendants are likely to be subject to strict liability. That is the rule applied to ground damage by aircraft—the Restatement (Second) of Torts provides that owners and operators are subject to liability for ground damage even when they have exercised utmost care to prevent the harm.[7]

International Liability Laws

Claimants may also seek to use international law in the event of injury or damages. Several areas of this law are relevant.

First, a few states remain subject to the liability provisions of Article VII of the 1967 OST[8] because they have not yet adopted the Liability Convention.[9] States agreed early in the space age that launching states and states that procure launches shall be liable for damages caused.[10] Article VII makes states "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

[4] *See* Loren Grush, *SpaceX Is About to Make History Relaunching a Used Falcon 9 Rocket*, The Verge (Mar. 28, 2017).

[5] William L. Prosser, Prosser on Torts 6 (3d ed. 1964).

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

[7] Restatement (Second) of Torts § 502A (Am. Law Inst. 1977).

[8] *See* OST, *supra* note 6, art. VII.

[9] *See* Liability Convention, *supra* note 1.

[10] G.A. Res. 1962 (XVIII), at 15 (Dec. 13, 1963).

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space or in outer space, including the Moon and other celestial bodies."[11] Thus, states are liable for damages caused by their governmental entities as well as by their nongovernmental entities, such as commercial operators. Furthermore, OST Article VIII provides that states in whose registry an object is registered retain jurisdiction and control of registered objects.[12] This means that a state cannot escape liability by abandoning an object in outer space.[13]

One of the primary difficulties here is that only states have rights under the OST. Consequently, under the treaty, a person seeking recovery must persuade a state to claim directly against another state rather than against an offending nongovernmental owner or operator. Likewise, a commercial satellite operator must look to its own state of authorization to defend against claims by other states. No outer space collision has yet necessitated such a defense. Nevertheless, claimants may avoid the treaty and bring claims against the responsible operator directly in the national courts.

Second, a large number of states are subject to the provisions of the Liability Convention. Article 1 defines responsible launching states to include the states that launch or procure launches as well as the states from whose territory or facility space objects are launched.[14] Thus the Convention has wider applicability than OST Article VII. Article II establishes strict liability for operators for damage caused by space objects to the surface and in the air. Article III provides that damages caused by space objects elsewhere than on Earth and in the air are subject to liability based on proof of fault of the responsible state or its authorized commercial operator. Importantly, the Convention clarifies that states can be held liable for damages caused by space debris from objects launched by them and their authorized operators, such as resulted from COSMOS 954. Attempted launches are included. The Convention does not apply to damages caused by a launching state or its authorized commercial operators to its own nationals. Neither does it apply to foreign nationals taking part in the launch or merely observing the launch at the invitation of the launching state. Article VI of the Liability Convention provides that launching states may be exonerated if they can prove that damage was caused by the claimant. Thus, liability remains almost as strict as that provided in OST Article VII.

Third, customary international liability law may play a role. Prior decisions by international tribunals can be used to argue that states should be held liable for environmental damages caused to another state. The *Trail Smelter Arbitration* is often cited as authority for the proposition that a state can be held liable for the actions of a private party within its borders for damages caused to persons and property located elsewhere.[15] Similarly, in the *Corfu Channel* case[16] and the *Chorzów Factory* case,[17] the International Court of Justice and the Permanent Court of International Justice respectively held a state internationally liable for harm caused to another state. These cases show the possibility of a customary international law of liability.

International Tribunals Deciding Liability Claims Against Commercial Operators

In the new space age, commercial operators can expect any of the following tribunals to decide liability claims.

[11] OST, *supra* note 6, art. VII.

[12] *Id.*, art. VIII.

[13] Francis Lyall & Paul B. Larsen, Space Law: A Treatise 96–97 (2d ed. 2018).

[14] Liability Convention, *supra* note 1, art. 1.

[15] Trail Smelter Arbitration (U.S. v. Can.), 3 R.I.A.A. 1905 (1938).

[16] The Corfu Chanel Case (U.K. v. Alb.), 1949 ICJ Rep. 1 (Apr. 9).

[17] Chorzow Factory Case (Ger. v. Pol.), Ser. A, No. 13, 4 (Perm. Ct. Arb. 1928); *see also* Military and Paramilitary Activities in and Against Nicaragua (Nicar. v. U.S.), Merits, 1986 ICJ Rep. 14 (June 27). Article VII of the OST expresses the same legal principle. *See* OST, *supra* note 6, art. VII.

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First, claims can come before national tribunals with jurisdiction. This will be the only recourse for claimants suing nationally authorized operators and foreigners who participate in the launch of national objects. Claimants eligible to seek recovery under the Liability Convention or OST Article VII may instead elect to claim under national law before national tribunals. Claimants must make their choice between national and international tribunal *ab initio* when filing claims. The claimant's decision will depend on which legal strategy will result in the most favorable outcome. Filing in national court will require selection of legal counsel and development of legal strategy suitable for national court trial. A significant number of claimants are likely to bring their action directly against responsible operators in national tribunals applying national law because they want to exercise greater control over their claims. National tribunals can award punitive damages, which are not available from claims commissions under the Liability Convention.

Second, claims can come before the Liability Convention's Claims Commission. Only states qualifying as launching states under the Convention may bring claims in this forum. The Claims Commission consists of three members: each party appoints one member and the two party-appointed members in turn select a third member, who acts as chairperson. The UN Secretary General may appoint the third member if the two party-appointed members cannot agree to do so. The tribunal's decision is binding if the states parties so agree, but otherwise it is merely recommendatory. Whether a government will represent an offending commercial operator may depend on extraneous political considerations and whether a government has the legal resources necessary to defend the operator. In fact, the responsible operator may seek another state to defend it. Claims commissions have not previously been established due to lack of claims and are probably too cumbersome to establish for the high volume of small claims associated with frequent launches in the new space age.

Third, the ICJ exists to decide disputes arising under international treaties such as the OST. Both the Permanent Court of International Law and the ICJ have decided claims cases, such as the *Corfu Channel* and *Chorzów Factory* cases. Whether the ICJ will entertain a case depends on whether the parties to the case accept the Court's jurisdiction. Nongovernmental entities are dependent on their governments agreeing to litigate; they thus lose control over the conduct of the case.

Liability Insurance

Independent of the OST and the Liability Convention, several states require nongovernmental operators to obtain insurance before authorizing their launches. U.S. federal law requires launch insurance limited to US $500 million for each launch with the possibility of a lower amount of insurance based on a risk assessment by the U.S. Federal Aviation Administration.[18] The law requires that the insurance cover

> probable loss from claims by (A) a third party for death, bodily injury, or property damages or loss resulting from an activity carried out under the license and (B) the United States Government against a person for damage or loss to the Government property resulting from an activity carried out under the license.[19]

The duration of the policy is ninety days after the launch. The cap on liability is attractive because it enables operators to buy insurance, unlimited launch liability insurance being unavailable at the time the law was adopted. In order to be competitive with the United States, other states have similarly required limited insurance coverage.[20] In effect, the governments act as guarantors of the commercial operators. The greater volume and attendant risk of accidents in the new space age will significantly increase the liability risks of these governments.[21]

[18] 51 U.S.C. § 50914. The law is only temporary pending the ability of the commercial operators to assume full risk exposure. *Id.*

[19] *Id.* at § 50914(a)(1).

[20] *See* LYALL & LARSEN, *supra* note 13, at 104–06.

[21] *Id.*

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Developments in Commercial Operators' Liability Risk Exposures

The main liability developments to expect in the new space age are the predominance of nongovernmental claimants and a shift from international to national tribunals. The expectations of the drafters of the Liability Convention were that claims for damages would be brought under the Convention and that commercial operators could largely depend on their governments to settle claims either by negotiation, as in the COSMOS 954 case, or by international governmental trial before the Convention's Claims Commission. The COSMOS 954 case illustrates the meager compensation that is available when claims are brought by states under international treaty law. Commercial satellite development in the new space age will drastically change the expectation that claims will be settled by the states as assumed by the drafters of the Liability Convention.

First, there will be an increase in functioning satellites from 1,200 to perhaps as many as 27,000. Most of the satellites will be in low-Earth orbit and require frequent replacement. In the beginning, most of the satellites will be from the United States. That means most of the operators involved will not be entitled to bring liability actions under the Liability Convention. Most claims will likely be litigated under U.S. law.

Second, regardless of the Liability Convention, whenever they can obtain jurisdiction over defendants, claimants are likely to opt to bring their claims under national law for much more favorable recoveries in national courts, where they can direct their own cases, using their own lawyers, and with the option to seek punitive damages. Bringing their own claims directly against defendants will free the claimants from extraneous political considerations that the national governments may have vis-à-vis each other. Commercial operators will be well advised to cover their greater liability exposure in the new space age by acquiring adequate insurance.

Third, the new commercial operators will not only experience more collisions with other space vehicles; they will face increasing collisions with unidentifiable space debris. This debris is primarily a liability problem that commercial operators have with other operators. According to the Kessler Syndrome,[22] fragmenting debris will grow faster than the traffic of functioning satellites. As commercial traffic grows, the huge amount of untracked space debris will engage not only governmental operators but also, increasingly, nongovernmental operators. Debris is not navigable and is largely untracked. When collisions occur and ownership cannot be established it becomes impossible to sue the owner of the debris for compensation. Collisions of satellites with space debris will become more frequent.[23] Reusable rocket technology will have little effect on liability.

The good news is that U.S. Space Policy Directive–3, issued in June 2018, is directed at resolving problems arising out of the growing liability of commercial satellite operators. The Directive recognizes that the anticipated growth of satellites and space debris will necessitate new international minimum standards and best practices for space traffic management, with the hope of avoiding the Kessler Syndrome.[24] As a first step, the United States will develop national minimum safety standards, with the objective of persuading the rest of the world to join in establishing international safety standards and practices.[25] Establishment of uniform international minimum standards for all space traffic and space debris will greatly benefit commercial space and significantly reduce collisions and the subsequent risk of liability.

[22] *See* Kerr, *supra* note 2 (discussing the Kessler Syndrome).

[23] Göktuğ Karacalioğlu, *Impact of New Satellite Launch on Orbital Debris*, Space Safety Mag. (June 2, 2016).

[24] Paul B. Larsen, *Minimum International Norms for Managing Space Traffic, Space Debris, and Near Earth Objects*, 82 J. Air L. & Com. 739 (2018). P.J. Blount takes up this topic in his essay for this symposium. *See* P.J. Blount, *Space Traffic Management: Standardizing On-Orbit Behavior*, 113 AJIL Unbound 120 (2019).

[25] White House, Space Policy Directive-3, National Space Traffic Management Policy (June 18, 2018) (stating that "[a] STM framework consisting of best practices technical guidelines safety standards, behavioral norms, prelaunch risk assessments, and on-orbit collision avoidance services is essential to preserve the space operational environment," and that "debris mitigation guidelines, standards, and policies [will be] revised periodically, enforced domestically, and adopted internationally to mitigate the operational effects of orbital debris").

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