

NOTE

FLAGS OF CONVENIENCE AND THE COMMERCIAL SPACE FLIGHT INDUSTRY: THE INADEQUACY OF CURRENT INTERNATIONAL LAW TO ADDRESS THE OPPORTUNE REGISTRATION OF SPACE VEHICLES IN FLAG STATES

*Adrian Taghdiri**

ABSTRACT

In recent decades, the landscape of space flight has changed dramatically. With the retirement of NASA's thirty-year government-run space shuttle program and recent advances in technology, the private sector has become an integral tool in the exploration of space. Notably, the commercial space tourism industry has made significant strides and is forecasted to grow to a \$1 billion industry in the next decade. Among the present industry trailblazers, Virgin Galactic plans to launch its first commercial spaceflight in 2014. Unlike the advances in the private sector, the development of international space law has remained stagnant—more than thirty years has passed since the last space law treaty of 1979. The principle treaty regulating outer space activities is the Outer Space Treaty. Under the Treaty, space-faring states are legally responsible for their own acts and the space activities of their national private enterprises. This Note argues that as the space tourism industry grows in the next decade, several countries may establish loose regulatory regimes in an effort to attract private space groups. This “flags of convenience problem,” prolific in the shipping industry, may lead to irreversible environmental damage, increased space debris, and safety hazards to space tourists. Further, this article argues that although the Outer Space Treaty penalizes states for their private actors, several states may disregard the prospective sanctions because of inadequate enforcement mechanisms.

I. INTRODUCTION

Since the 1957 launch of the first object into orbit, a wide gap has emerged between the growth of technology in the commercial space industry and the development of international law regulating that industry.¹ In the near future, space travel will no longer be reserved exclusively to trained astronauts and the

* J.D. 2013, Boston University School of Law; B.A., International Political Economy, University of California, Berkeley, 2008.

¹ See *infra* Part III.

extremely wealthy. Rather, because of recent technological developments,² several private entities plan to launch commercial space flight programs within the next few years.³ Notably, Virgin Galactic has secured 500 down payments for its \$200,000 suborbital commercial flight that is scheduled to launch in 2014.⁴

The principal treaty regulating activities in outer space is 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”).⁵ In relevant part, Articles VI and VII of the Outer Space Treaty provide that countries party to the Treaty shall be both responsible and liable for their activities in outer space, including activities carried on by national non-governmental entities.⁶

Accordingly, one of the goals of the Outer Space Treaty is to deter nations from permitting domestically registered private entities to participate in unreasonably risky activities.⁷ This Note argues, however, that because of the inadequate enforcement mechanisms of international space law, some states may disregard these laws and loosen their regulations in an effort to attract private space enterprises. The shipping industry provides a prime example of states loosening regulations to attract private commerce. There, the practice of permitting the registration of a foreign-owned vessel under conditions that are convenient and opportune for the entity registering the vessel is known as a “flag of convenience.”⁸ This practice has led to environmental destruction, poor oversight, and safety concerns.⁹

This Note explores the growing possibility of a flags of convenience

² The principal reason space launches have become more affordable is because of the development of reusable launch vehicles, which dramatically decrease the cost of lifting payloads. See Timothy Robert Hughes & Esta Rosenberg, *Space Travel Law (and Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004*, 31 J. SPACE L. 1, 6 (2005).

³ Timothy Stenovec, *Space Tourism Expected to be \$1 Billion Industry Over Next 10 Years, Says FAA*, THE HUFFINGTON POST (Mar. 22, 2012, 1:13 AM), http://www.huffingtonpost.com/2012/03/22/space-tourism-1-billion-industry_n_1371354.html.

⁴ *Id.*

⁵ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

⁶ *Id.* arts. VI–VII.

⁷ FRANCIS LYALL & PAUL B. LARSEN, *SPACE LAW: A TREATISE* 470 (2009).

⁸ BOLESŁAW ADAM BOCZEK, *FLAGS OF CONVENIENCE: AN INTERNATIONAL LEGAL STUDY* 2 (1962).

⁹ See H. Edwin Anderson, III, *The Nationality of Ships and Flags of Convenience: Economics, Politics, and Alternatives*, 21 TUL. MAR. L.J. 139, 162 (1997).

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problem in space as the commercial space flight industry continues to develop. Specifically, if nations do not believe that there are any adequate mechanisms to enforce the signed treaties, they may elect to attract space business by maintaining minimal environmental and safety regulations. Part II of this Note outlines the evolution of space law, focusing on the rise of space tourism and the laws governing liability for commercial activities in space. Part III addresses the inadequacies of the international space law regime and specifically discusses the vague enforcement procedures with respect to space law. Part IV shifts from space law and details the flags of convenience issue. In particular, the section will define the issue, discuss the flags of convenience problem in the shipping industry, and conclude by describing the harmful effects of the prospective flags of convenience problem in space. Part V analyzes why states might disregard their legal obligations because the rewards for maintaining loose regulations outweigh the risks of enforcement. This Note concludes by addressing possible steps to avoid the flags of convenience problem in space, including deterrence through a supervision regime, the formation of an international space tribunal, and the creation of a mandatory international insurance plan.

II. THE EVOLUTION OF SPACE LAW

A. *Introduction*

Space law encompasses the collection of national and international laws and customs that regulate human activities in outer space.¹⁰ Unlike the bodies of contract or tort law, where the law derives from the development of a single concept, space law more closely resembles family or environmental law, in which several disparate laws are denoted by “a series of concepts within a single phylum.”¹¹ Thus, space law ranges from domestic contractual issues, including informed consent in a commercial spaceflight¹² to multinational agreements establishing intergovernmental organizations with functions in space.¹³

The origins of space law date to the late nineteenth century development of international aviation regulations.¹⁴ Subsequent to the U.S.S.R.’s successful

¹⁰ Matthew J. Kleiman, *Space Law 101: An Introduction to Space Law*, A.B.A., http://www.americanbar.org/groups/young_lawyers/publications/the_101_201_practice_series/space_law_101_an_introduction_to_space_law.html (last visited Oct. 30, 2011).

¹¹ See LYALL & LARSEN, *supra* note 7, at 2.

¹² Tracey Knutson, *What is “Informed Consent” for Space-Flight Participants in the Soon-to-Launch Space Tourism Industry?*, 33 J. SPACE L. 105, 105–22 (2007).

¹³ Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT’L L. 363, 370 (2004).

¹⁴ See LYALL & LARSEN, *supra* note 7, at 3–4.

launch of *Sputnik I* on October 4, 1957, the United States further developed the law regulating space activities by initiating its own national laws and encouraging the establishment of space law at an international level.¹⁵ Consequently, in 1958, the United Nations General Assembly organized an Ad Hoc Committee on the Peaceful Uses of Outer Space and established a permanent body one year later.¹⁶ In 1967, The Outer Space Treaty was adopted.¹⁷ Regarded as the “Magna Carta” of outer space, the Outer Space Treaty assembled broad fundamental principles concerning the exploration and use of outer space.¹⁸ In the ensuing twelve years, four more major international conventions were established that collectively provide the international legal framework regulating the conduct of space activities.¹⁹ They are: (1) the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (“ARRA”);²⁰ (2) the 1975 Convention on the Registration of Objects Launched into Outer Space (“Registration Convention”);²¹ (3) the 1977 Convention on the International Liability for Damage Caused by Space Objects (“Liability Convention”);²² and (4) the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (“Moon Agreement”).²³

In addition to the five space treaties, the legal regime of space includes a series of arms control treaties, general international law, and the practices of space-faring nations.²⁴ The regime also includes various agreements dealing with the commercial uses of space, such as the agreements governing the International Space Station that establish intergovernmental organizations with

¹⁵ Joanne Irene Gabrynowicz, *One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues*, 4 HARV. L. & POL’Y REV. 405, 405 (2010).

¹⁶ David Tan, *Towards a New Regime for the Protection of Outer Space as the “Province of All Mankind,”* 25 YALE J. INT’L L. 145, 156 (2000).

¹⁷ See Outer Space Treaty, *supra* note 5.

¹⁸ See Tan, *supra* note 16, at 156.

¹⁹ *Id.*

²⁰ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119.

²¹ Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

²² Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

²³ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3 [hereinafter Moon Agreement].

²⁴ Tannenwald, *supra* note 13, at 370.

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functions in space.²⁵ Broadly, the principles in this regime encompass the concept that space should be reserved for “peaceful purposes” and that it is not to be assigned exclusive use to any party.²⁶ However, these principles remain fundamentally aspirational because they are untested and because of the limited number of states that operate in space.²⁷ Further, these efforts have fragmented the current legal regime, leaving it ill-equipped to meet the growing difficulties of the use of space.²⁸

Looking forward, the “three alternative scenarios for the future of space law” are: (1) United States national dominance; (2) “muddling through;” or (3) a more involved normative regime including treaties and detailed operational rules.²⁹ In the first scenario, the United States would leverage its superior technological capabilities to control space the way Britain “dominated the high seas a hundred years ago.”³⁰ Under the “muddling through” scenario, rule creation is “ad hoc, incremental, and piecemeal”—modifying “the existing regime where it can.”³¹ The third scenario, an “elaborated normative regime,” involves international collaboration “among all parties with an interest in space, and widespread participation in decision-making and rulemaking regarding space.”³²

B. The Rise of Space Tourism

Generally, “space tourism” refers to any commercial activity that provides customers with a direct or indirect space travel experience.³³ Such activities range from long-term visits to orbital facilities to short-term orbital flights,³⁴ suborbital flights,³⁵ and parabolic flights in aircrafts that expose passengers to

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.* at 378.

³⁰ *Id.*

³¹ *Id.*

³² *Id.* at 379.

³³ Stephen Hobe, *Legal Aspects of Space Tourism*, 86 NEB. L. REV. 439, 439 (2007).

³⁴ In orbital spaceflight, a space vehicle must reach orbital velocity to maintain flight along Earth’s curvature without falling back to Earth. The orbital velocity of a 200-kilometer circular orbit is 28,000 kilometers/hour. Tanja Masson-Zwaan & Steven Freeland, *Between Heaven and Earth: The Legal Challenges of Human Space Travel*, 66 ACTA ATRONAUTICA 1597, 1599 (2010).

³⁵ See *id.* (describing suborbital spaceflight as covering flights in which orbital velocities are not achieved). Specifically, following engine shutdown at approximately 100km, three to six minutes of microgravity is achieved. Subsequently, the vehicle falls back to Earth and re-enters the atmosphere. *Id.*

brief intervals of weightlessness.³⁶

The era of space tourism began in 2001 with American entrepreneur Dennis Tito's \$20 million orbital trip to the International Space Station.³⁷ Since then, only six other tourists have traveled into space, paying up to \$35 million for similar trips.³⁸ However, the prospects for the future of space tourism have significantly changed with the emerging market for privately-funded suborbital flights. In 1996, the X Prize Foundation offered a \$10 million prize to the first private organization to fund, develop, and launch a spaceship capable of flying individuals to an altitude of 100 kilometers and back to Earth safely twice in a two-week period.³⁹ Eight years later, Scaled Composites, LLC won the prize with its *SpaceShipOne* vehicle.⁴⁰ The success of *SpaceShipOne* led the Chairman of Virgin Atlantic Airways, Sir Richard Branson, to invest \$25 million in a new venture titled Virgin Galactic.⁴¹ To date, Virgin Galactic has made its first powered test flight with its *SpaceShipTwo* vehicle, has secured approximately 500 deposits for its \$200,000 tickets, and plans on launching commercial operations shortly after 2014.⁴²

Other space companies use different technologies and models in an attempt to enter the suborbital spaceflight market.⁴³ XCOR Aerospace is developing a two-person suborbital space vehicle, which is designed to depart and land on an airport runway.⁴⁴ Planning to offer suborbital flights for \$102,000 per passenger, Armadillo Aerospace is building a vehicle that will launch vertically.⁴⁵ Blue Origin, an extremely guarded project by Amazon.com CEO Jeff Bezos, plans to launch a fully reusable suborbital vehicle that will be capable of flying three or more passengers.⁴⁶

With the retirement of NASA's thirty-year government-run space shuttle

³⁶ Hobe, *supra* note 33, at 439.

³⁷ Mike Wall, *Despite Slow Start, Space Tourism Biz Begins to Fire Up*, SPACE.COM (Oct. 18, 2011, 12:05 PM), <http://www.space.com/13313-suborbital-spaceflight-virgin-galactic-space-tourism.html>.

³⁸ *Id.*

³⁹ Hughes & Rosenberg, *supra* note 2, at 8.

⁴⁰ *Id.* at 8–9.

⁴¹ *Id.* at 9.

⁴² Raquel Maria Dillon, *Space tourism milestone: Virgin Galactic test flight over Mojave*, MERCURYNEWS.COM (Apr. 29, 2013, 08:48 AM), http://www.mercurynews.com/science/ci_23130799/space-tourism-milepost-virgin-galactic-test-flight-over.

⁴³ Denise Chow, *Future of Space Tourism: Who's Offering What*, SPACE.COM (Apr. 25, 2011, 11:59 AM), <http://www.space.com/11477-space-tourism-options-private-spaceships.html>.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

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program on July 21, 2011,⁴⁷ numerous companies continue to explore prospects to fill the gap in human spaceflight.⁴⁸ In addition to the demand from space tourists, space companies are incentivized to continue research because of the increasing demand by various organizations, including government agencies and research institutions, to charter future suborbital research flights.⁴⁹ Among the private enterprises, Boeing, SpaceX, Blue Origin, and Sierra Nevada are developing and testing space vehicles as part of NASA's Commercial Crew Development program.⁵⁰ Looking to the near future, George Nield, the Associate Administrator for Commercial Space Transportation at the U.S. Federal Aviation Administration, noted that the suborbital market will be "broad and deep enough to accommodate several different spaceflight companies."⁵¹ "We're seeing different companies decide what niche they want to go after . . . There is a significant market, especially if you target individual pieces of that market."⁵²

C. Law Governing Liability and Responsibility for Commercial Activities in Space

There are four different sources of liability related to space activities: (1) the Outer Space Treaty for its parties; (2) the Liability Convention⁵³ for its parties; (3) "normal" international law; and (4) in certain circumstances, national law.⁵⁴

1. The 1967 Outer Space Treaty

In the period immediately following the launch of *Sputnik I*, several nations had opposing views as to the type of entities that could engage in outer space activities.⁵⁵ The Soviet Union proposed that only nation-states should act in space, whereas the United States supported the inclusion of private entities as space actors.⁵⁶ The debate resulted in the drafting of Article VI of the Outer

⁴⁷ *Space Shuttle Program: Spanning 30 Years of Discovery*, NASA, http://www.nasa.gov/mission_pages/shuttle/main/index.html (last visited Oct. 30, 2011).

⁴⁸ Chow, *supra* note 43.

⁴⁹ See Wall, *supra* note 37.

⁵⁰ See Chow, *supra* note 43.

⁵¹ See Wall, *supra* note 37 (paraphrasing Nield).

⁵² *Id.* (quoting Nield).

⁵³ See Tan, *supra* note 16, at 159 (stating that the 1972 Liability Convention modifies the principle of liability in Article VII of the Outer Space Treaty); see also Liability Convention, *supra* note 22.

⁵⁴ See LYALL & LARSEN, *supra* note 7, at 67.

⁵⁵ Gabrynowicz, *supra* note 15, at 422.

⁵⁶ *Id.*

Space Treaty,⁵⁷ which provides:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by government agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.⁵⁸

In addition to recognizing the right of private enterprise in space,⁵⁹ Article VI places international responsibility for privately funded activities on a state party.⁶⁰ Further, privately funded non-governmental activities require authorization by the respective state and are subject to continuing supervision by the state.⁶¹

Article VII of the Outer Space Treaty builds on Article VI by assigning liability for damage caused by space activity.⁶² In relevant part Article VII provides:

[e]ach State Party to the Treaty that launches or procures the launching of an object . . . 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 persons⁶³

Consequently, the cumulative principles of Articles VI and VII of the Outer Space Treaty provide that parties to the agreement are legally responsible and liable for their own acts and for the space activities of their national private enterprises.⁶⁴ As a result, it is often in a signing party's best interest to adopt effective legislation to avoid "unexpected liability for damages caused through a launch failure or a mishap in outer space."⁶⁵

2. *The 1972 Liability Convention*

The Liability Convention created specific rules to supplement Article VII of the Outer Space Treaty and to determine liability for damage caused by space

⁵⁷ *Id.*

⁵⁸ Outer Space Treaty, *supra* note 5, art. VI.

⁵⁹ Gabrynowicz, *supra* note 15, at 422.

⁶⁰ LYALL & LARSEN, *supra* note 7, at 66.

⁶¹ *Id.*

⁶² See Outer Space Treaty, *supra* note 5, art. VII.

⁶³ *Id.*

⁶⁴ LYALL & LARSEN, *supra* note 7, at 469–70.

⁶⁵ *Id.* at 470–71.

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objects.⁶⁶ Damage is defined 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 government organisations.”⁶⁷ Further, the launching state is liable for damage caused by space objects.⁶⁸ A launching state is defined as “a State which launches or procures the launching of a space object” or “a State from whose territory or facility a space object is launched.”⁶⁹ The Liability Convention imposes strict state liability for space flight accidents on the surface of the Earth, and fault-based liability for accidents elsewhere.⁷⁰

The process for presenting a claim under the Liability Convention differs in two significant ways from the general rules of international law.⁷¹ First, the Liability Convention does not follow the “Nationality of Claims” rule adopted by international law—under Nationality of Claims, a state, and only that state, can make a claim for damage to its national; however, under the Liability Convention, if the state of nationality does not present a claim, another state may present a claim with respect to damage sustained in its territory.⁷² Second, unlike the ordinary rule of international law, “a claim for compensation under the [Liability] Convention does not require the prior exhaustion of local remedies.”⁷³

To date, two incidents have activated the Liability Convention.⁷⁴ The more serious incident was the disintegration of the USSR Satellite Cosmos 954 over Northern Canada in 1978.⁷⁵ After a malfunction, the satellite scattered a large amount of debris, including radioactive materials, over 124,000 square km.⁷⁶ Although the cleanup cost Canada approximately C\$14 million, the Soviet Union only paid Canada C\$3 million in 1981.⁷⁷ Beyond the Cosmos malfunction, there is little precedent to apply to any future incidents in space.

⁶⁶ Tan, *supra* note 16, at 159.

⁶⁷ Liability Convention, *supra* note 22, art. I.

⁶⁸ Liability Convention, *supra* note 22, arts. II–III.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ LYALL & LARSEN, *supra* note 7, at 111.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ The Liability Convention was first activated by the disintegration of Cosmos 954 over Northern Canada in 1978. The Convention was once again activated in 1979 when parts of Skylab landed in a desert east of Perth, Australia, causing no damage. *Id.* at 117.

⁷⁵ GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 167–69 (1989).

⁷⁶ LYALL & LARSEN, *supra* note 7, at 117.

⁷⁷ Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 YALE J. INT’L L. 78, 80 (1984).

III. THE INADEQUACY OF THE INTERNATIONAL SPACE LAW REGIME

There are wide-ranging multilateral agreements as to the international law of space.⁷⁸ As of January 1, 2010, 100 nations have ratified and twenty-six others have signed the Outer Space Treaty.⁷⁹ Additionally, most space-competent and space-faring states are also party to the ARRA, the Liability Convention, the Registration Convention, and are members of the International Telecommunication Union.⁸⁰

Yet, even with the broad base of international agreements, the time of formal space law treaties may have come to an end.⁸¹ More than thirty years have passed since the last space law treaty in 1979,⁸² and national legislation can most effectively resolve many of the emerging space law issues that require legal action.⁸³ Further, commercial operators in outer space, including space tourism operators, have recently begun to negotiate private contracts.⁸⁴ The growing gap between the advancement of technology in the field and the legal regime has raised two legal issues that have not been sufficiently addressed: (1) the legal status of space tourists; and (2) the vague enforcement procedures.

A. *Legal Status of Space Tourists*

In the five multilateral space treaties relating to outer space there is no reference to space “tourists.”⁸⁵ The treaties do, however, refer to space travel by “astronauts” and “personnel of a space craft.”⁸⁶ Assuming that space tourists are “personnel of a space craft,” there is no system of responsibility and liability in international law to regulate situations where a space tourist suffers injury, loss, or damage.⁸⁷

As discussed above,⁸⁸ Articles VI and VII of the Outer Space Treaty

⁷⁸ See LYALL & LARSEN, *supra* note 7, at 467.

⁷⁹ U.N. Office for Outer Space Affairs, *Status of International Agreements Relating to Activities in Outer Space as at 1 January 2012*, U.N. Doc. A/AC.105/2013/CRP.5 (Mar. 12, 2012), available at http://www.oosa.unvienna.org/pdf/limited/c2/AC105_C2_2012_CRP03E.pdf.

⁸⁰ LYALL & LARSEN, *supra* note 7, at 467.

⁸¹ See *id.* at 468.

⁸² See Moon Agreement, *supra* note 23.

⁸³ See LYALL & LARSEN, *supra* note 7, at 468.

⁸⁴ See *id.*

⁸⁵ Steven Freeland, *Up, Up and . . . Back: The Emergency of Space Tourism and Its Impact on the International Law of Outer Space*, 6 CHI. J. INT’L L. 1, 10 (2005).

⁸⁶ *Id.*

⁸⁷ See *id.* at 15.

⁸⁸ See *supra* Part II.C.1.

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provide that states are to supervise national activities in outer space undertaken by nongovernmental entities and the “launching State” is to be held liable for damages caused by those entities.⁸⁹ Further, without certain waivers, or “where the various exceptions and exonerations contained in the Liability Convention do not apply, all launching states will bear th[e] international . . . liability on a joint and several basis.”⁹⁰ This prospect for state liability is why several space-faring states have passed national space laws that enable the states to assign financial liability to the nongovernment actors and to recover a certain amount of damages for which the state is liable to the international community from those actors.⁹¹

Within the framework of the international space legal regime, space tourists have few rights. For example, space tourists may not make a claim for damages under the Liability Convention.⁹² When an individual is injured, the Liability Convention only allows for legal action to be taken by a relevant state, not by the individual injured.⁹³ Moreover, given the freedom to contract between the operator of space vehicles and the space tourists, it is very likely that “exclusion of liability clauses for death and injury [will be] included in the space tourism services agreement.”⁹⁴

B. Vague Enforcement Procedures

Unlike air and sea law, where “domestic practice . . . paved the way before international legislation was resorted to,” dispute settlement procedures relating to outer space are based on international treaties and agreements.⁹⁵ These treaties and agreements reference peaceful settlements of disputes; however, there is currently no international tribunal that has compulsory or universal jurisdiction.⁹⁶ Since the leading treaties on space law do not sufficiently address enforcement procedures, there is “no system to ensure enforcement of any particular standard or rule of international law.”⁹⁷ The current enforcement procedures that govern international space law include the Outer Space Treaty and the 1972 Liability Convention.

⁸⁹ Outer Space Treaty, *supra* note 5, arts. VI–VII.

⁹⁰ Freeland, *supra* note 85, at 16.

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ GERARDINE MEISHAN GOH, *DISPUTE SETTLEMENT IN INTERNATIONAL SPACE LAW: A MULTI-DOOR COURTHOUSE FOR OUTER SPACE* 75 (2007).

⁹⁶ *See id.* at 166–67.

⁹⁷ *Id.* at 321.

1. The 1967 Outer Space Treaty

The two articles of the Outer Space treaty that make treaty states responsible for damage caused by their activities in outer space, Articles VI and VII, do not reference any enforcement mechanism or settlement process for such responsibility.⁹⁸ Specifically, although Articles VI and VII deal with the substantive part of the law involving liability, “these two provisions do not give a clue as to the procedural law that might be invoked to enforce liability.”⁹⁹

However, Article III of the Outer Space Treaty does provide that the principles of international law are applicable to activities in outer space: “States Parties to the Treaty shall carry on activities in the exploration and use of outer space . . . in accordance with international law, including the Charter of the United Nations”¹⁰⁰ According to Article 2(3) of the United Nations Charter, “[a]ll Members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered.”¹⁰¹ Dispute settlement through peaceful means includes inquiry, mediation, good offices, conciliation, arbitration, resort to regional agencies, and adjudication by permanent international courts.¹⁰²

Another approach for dispute settlement is via sanctions from the U.N. Security Council under Chapter VII of the U.N. Charter.¹⁰³ However, the Security Council only takes action “to maintain or restore international peace and security.”¹⁰⁴ A third avenue for settlement of dispute is through the International Court of Justice (“ICJ”).¹⁰⁵ Settlement through the ICJ related to outer space is a viable option “because all members of the U.N. are *ipso facto* parties of the Statute of the ICJ.”¹⁰⁶ The ICJ’s procedures for dispute resolution are detailed in Articles 92-96 in Chapter XIV of the U.N. Charter.¹⁰⁷ These procedures, however, remain “largely invalidated by the voluntary nature of the jurisdiction of the Court.”¹⁰⁸ Parties may opt for compulsory jurisdiction; however, no space-faring state has yet to recognize the jurisdiction

⁹⁸ *Id.* at 29.

⁹⁹ *Id.*

¹⁰⁰ See Outer Space Treaty, *supra* note 5, art. III.

¹⁰¹ U.N. Charter art. 2, para. 3.

¹⁰² See GOH, *supra* note 95, at 26.

¹⁰³ U.N. Charter ch. VII.

¹⁰⁴ See *id.* at art. 39.

¹⁰⁵ See GOH, *supra* note 95, at 26.

¹⁰⁶ *Id.* (citing U.N. Charter ch. XIV, art. 93, para. 1).

¹⁰⁷ *Id.* at 27 (citing U.N. Charter ch. XIV, art. 94).

¹⁰⁸ *Id.*

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of the ICJ according to this elective clause.¹⁰⁹

2. The 1972 Liability Convention

The Liability Convention integrated a framework under Article IX to settle liability claims. Article IX provides that a claim for compensation for damage must be presented to a launching state through a diplomatic channel or through the Secretary-General of the United Nations.¹¹⁰ If the parties do not reach a settlement within one year of notification, either involved party may establish a Claims Commission.¹¹¹ The Claims Commission will decide the merits of the claim and determine the amount of compensation payable, if any.¹¹² A key provision regarding the obligations of the results of the Claims Commission provides that, “[t]he decision of the Commission shall be final and binding if the parties have so agreed; otherwise the Commission shall render a final and recommendatory award, which the parties shall consider in good faith.”¹¹³ Therefore, “[t]he major deficiency of the Liability Convention . . . lies in the fact that its decision shall only be final and binding if the parties have so agreed, which diminishes the decision to the status of an advisory award in all other cases.”¹¹⁴

IV. THE “FLAGS OF CONVENIENCE” ISSUE

A. *Background*

As a result of the inadequate dispute settlement procedures, a flag of convenience problem may soon arise in the commercial spaceflight industry. A “flag of convenience” is defined as “the flag of any country allowing the registration of foreign-owned and foreign-controlled vessels under conditions which, for whatever the reasons, are convenient and opportune for the persons who are registering the vessels.”¹¹⁵ The use of flags of convenience spans centuries. For example, several sixteenth century English merchants sailed under the Spanish flag in an effort to avoid Spanish monopoly restrictions on trade with the West Indies.¹¹⁶ The common usage of such flags began in the 1920’s with the creation of open registries.¹¹⁷ The advantages of an open

¹⁰⁹ *Id.*

¹¹⁰ Liability Convention, *supra* note 22, art. IX.

¹¹¹ *Id.* art. XIV.

¹¹² *Id.* art. XVIII.

¹¹³ *Id.* art. XIX(2).

¹¹⁴ *See* GOH, *supra* note 95, at 38.

¹¹⁵ *See* BOCZEK, *supra* note 8, at 2.

¹¹⁶ *See id.* at 6.

¹¹⁷ *See* Elizabeth R. DeSombre, *Convenient Fishing: Participation in International*

registry system include no citizenship requirement for ship owners or operators, minimal taxes, and fewer domestic and international regulatory enforcement mechanisms.¹¹⁸ According to an officer of the first shipping company that transferred from a U.S. flag to a Panamanian flag, “[t]he chief advantage of a Panamanian registry is that the owner is relieved of the continual . . . boiler and hull inspections and the regulations as to crew’s quarters and sustenance.”¹¹⁹ Further, as long as the ships pay the registry fee and annual tax, the operators “are under absolutely no restrictions.”¹²⁰

B. Dangers of Flags of Convenience in the Shipping Industry

Flags of convenience are frequently criticized for “creating a permissive environment for criminal activities, poor working conditions, and environmental damage” as a result of the loose regulations, nominal oversight, and inadequate record keeping of the flag states.¹²¹ Further, there are safety concerns with flags of convenience. The oil spills from Liberian registered tankers in the 1960’s and 1970’s called attention to the concerns of inadequate training, communication and equipment.¹²² In fact, a significant number of the widely publicized maritime disasters involved vessels registered under flags of convenience: the Torrey Canyon in 1968, the Amoco Cadiz in 1978, the Exxon Valdez in 1989, the Scandinavian Star in 1990 and the Sea Empress in 1996.¹²³ Most recently, the Deepwater Horizon oil rig, which exploded in the Gulf of Mexico in 2010, was registered under the flag of convenience of the Marshall Islands.¹²⁴ Marked as the “worst environmental catastrophe in U.S. history,”¹²⁵ the oil spill killed eleven crewmen and leaked nearly 206 million

Fishery Management (Mar. 2002) (unpublished paper for presentation at the International Studies Association Annual Meeting), available at <http://isanet.ccit.arizona.edu/noarchive/desombre.html>.

¹¹⁸ See *id.*

¹¹⁹ See *id.* (alteration in original) (citation omitted).

¹²⁰ See *id.*

¹²¹ Matthew J. Kleiman, *Patent Rights and Flags of Convenience in Outer Space*, THE SPACE REV. (Feb. 7, 2011), <http://www.thespacereview.com/article/1772/1>.

¹²² See Anderson, *supra* note 9, at 162.

¹²³ Edgar Gold, *Learning from Disaster: Lessons in Regulatory Enforcement in the Maritime Sector*, 8 REV. EUR. COMMUNITY & INT’L ENVTL. L. 16, 19 (1999).

¹²⁴ Angel Gonzalez, *New Gulf-Spill Report Points to Missed Signs*, THE WALL STREET JOURNAL (Aug. 18, 2011), <http://online.wsj.com/article/SB10001424053111903596904576514281511893242.html>.

¹²⁵ Tom Hamburger & Kim Geiger, *Foreign Flagging of Offshore Rigs Skirts U.S. Safety Rules*, LOS ANGELES TIMES (June 14, 2010), <http://articles.latimes.com/2010/jun/14/nation/la-na-oil-inspection-20100615>.

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gallons of oil, contaminating 665 miles of coastline.¹²⁶ U.S. government reviews of the spill criticized the Marshall Islands' oversight of the vessel,¹²⁷ and Democratic congressman Jim Oberstar suggested that the foreign registration was an effort to evade strict safety standards: "Coastguard inspection of a US-flagged mobile offshore drilling unit takes two to three weeks, but the safety examination of a foreign flag offshore drilling unit, such as Deepwater Horizon, takes four to eight hours."¹²⁸

In an effort to obtain cost economies and remain competitive in the industry, operators continue to frequently operate under foreign flags.¹²⁹ As of 2009, more than half of the world's merchant ships were registered under flags of convenience.¹³⁰ Additionally, the Panamanian, Liberian, and Marshall Island flags account for nearly 40% of the global fleet.¹³¹

C. *Prospective Flag of Convenience Problem in Space*

Similar to maritime law, under the Outer Space Treaty, a space vehicle operates under the law, or "flag," of the operator's registered country.¹³² As such, the Outer Space Treaty creates a similar flag of convenience problem in outer space by "making the country of registration the basis for applying national laws to space objects."¹³³ Moreover, the 1975 Registration Convention,¹³⁴ which enforces the Outer Space Treaty's registration standards, classifies registration by the "launching state."¹³⁵ However, since the launching state can be defined as the country that either launches the space object or the country from which the space object is launched, space operators could choose an outer space flag of convenience by either launching their vehicle from the preferred country or incorporating their businesses in that

¹²⁶ Jeremy Repanich, *The Deepwater Horizon Spill by the Numbers*, POPULAR MECHANICS (Aug. 10, 2010, 12:39 PM), <http://www.popularmechanics.com/science/energy/coal-oil-gas/bp-oil-spill-statistics>.

¹²⁷ See Gonzalez, *supra* note 124.

¹²⁸ Andrew Clark, *BP Oil Rig Registration Raised in Congress Over Safety Concerns*, THE GUARDIAN (May 30, 2010, 2:56 PM), <http://www.guardian.co.uk/environment/2010/may/30/oil-spill-deepwater-horizon-marshall-islands>.

¹²⁹ See Zoya Özçayir, *Flags of Convenience and the Need for International Co-operation*, 7 INT'L MAR. L. 111, 111 (2000), available at <http://www.amiri.org.uk/oya/lawofthesea/wp-content/uploads/2012/12/foc.pdf>.

¹³⁰ Kleiman, *supra* note 121.

¹³¹ *Id.*

¹³² See Kleiman, *supra* note 121.

¹³³ *Id.*

¹³⁴ See Registration Convention, *supra* note 21.

¹³⁵ See Kleiman, *supra* note 121.

country.¹³⁶

D. Prospective Dangers of Flags of Convenience in Space

On March 20, 2012, the head of the Federal Aviation Administration (“FAA”) forecasted that space tourism will be a \$1 billion industry within the next ten years.¹³⁷ Due to the infancy of the current industry, flags of convenience is not a present problem—operators are likely “too high profile” and the “barriers of entry [are] too great.”¹³⁸ However, as the commercial space industry develops, attempts to obtain cost economies and attempts to remain competitive in the industry may pose a threat to both the environment and space tourists.¹³⁹ Just as state shipping registries often lack the capacity or determination to monitor the safety and conditions on ships,¹⁴⁰ similar results may arise in outer space in the near future. Three prospective dangers of flags of convenience in space are (1) the proliferation of space debris; (2) pollution to the environment; and (3) danger to space tourists.

1. Increase in Space Debris

Space debris is “a blanket term for any man-made artifact discarded, or accidentally produced, in space, either in orbit around a planetary body . . . or on a trajectory between planetary bodies.”¹⁴¹ Over the span of fifty years, more than 21,000 traceable objects larger than ten centimeters have been recorded.¹⁴² Further, scientists have estimated as many as 500,000 pieces between one centimeter and ten centimeters and more than 100 million pieces less than one centimeter in size.¹⁴³ At altitudes above 1,000 km, orbital debris may remain in Earth’s orbit for over a century.¹⁴⁴

Human-made space debris is categorized into four types: inactive payloads, operational debris, fragmentation debris, and microparticulate debris.¹⁴⁵

¹³⁶ See *id.*

¹³⁷ David Their, *FAA Predicts Space Tourism will be Worth \$1 Billion in 10 Years*, FORBES (Mar. 22, 2012, 11:56 AM), <http://www.forbes.com/sites/davidthier/2012/03/22/faa-head-predicts-space-tourism-will-be-worth-1-billion-in-10-years/>.

¹³⁸ See Kleiman, *supra* note 121.

¹³⁹ See Özçayir, *supra* note 129, at 111.

¹⁴⁰ See *supra* Part IV.B.

¹⁴¹ See Joseph S. Imburgia, *Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreement to Clean Up the Junk*, 44 VAND. J. TRANSNAT’L L. 589, 593 (2012) (quoting MARK WILLIAMSON, *SPACE: THE FRAGILE FRONTIER* 46 (2006)).

¹⁴² *Orbital Debris Frequently Asked Questions*, NASA ORBITAL DEBRIS PROGRAM OFFICE (Mar. 2012), <http://orbitaldebris.jsc.nasa.gov/faqs.html#3>.

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ See Robert C. Bird, *Procedural Challenges to Environmental Regulation of Space*

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Inactive payloads are earth-orbiting satellites that are no longer controlled by their owners and account for approximately twenty percent of the trackable space debris.¹⁴⁶ Operational debris, accounting for twenty-six percent of trackable space debris, is generally “residue of past space operations” that includes empty fuel tanks, insulation windows and lens covers, fuel, and frozen sewage.¹⁴⁷ “Fragmentation debris consists of small pieces of matter . . . created by accidental spacecraft explosions” and collisions between two space objects and represents forty-nine percent of trackable debris.¹⁴⁸

The current international space treaty regime presents no regulations for states or nongovernmental entities to limit space debris.¹⁴⁹ Although the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (“COPUOUS”) and the Inter-Agency Space Debris Coordination Committee (“IADC”) have published orbital debris mitigation guidelines,¹⁵⁰ efforts to alleviate the problem continue to be restricted to recommendations and non-binding practices.¹⁵¹ Unlike the absence of international regulations, NASA and the U.S. Department of Defense have issued requirements governing the design and operation of spacecraft in an effort to mitigate the proliferation of orbital debris.¹⁵² Further, the FAA and the Federal Communications Commission (“FCC”) also consider orbital debris issues in the spacecraft licensing process.¹⁵³ Consequently, these established domestic regulations increase the incentive for space-faring companies to register in flag of convenience states.

Similar to the shipping industry, with lax domestic regulations, flag of convenience space states can potentially increase the space debris in earth’s orbit by not following debris mitigation practices, such as limiting the break-up of spent rocket stages or ensuring that vessels that have reached the end of their useful life are either de-orbited or moved into a “graveyard” orbit out of the way of other vessels.¹⁵⁴ Although base level standards will likely ensure that space vehicles function properly in space, other non-functional features, including operational debris and fragmentation debris, may create dangerous conditions for other space-faring states. As travel to outer space becomes more common, more space debris will accumulate, and as more space debris

Debris, 40 AM. BUS. L.J. 635, 638 (2003).

¹⁴⁶ *See id.* at 638–39.

¹⁴⁷ *Id.* at 639.

¹⁴⁸ *Id.* at 639–40.

¹⁴⁹ LYALL & LARSEN, *supra* note 7, at 303.

¹⁵⁰ *See Orbital Debris Frequently Asked Questions*, *supra* note 142.

¹⁵¹ LYALL & LARSEN, *supra* note 7, at 146.

¹⁵² *See Orbital Debris Frequently Asked Questions*, *supra* note 142.

¹⁵³ *Id.*

¹⁵⁴ *Id.*

accumulates, the probability of inter-debris collisions will increase greatly.¹⁵⁵ Supporters of the “Kessler Syndrome” believe that once the inter-debris collisions begin, they will be unstoppable, thereby producing an “impenetrable cloud of fragmentation debris that will encase Earth,” making space travel nearly impossible.¹⁵⁶

2. Pollution of Space Environment

International space law alludes to environmental protection, however, it fails to sufficiently detail regulations or standards.¹⁵⁷ Specifically, Article IX of the Outer Space Treaty merely calls on states to avoid “adverse changes in the environment of the Earth.”¹⁵⁸ Although the commercial space industry continues to grow, very little is done to implement the environmental legal regulations because of the substantial costs associated with integrating “clean” space technology.¹⁵⁹ As such, without the establishment of clear principles to regulate environmental activities, the “unavoidable conflict between the development of space tourism activities and any environmental protection principles that form part of international space law” will continue to grow.¹⁶⁰

3. Hazard to Space Tourists

Just as loose regulations and nominal oversight in maritime flag states create safety concerns in the shipping industry, similar problems in the commercial space flight industry can pose significant risks to space tourists.¹⁶¹ In the United States, the Federal Aviation Administration (“FAA”) is the government agency responsible for regulating safety rules and procedures for the growing private space flight industry.¹⁶² In 2006, the FAA Office of Commercial Space Transportation published *Safety Approval: Guide for Applicants*, which “provides procedures for identifying appropriate safety standards and obtaining safety approval” for commercial launch operations.¹⁶³ Although the FAA will

¹⁵⁵ SPACE SECURITY INDEX, SPACE SECURITY 2010 31 (Cesar Jaramillo et al. eds., 2010).

¹⁵⁶ Mark J. Sundahl, Note, *Unidentified Orbital Debris: The Case for a Market-Share Liability Regime*, 24 HASTINGS INT’L & COMP. L. REV. 125, 132 (2000).

¹⁵⁷ See Freeland, *supra* note 85, at 20.

¹⁵⁸ See Outer Space Treaty, *supra* note 5, art. IX.

¹⁵⁹ See Freeland, *supra* note 85, at 20.

¹⁶⁰ *Id.* at 21.

¹⁶¹ See *supra* Part IV.B.

¹⁶² *House Panel Insists on Safety of Private Space Travel*, NBC NEWS (Mar. 31, 2012, 3:06:39 PM EST), http://www.msnbc.msn.com/id/46811246/ns/technology_and_science-space/#.T38-5BzO7JQ.

¹⁶³ FEDERAL AVIATION ADMINISTRATION, SAFETY APPROVAL: GUIDE FOR APPLICANTS, VERSION 1.0 (2009), available at http://www.faa.gov/about/office_org/headquarters_offices/ast/regulations/media/Safety%20Approval%20Guide%20V%201.0%20090928%20Final.pdf

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not impose safety regulations for space tourist passengers until October 2015,¹⁶⁴ once domestic regulations are imposed, some private companies may register in foreign territories with little or no regulations. Consequently, the incremental increase in risk to an already risky endeavor¹⁶⁵ can create considerable hazards to space tourists.

V. BENEFITS OF LOOSE REGULATIONS OUTWEIGH RISKS OF LIABILITY
ENFORCEMENT

As the commercial space flight industry grows, space tourists may be less concerned with the space flight's launching state. As a result, some states may follow the practice in the shipping industry of offering lower taxes and lax labor and environmental laws to attract business.¹⁶⁶ Although space law is distinguishable from maritime law due to space law's state liability for non-governmental actors,¹⁶⁷ weak enforcement mechanisms and the non-binding nature of the relevant treaties may incentivize states to disregard Articles VI and VII of the Outer Space Treaty. This section first discusses the problems with applying international law to space law, then describes the United Nation's various enforcement mechanisms, and concludes by outlining the ineffectiveness of those enforcement mechanisms.

A. *Problems with Applying International Law to Space Law*

As discussed above,¹⁶⁸ none of the international space treaties enumerate procedures for enforcement of liability or the settlement of disputes.¹⁶⁹ Rather, Article III of the Outer Space Treaty provides for the application of international law and the U.N. Charter to settle disputes relating to international space law.¹⁷⁰ While international law and the U.N. Charter provide a significant number of dispute settlement mechanisms for disputes related to outer space, there are several deficiencies.¹⁷¹ First, Article III of the Outer Space Treaty implies, yet does not impose, any form of dispute

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¹⁶⁴ *Space Tourism and Private Space Travel Must be Safe, House Panel Says*, SPACE.COM (Mar. 21, 2012, 10:46 AM), <http://www.space.com/14982-private-space-travel-risks-faa.html>.

¹⁶⁵ “[T]he loss of two (of the original five) space shuttles after only 113 flights is in itself an unacceptably high failure rate for any type of activity open to the public, and even exceeds NASA’s own safety margin requirements.” Freeland, *supra* note 85, at 15.

¹⁶⁶ See Kleiman, *supra* note 121.

¹⁶⁷ See Outer Space Treaty, *supra* note 5, art. VI.

¹⁶⁸ See *supra* Part III.B.

¹⁶⁹ See GOH, *supra* note 95, at 29.

¹⁷⁰ See Outer Space Treaty, *supra* note 5, art. III.

¹⁷¹ See GOH, *supra* note 95, at 31.

settlement.¹⁷² This “extremely indirect reference” can help potentially liable states evade responsibility because of the absence of any compulsory procedures.¹⁷³ Second, even though there are references to the U.N. Charter and the International Court of Justice, it is not likely those references will be satisfactory settlement mechanisms because there is no binding obligation to submit disputes or any “inclination on the part of space-faring States to submit to the jurisdiction of the International Court.”¹⁷⁴ Third, the laws of customary international law and of the U.N. Charter will not be capable of addressing many of the issues that will likely face the “novel, rapidly evolving field of [space] law and activity.”¹⁷⁵

B. Application of U.N. Charter to Enforce Disputes

Article 39 of the U.N. Charter provides, “[t]he Security Council shall determine the existence of any threat to the peace, breach of the peace, or act of aggression and shall make recommendations, or decide what measures shall be taken in accordance with Articles 41 and 42, to maintain or restore international peace and security.”¹⁷⁶ Some commentators argue that the Security Council’s “broad discretion to take action” under Article 39 for the maintenance of peace and security in fact places the Council’s powers “above the law.”¹⁷⁷ Others, however, argue that there are legal limits to the Council’s power.¹⁷⁸ One Charter-based limit on the power of the Council’s sanctions is in the text of Article 39 itself.¹⁷⁹ Namely, there must be a “demonstrable link to the use of armed force in international relations or a clear impact upon international relations” for the Security Council to determine the existence of a threat to the peace or a breach of the peace.¹⁸⁰ However, in a globalized world, some argue that the imposition of most types of sanctions are justified because virtually every circumstance that could be described as a threat impacts international relations.¹⁸¹ Once the existence of a threat is established, non-economic and economic sanctions are the two types of sanctions that could be applied to non-complying, space-faring states.

¹⁷² *See id.*

¹⁷³ *Id.*

¹⁷⁴ *See id.*

¹⁷⁵ *Id.*

¹⁷⁶ U.N. Charter art. 39.

¹⁷⁷ JEREMY MATAM FARRAL, UNITED NATIONS SANCTIONS AND THE RULE OF LAW 68 (2007).

¹⁷⁸ *See id.*

¹⁷⁹ *Id.* at 70.

¹⁸⁰ *Id.* (citation omitted).

¹⁸¹ *Id.*

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1. Non-Economic Sanctions

Non-economic sanctions are one method of influencing a non-complying state to observe requirements.¹⁸² Non-economic sanctions seek to interrupt the target's relations with the global community in areas that do not involve basic trade.¹⁸³ Three major non-economic sanctions include diplomatic and representative sanctions, transportation sanction, and travel sanctions.¹⁸⁴

The primary goal of diplomatic and representative sanctions is to interrupt the relations between the target and the global community.¹⁸⁵ The Security Council has required states to restrict or dissolve diplomatic relations with the target when applying diplomatic and representative sanctions.¹⁸⁶ The restrictions can apply against a sanctioned activity, a state performing the sanction, or against a specific activity within the target state.¹⁸⁷ To date, the U.N. has not enumerated any exemptions from diplomatic sanctions.¹⁸⁸

The chief goal of transportation sanctions is "to prevent the flow of transportation" to a target via land, sea, or air.¹⁸⁹ Even though transportation sanctions often include those items prohibited by economic sanctions, the Security Council has at times narrowed the scope of sanctions to only explicitly prohibit the flow of transportation to or from a state.¹⁹⁰ Similarly, travel sanctions restrict individuals' ability to travel internationally.¹⁹¹ Travel sanctions can apply to the entire population of a state or specific individuals associated with the non-compliance issue.¹⁹² While travel sanctions can be utilized to restrict passengers from flying to and from non-complying states, such states can evade the restriction by incorporating their businesses in the flag state and launching within state borders.¹⁹³

2. Economic Sanctions

A "sender state"¹⁹⁴ may attempt to inflict costs on the target state by

¹⁸² *See id.* at 123.

¹⁸³ *Id.*

¹⁸⁴ *Id.* at 123–24.

¹⁸⁵ *Id.* at 123.

¹⁸⁶ *See id.*

¹⁸⁷ *Id.*

¹⁸⁸ *Id.*

¹⁸⁹ *Id.* at 124.

¹⁹⁰ *See id.*

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ *See supra* Part IV.C.

¹⁹⁴ A sender state is defined as the country or international organization that is the principal implementer of the sanction. GARY CLYDE HUFBAUER ET AL., ECONOMIC

“limiting exports, by restricting exports, by restricting importing, or by impeding the flow of finance (commercial finance, World Bank and International Monetary Fund credits, and bilateral aid), including by freezing or seizing target-country assets within the sender’s control.”¹⁹⁵ The majority of economic sanctions have involved applying trade and financial sanctions, however, asset freezes and travel bans are still used, albeit infrequently.¹⁹⁶

The imposition of trade sanctions economically affects a target state by decreasing the state’s export markets, denying key imports, lowering the prices received for embargoed imports, and increasing the prices for substitute imports.¹⁹⁷ Target states can also be affected by financial sanctions, by a blockage of foreign assistance and, less frequently, with restrictions on private lending or investment.¹⁹⁸ Financial sanctions may be more effective than trade sanctions for multiple reasons.¹⁹⁹ First, financial sanctions are easier to enforce because government and financial institutions are often providers of financial flows, particularly with respect to developing states.²⁰⁰ Further, financial activities can be more readily monitored and penalties for violations can be applied more efficiently.²⁰¹

3. Economic Sanctions Do Not Work

As of 1998, of the 115 cases of economic sanctions, only five have succeeded.²⁰² Robert A. Pape defines success of an economic sanction as satisfying three criteria: “(1) the target state conceded to a significant part of the coercer’s demands; (2) economic sanctions were threatened or actually applied before the target changed its behavior; and (3) no more-credible explanation exists for the target’s change in behavior.”²⁰³ Looking forward, Pape notes that if economic sanctions are to lead to greater success results in the near future, the enforcers will have to dramatically increase the levels of economic punishment.²⁰⁴

SANCTIONS RECONSIDERED 43 (3d ed. 2007).

¹⁹⁵ *Id.* at 44–5.

¹⁹⁶ *Id.* at 45.

¹⁹⁷ *Id.*

¹⁹⁸ *Id.* at 46.

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

²⁰¹ *Id.*

²⁰² Robert A. Pape, *Why Economic Sanctions Still Do Not Work*, 23 INT’L SECURITY 66, 66 (1998).

²⁰³ Robert A. Pape, *Why Economic Sanctions Do Not Work*, 22 INT’L SECURITY 90, 97 (1997) (footnote omitted).

²⁰⁴ *Id.* at 108.

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VI. POSSIBLE STEPS TO AVOID THE FLAG OF CONVENIENCE PROBLEM

Without a dispute settlement mechanism that ensures observance and enforcement of the law in a majority of cases, the law will lose its primary reason for existence.²⁰⁵ In order to create such a system, the dispute settlement mechanism “must be credible and practicable, not just in theory, but also in structure, implementation and authority.”²⁰⁶ Opinions on how to solve the inadequacies in international space law have varied greatly, and many do not adequately address the insufficient enforcement mechanisms of international law.²⁰⁷ This section will first advocate a method of deterrence, and then provide two alternative mechanisms to mitigate a prospective flag of convenience problem in space.

A. *Deterrence through Supervision*

In situations where one or more parties do not comply with the law, enforcement mechanisms are necessary.²⁰⁸ Three devices most effectively garner state participation:

1. Verification; consisting of (a) Treaty Compliance Regimes; (b) Inspection panels and party reports;
2. Supervision; consisting of (a) Good offices of the UN Secretary-General; (b) Compensation Commissions and in the last resort (c) Referral of the dispute via the UN Secretary-General to the UN Security Council . . . [and]
3. Procedural Issues in Settlement Enforcement.²⁰⁹

1. Verification

A compliance regime restricts the opportunities to violate the rules.²¹⁰ Whereas deterrence regimes endeavor to prevent violations by imposing penalties and sanctions, compliance regimes will likely achieve more in the commercial space industry.²¹¹ This is so because compliance regimes establish monitoring and enforcement regulations aimed at preventing violations, not at dealing with violations once they have occurred.²¹²

Compliance regimes in international space law that integrate technical capabilities or procedures in order to make monitoring transparent would

²⁰⁵ GOH, *supra* note 95, at 244.

²⁰⁶ *Id.*

²⁰⁷ *See supra* Part V.A.

²⁰⁸ GOH, *supra* note 95, at 316.

²⁰⁹ *Id.*

²¹⁰ *Id.*

²¹¹ *Id.* at 317.

²¹² *Id.*

effectively coerce participating states into compliance.²¹³ U.N.-operated, on-site, pre-launch verification systems would be one way to achieve this end.²¹⁴ These verification systems could track space objects, monitor telemetry, observe, and evaluate parameters including radiation hardening, weight, power sources, mission objectives, nature of telemetry, contamination issues, and satellite services.²¹⁵ To assure compliance and transparency, the Registration Convention would be expanded to include mandatory monitoring systems.²¹⁶ Further, failure to provide data may be an indication to the international community of poor standards or suspicious use.²¹⁷

2. Supervision

Supervision is the arm of the law “that ensures compliance with the law” or the settlement of a particular dispute.²¹⁸ In an attempt to motivate state actors to comply with international legal obligations, three supervisory models can be implemented: a reporting system, an independent supervisory mechanism, and binding supervisory procedures.²¹⁹

Under a reporting system, members of international organizations and treaties often times abide by the requirements to report their behavior on a regular basis.²²⁰ Examples of fields that implement these requirements include “International Labor Organizations . . . human rights conventions and environmental law instruments.”²²¹ However, since states’ self-documented reports may be “overly political or biased,” the implementation of “independent supervisory mechanisms” may guarantee the independence of the reports.²²² Once an agency has evidence of non-compliance, it can “[impose sanctions or suspend] the rights of the defaulting member[s].”²²³

Although an independent supervisory mechanism may be implemented successfully in the current commercial spaceflight industry, difficulties will arise as the industry continues to grow. With new companies entering the market, an independent supervisory mechanism will become both expensive to maintain and difficult to remain neutral. Additionally, as participation will likely remain voluntary, states that wish to maintain loose regulatory regimes

²¹³ *Id.*

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ *Id.*

²¹⁷ *Id.*

²¹⁸ *Id.* at 318.

²¹⁹ *See id.* at 318–21.

²²⁰ *Id.* at 318.

²²¹ *Id.* at 318–319 (footnotes omitted).

²²² *Id.* at 319.

²²³ *Id.*

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may simply opt out of the process. Lastly, without international regulations and standards set in place, reports may be futile because “violations” on an international level may be legal under the violating states’ laws.

3. Enforcement Mechanisms

Unfortunately, even though an adequate verification and supervision regime would decrease the probability of a flags of convenience issue, “there is no system to ensure enforcement of any particular standard or rule of international law.”²²⁴ Accordingly, many argue that international law cannot represent an adequate legal system.²²⁵

Without efforts to institute specific regulations that detail the enforcement of liability issues and settlements, states will continue to be able to unilaterally interpret settlement obligations and often avoid payment.²²⁶ Even though the prospects for binding enforcement of dispute settlements are better now than they ever have been, it is not likely that a universal acceptance of enforcement procedures will be adopted because of diverging opinions in the global community.²²⁷

Therefore, accounting for the unlikelihood that the international community will universally adopt enforcement procedures in the event a party refuses to settle, the viable avenues to address the flags of convenience problems are through U.N. Security Council Sanctions and compliance regimes that will help monitor and prevent incidents from arising.²²⁸ Nevertheless, based on the space program’s track record, an extremely strong compliance regime will likely not eliminate all space-related incidents.

B. International Space Tribunal and International Space Safety Regulations

One mechanism for mitigating the flags of convenience problem would be an international space tribunal. This tribunal could be structured after specialized international courts like the European Court of Human Rights, and would deal “exclusively with space-related accidents.”²²⁹ Similar to the European Court of Human Rights, the tribunal would hear cases brought by both states and individuals.²³⁰ In addition to resolving disputes based on international custom and the established space treaties, the tribunal would

²²⁴ *Id.* at 321.

²²⁵ *Id.*

²²⁶ *See id.*

²²⁷ *Id.* at 322.

²²⁸ *See supra* Part III.B.1 & Part VI.A.1.

²²⁹ Van C. Ernest, *Third Party Liability of the Private Space Industry: To Pay What No One Has Paid Before*, 41 CASE W. RES. L. REV. 503, 539 (1991).

²³⁰ *Id.*

follow the laws of an international commercial space regulatory regime.²³¹ The International Civil Aviation Organization (ICAO) is an appropriate agency to draft the international laws because it is the specialized agency of the United Nations that has “set international standards for civil aviation safety.”²³² Accordingly, it is in ICAO’s purview to develop a “space safety oversight operating model,” establish an “organizational framework for the implementation of the operating model,” and implement a “safety certification process” in order to obtain appropriate international safety certifications to operate.²³³

Similar to the deterrence through supervision model, the international safety regulations will focus on minimizing the risk of an incident and not on enforcing a decision by the international space tribunal. As such, in an effort to mitigate the flags of convenience problem, the international regulatory regime can amend the current laws enumerated in the foundational treaties and shift liability from the state to the private entities operating in space. By holding private entities liable for any damage incurred, private companies will be incentivized to follow rigorous inspection standards. This method, however, would likely inhibit insurance rates. Further, due to the astronomical prices associated with missions, companies with minimal insurance plans will likely default and consequently will not be able to compensate the injured parties. In an effort to ease the burden on both the private enterprise and the state, Van C. Ernest suggests a model that holds the state “responsible for providing compensation in excess of the amount the launch agency is able to pay.”²³⁴ This is the model currently adopted by the United States Commercial Space Launch Act,²³⁵ recently codified as the Commercial Space Launch Activities (“CSLA”).²³⁶

C. Mandatory International Insurance Plans

Another possible mechanism to regulate the prospective flags of convenience problem in space is to implement a mandatory international insurance plan for states. When commercial space tourism becomes a viable industry, it will be especially critical to ensure that the legal regime for liability for outer space activities will have appropriate insurance coverage.²³⁷ One model that could be useful in creating a uniform regime that would include

²³¹ *Id.*

²³² RAM S. JAKHU ET AL., THE NEED FOR AN INTEGRATED REGULATORY REGIME FOR AVIATION AND SPACE: ICAO FOR SPACE? 4 (Eur. Space Pol’y Inst. ed., 2011).

²³³ *Id.* at 128.

²³⁴ Ernest, *supra* note 229, at 536.

²³⁵ *See id.* at 510–12.

²³⁶ 51 U.S.C.A. § 509 (West 2010).

²³⁷ Freeland, *supra* note 85, at 18.

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mandatory international insurance is the CSLA. The CSLA is a useful tool because it requires many conditions on commercial space-related activities in the United States. One particular condition of CSLA requires all private entities to demonstrate financial responsibility.²³⁸ Financial responsibility includes liability insurance or another independent source of guaranteeing compensation in the event of losses to compensate, “(A) a third party for death, bodily injury, or property damage 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 Government property resulting from an activity carried out under the license.”²³⁹ Specifically, the CSLA mandates private entities that launch space vehicles to purchase \$500 million in third-party liability insurance.²⁴⁰

The problem, however, with extending the application of the Commercial Space Launch Act, and subsequently CSLA, to international law is that many operations are subject to strict liability on an international level,²⁴¹ and many insurance companies would not insure a space craft with such a high risk of failure.²⁴² Further, while the insurance plan will likely be integrated into one of the U.N. treaties, enforcement of the plan will once again remain a root problem.

VII. CONCLUSION

The prospects for the future of space law and space tourism have significantly changed with the growing market for privately funded flights. In addition to Virgin Galactic, which plans to launch its first commercial flights in 2014, many other private enterprises are emerging in the field, including XCOR Aerospace, Armadillo Aerospace, and Blue Origin.²⁴³ Unfortunately, this growth in private enterprise has far outpaced developments in the law regulating the industry. As such, the current international legal regime is ill equipped to address the novel and rapidly evolving demands of commercial enterprise in space.²⁴⁴

The collective principles of Article VI and Article VII of the Outer Space Treaty provide that parties to the agreement are legally responsible and liable

²³⁸ See 51 U.S.C.A. § 50914(a)(1) (West 2010).

²³⁹ *Id.*

²⁴⁰ 51 U.S.C.A. § 50914(a)(3)(A)(i) (West 2010).

²⁴¹ See Charity Trelease Ryabinkin, *Let There Be Flight: It's Time to Reform the Regulation of Commercial Space Travel*, 69 J. AIR L. & COM. 101, 119 (2004). Ryabinkin's article refers to the language of the repealed CSLA; however, the discussed language is identical to language of the newly adopted CSLA.

²⁴² See *supra* text accompanying note 165.

²⁴³ Chow, *supra* note 43.

²⁴⁴ Tannenwald, *supra* note 13, at 370.

for their own actions and for the space activities of their national private enterprises.²⁴⁵ These principles do not, however, give any “indication as of how such responsibility would be enforced, or how disputes arising . . . [from] damage caused by space activities would be settled.”²⁴⁶ Consequently, in an effort to “obtain cost economies and stay competitive in the industry,”²⁴⁷ states may enact loose regulatory regimes in the near future to attract private companies. Similar to the problems in the shipping industry, this flags of convenience problem could lead to hazardous consequences, including an increase in space debris, pollution to the space environment, and hazards to space tourists.

The time for action is now. Before prospective flags of convenience states enter the commercial space flight industry, the international space treaties must integrate comprehensive compliance regimes. Mechanisms to achieve this end include an international space tribunal, international space safety regulations, and a mandatory international insurance plan. These measures, coupled with procedural guidelines for the enforcement of these rules, will decrease the probability of a flags of convenience problem developing in space. Space tourism is no longer a science-fiction construct, but is a fast emerging reality that requires comprehensive legal reform in order to meet the growing demands of the near future.

²⁴⁵ LYALL & LARSEN, *supra* note 7, at 469–70.

²⁴⁶ GOH, *supra* note 95, at 29.

²⁴⁷ See Özçayir, *supra* note 129, at 111.