

A Space Law Primer for Colorado Lawyers

Part 1: International Space Law

BY SKIP SMITH

*International and national space laws impact many Colorado companies.
This article addresses international space law. Part 2 will address U.S. national space law.*

Space law is the collection of international and national laws governing space-related activities. Space law addresses a wide assortment of matters, such as the freedom of use and exploration of outer space by all nations, protection of the space and Earth environments, liability for damages caused by space objects, dispute resolution, rescue and return of astronauts and space objects, sharing of information about potential hazards in outer space, prevention of harmful interference, use of space-related technologies, licensing of satellite launches, and international cooperation.

Why is space law relevant to Colorado lawyers? It's simple: Colorado has the second largest aerospace economy in the United States, with more than 400 aerospace companies and over 25,000 private aerospace workers.¹ Colorado is home to Lockheed Martin Space Systems Company (satellite launch and manufacture, earth observation and exploration, human space flight, planetary and asteroid exploration); Ball Aerospace (satellite manufacture, astrophysics and planetary science, instruments and technologies, earth science); United Launch Alliance (satellite launch); EchoStar (the world's fourth largest commercial satellite fleet of 25 satellites); Digital Globe (owner and operator of earth remote sensing satellites); Sierra Nevada Corporation Space Systems (space technologies, spacecraft systems, space exploration systems); and many midsize and small subcontractors and suppliers of space goods and services.

Colorado is also the home of Air Force Space Command (military space), a National Oceanic and Atmospheric Administration Laboratory (civil space), the National Center for Atmospheric Research (a federally funded research and development center), and the Space Foundation (space education).

“
Why is space law relevant to Colorado lawyers? It's simple: Colorado has the second largest aerospace economy in the United States, with more than 400 aerospace companies and over 25,000 private aerospace workers.
”

Additionally, Colorado is one mile closer to space than most other places! In short, many Colorado companies are involved in space activities, so Colorado lawyers are well-served by understanding the legal environment within

which these companies operate. This two-part series will review the primary components of space law: international space law (part 1) and U.S. national space law (part 2).

The Venn diagram on the next page shows one way of looking at space law. The first component is international space law—mainly treaties and other international agreements. The second piece is domestic space law—many nations have developed detailed laws and regulations applicable to space activities, and the United States is clearly the leader in this effort.²

The United States has many laws specifically aimed at space activities, such as the Commercial Space Launch Act of 1984, as amended,³ the Land Remote-Sensing Policy Act of 1992,⁴ the U.S. Commercial Space Launch Competitiveness Act,⁵ and the Inventions in Outer Space Act.⁶

The third component is a large body of laws that were developed over centuries for other applications that now are being applied to space-related activities. For example, contract law governs contracts for the manufacture of satellites and for the launch of those satellites. Normal principles of contract drafting and interpretation apply to each of these transactions, which typically far exceed \$100 million each.

The pyramid shows another way of looking at space law, with international and national space law as its foundation, upon which rest the many other legal principles and laws that impact space activities built on this base. Government and commercial contracts are a major aspect of space business. Many of the companies involved in space activities are government contractors. Dispute avoidance and resolution is a major part of space business and very often involves international dispute resolution forums such as the International Chamber of Commerce. Financing and insuring space-related activities

are critical activities and are not that different from financing and insuring other large-dollar, high-risk business ventures.

The Five Major Space Treaties

There are five major outer space treaties that all came out of the United Nations in the late 1960s

and 1970s. During this period, space-related issues generally involved two blocks of nations: those led by the Soviet Union and those led by the United States. The lack of subsequent development of international space treaties within the United Nations is likely due to the end of the Cold War and the increasing number of

space-faring nations. In many ways, negotiations between two primary blocks, with relative parity in space power, was easier. Negotiations now must occur among the many space powers including, but certainly not limited to, the United States, Russia, China, Europe (with its own internal divisions), India, and Japan. Developing countries also have considerable weight within the U.N. system, where each country has one vote.

Within the United Nations, the Committee on the Peaceful Uses of Outer Space (COPUOS) was instrumental in establishing the five treaties. COPUOS has two bodies: the Scientific and Technical Subcommittee and the Legal Subcommittee, both of which were established in 1961.⁷

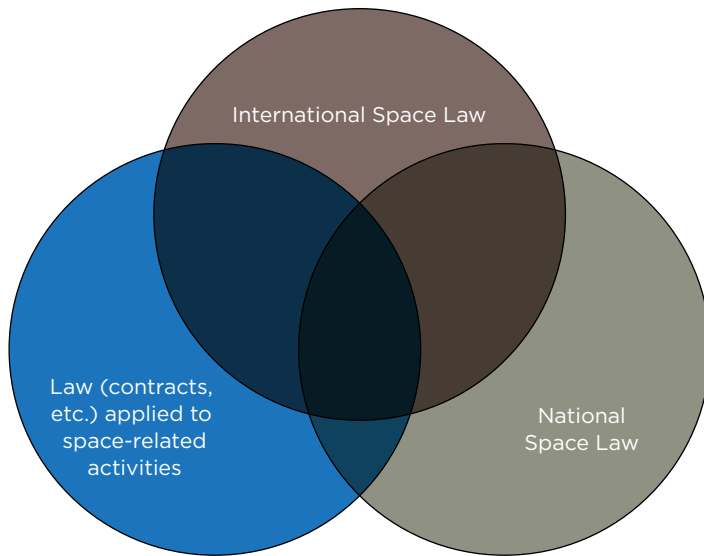
The Outer Space Treaty

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,⁸ is best known simply as the Outer Space Treaty. It has 105 parties, including all of the space powers.⁹ This treaty was based mainly on an earlier Declaration that was adopted by the U.N. General Assembly in 1963. The Outer Space Treaty entered into force in 1967.

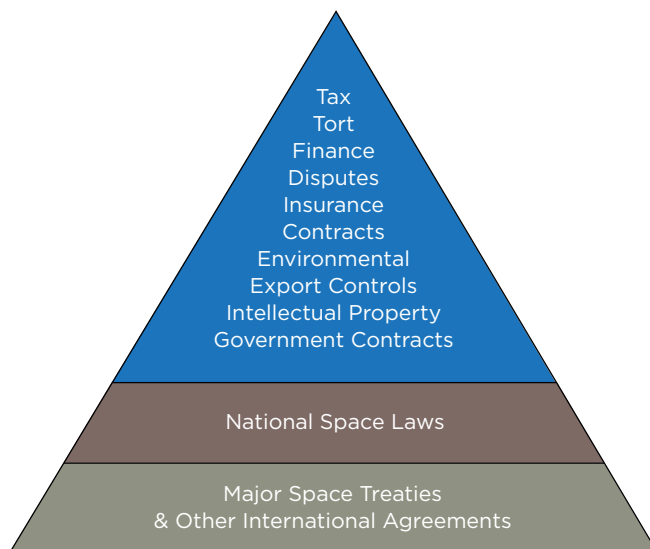
The Outer Space Treaty is the “Magna Carta” of space law. It establishes broad, general principles for the use and exploration of outer space. This Treaty establishes the basic rights, duties, and responsibilities of nations with respect to conducting activities in space. In general, the Outer Space Treaty establishes a legal regime that is favorable to commercial activities in space. It recognizes the legitimacy of activities by private enterprise in outer space, although nations bear responsibility and liability for the space activities of their non-governmental agencies.¹⁰ Furthermore, the Treaty calls for space activities to be conducted with due regard to the corresponding interests of other parties, and if an activity may cause harmful interference with the outer space activities of other parties, consultation should occur before the activity may proceed.¹¹

Article I establishes that the exploration and use of outer space shall be conducted “for the benefit and in the interests of all countries . . . and shall be the province of all mankind.”

WHAT IS SPACE LAW?



THE CONTEXT



This “common interests” principle must not be confused with the “common heritage of mankind”¹² concept discussed below.¹³ The common interests principle is inherently vague and imposes no requirement for direct sharing of benefits in any specific manner; it requires only that space activities be beneficial in a very general sense.¹⁴ Notwithstanding, history has shown that practically every nation has benefited in some manner from the exploration and use of space. These benefits include the availability of weather and other remote sensing information from satellites, access to international and domestic telecommunication satellites, universal use of global positioning information, and increased knowledge about our universe.¹⁵ All of these benefits have been realized by developing countries without their risk of investment capital.

Article I also establishes the principle of the freedom of exploration and use of outer space. As with the freedoms of the high seas,¹⁶ the freedom of use of outer space must be exercised with regard to the interests of other states so that their exercise of such freedoms is not unreasonably denied. Otherwise, there would be no meaning to the freedom-of-use provision. In application, the freedom-of-use-principle probably has been the most important principle in the Outer Space Treaty. It has created a legal environment within which many governmental and non-governmental space activities have been able to flourish.

Article II establishes that outer space is “not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹⁷ The purpose of the non-appropriation clause was to implement the freedom of use principle. Appropriation is inconsistent with freedom of use. This clause also furthers the common interests principle because appropriation of an area may only benefit the appropriator.

Article III extends the U.N. Charter and international law, in general, to space. It beckons nations to conduct space activities “in the interest of maintaining international peace and security and promoting international co-operation and understanding.”¹⁸ The general extension of international law to space is very

important. Because of Article III, gaps in the space treaties may be filled by principles of customary international law and other international law principles. For example, principles of self-defense and the law of armed conflict are well-defined in other domains, and they may be applied with respect to space.

Article IV addresses arms control issues in space. Nations may not place nuclear weapons or other weapons of mass destruction in earth

Article V declares astronauts to be “envoys of mankind” and requires parties to render assistance to astronauts in distress and return them to the state of registry of their space vehicle.²¹ Parties must also immediately inform other parties or the United Nations of any phenomena in outer space that could endanger the life or health of astronauts. The Rescue and Return Agreement, discussed below, expands on Article V.

Article VI has proven to be quite important, and it forms the basis for much national space law:

States Parties to the Treaty shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space . . . shall require authorization and continuing supervision by the appropriate State Party to the Treaty.²²

During negotiation of the Outer Space Treaty, the Soviet Union wanted only nations to conduct space activities. Article VI provided a compromise pursuant to which non-governmental entities (i.e., individuals and companies) could conduct space activities. Each nation, however, remains responsible for the space activities of its non-governmental entities and must provide “authorization and continuing supervision.”²³ This requirement has prompted nations with non-governmental entities conducting space activities to develop laws and regulations licensing such activities to fulfill their obligations under the Outer Space Treaty.

Article VII reinforces the provisions of Article VI and declares that any party “that launches or procures the launching of an object into outer space, . . . and each State Party from whose territory or facility an object is launched, . . . is internationally liable for damage to another State Party . . .”²⁴ Articles VI and VII thus firmly establish that nations bear international responsibility and liability for their space activities. The Liability Convention,

“
There are five
major outer space
treaties that all
came out of the
United Nations in
the late 1960s and
1970s.
”

orbit, on celestial bodies or in other areas of outer space, and the Moon and other celestial bodies are to be used “exclusively for peaceful purposes.”¹⁹ This is in accord with U.S. space policy and legislation, which provides that space will be used for “peaceful purposes.”²⁰ In general, the United States and most countries define “peaceful” as being “non-aggressive.” For example, it is clear from state practice that military satellites may be placed in space, but such satellites may not be used for acts of aggression.



addressed below, provides further details on the responsibility and liability of nations for space activities.

Pursuant to Article VIII, parties retain jurisdiction, ownership, and control of their registered space objects.²⁵ Additionally, space objects or component parts found outside the state of registry must be returned to their state of registry.²⁶ These aspects underscore the importance of registering space objects and also imply that a registered space object may not be abandoned by its owner. This has important implications for issues related to the problems caused by “orbital debris.”²⁷ The Registration Convention, addressed below, provides further details on the responsibility and liability of nations for space activities.

Articles IX, X, and XI focus on the conduct of space activities. All three Articles require cooperation and mutual assistance. Pursuant to Article IX, parties must avoid harmful contamination of the Moon and other celestial bodies and adverse changes to the Earth’s environment, must conduct their space activities with “due regard to the corresponding interests of all other States Parties to the Treaty,” and must “undertake appropriate international consultations” before proceeding with any activity or experiment that could cause harmful interference with the activities of other parties.²⁸ Article X requires parties to consider requests by other parties

to observe the flight of space objects launched by those states.²⁹ Under Article XI, parties are required to inform the United Nations and the international scientific community “of the nature, conduct, locations and results of [outer space] activities.”³⁰

Pursuant to Article XII, “[a]ll stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity.”³¹ Reasonable advance notice is to be given to allow appropriate consultations to assure safety and avoid interference with operations in the facility to be visited. This Article establishes a regime similar to that established in the Antarctic Treaty.³²

The Outer Space Treaty has provided a foundation upon which space activities have been conducted for over 50 years. Because its broad, general principles may be subject to varying interpretations, the efficacy of the Treaty sometimes has been called into question. In 2017, the 50th anniversary of the Outer Space Treaty, Senator Cruz, chairman of the space subcommittee of the Senate Commerce Committee, held hearings to examine whether the Treaty needed revisions.³³ Notwithstanding, the Treaty has stood the test of time, and some of its key principles, including freedom of use and non-appropriation, are considered to have acquired the status of customary international

law applicable to all nations. The broad principles of the Outer Space Treaty formed the basis for the subsequent treaties developed within the United Nations.

The Rescue and Return Agreement

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space³⁴ (Rescue and Return Agreement) entered into force in 1968. This treaty has 95 parties³⁵ and expands on the rescue and return provisions in Articles V and VIII of the Outer Space Treaty. The primary purpose of this treaty is the safety of astronauts. Although the Outer Space Treaty refers to “astronauts,” the Rescue and Return Agreement broadens this term to “personnel of a spacecraft.”³⁶

Articles II through IV address the rescue of personnel of the spacecraft. If a party becomes aware that personnel of the spacecraft are in distress, they must notify the launching authority and United Nations. A party must “immediately take all possible steps” to rescue and assist the personnel of a spacecraft who have landed within that state’s territory in distress and must return them promptly to the launching state.³⁷ If the spacecraft is located on the high seas or another location not under the jurisdiction of any state, parties in a position to do so must assist in search and rescue operations.³⁸

The Rescue and Return Agreement also addresses obligations regarding the return of space objects to the launching state. These obligations are less stringent than those requiring the prompt return of the personnel of a spacecraft. Pursuant to Article V, if a space object lands in the territory of another party, the state where the object lands, upon request of the “launching authority,” is to take all steps “practicable” to recover the object.³⁹ Duties to recover the space object are less strict than those with respect to the personnel of the spacecraft; a state need only take all steps “practicable,” not all steps “possible.” Duties to return the space object also are less rigorous. For example, upon request, the launching authority must provide “identifying data” before return is required.⁴⁰ Moreover, the Treaty is silent on issues such as whether the recovering state could seek payment of recovery costs before returning a space object.

The Liability Convention

The Convention on International Liability for Damage Caused by Space Objects⁴¹ (Liability Convention) entered into force in 1972. The objective of the Liability Convention is full and equitable compensation for damage caused by space objects. It has 94 parties⁴² and expands considerably on the Outer Space Treaty provisions that launching states are liable to other states for damages caused by space objects. The Liability Convention is significantly longer and more detailed than the other space treaties, and it defines key terms such as “damage,” “launching state,” and “space object.”⁴³ It establishes absolute liability of the launching state for damage caused on the Earth’s surface or to aircraft in flight by its space object.⁴⁴ For damages occurring in outer space, however, the launching state is only liable if damage is due to its “fault.”⁴⁵ Establishing “fault” liability would be a real challenge given the general lack of rules of the road in outer space. When two or more states jointly launch a space object, they are jointly and severally liable for damage caused by the space object.⁴⁶

The provisions of Article VII of the Outer Space Treaty and of the Liability Convention

do not require implementing legislation with respect to state responsibility and liability for damage caused by space objects. However, the United States is a party to both agreements and therefore is responsible and liable for damage caused to others by its space objects. Accordingly, the United States has set forth launch safety, regulatory, and insurance requirements in the Commercial Space Launch Act⁴⁷ (CSLA), as well as a detailed regulatory regime⁴⁸ that includes cross-waivers of liability by all parties to a launch.⁴⁹ These will be addressed in part 2 of this series.

Pursuant to the Liability Convention, a party may submit, through diplomatic channels, claims for damages caused by a space object.⁵⁰ If the parties are unable to negotiate a resolution of the dispute, a three-member Claims Commission may be formed.⁵¹ Each nation involved appoints one member, and the

two appointed members then appoint a third, the chair.⁵² The Commission establishes its own procedures, and decisions are by majority vote.⁵³ Decisions of the Commission are final and binding if the parties so agree; otherwise, they are recommendatory.⁵⁴

The Liability Convention does not require prior exhaustion of any local remedies, and it does not prevent the assertion of private claims in courts or administrative tribunals.⁵⁵ A party, however, may not present a claim under the Liability Convention if a private remedy is being pursued.⁵⁶

The Liability Convention has been used once as the basis for a claim. In 1978, Cosmos 954, a Soviet satellite with a nuclear power source, returned to the Earth, failed to burn up in the atmosphere, and crashed in Canada’s northern territories.⁵⁷ Radioactive debris was spread over a large portion of the northern territories. As



WANT TO KNOW MORE ABOUT SPACE LAW?

Join the Space Law Workshop presented by the International Institute of Space Law at the

34TH SPACE SYMPOSIUM

APRIL 16, 2018 | 2-5 P.M.

The Broadmoor | Colorado Springs | 3 hours CLE

Registration includes post-Workshop reception, admission to the Symposium Opening Ceremony and Grand Opening of the Ball Aerospace Exhibit Center

www.SpaceSymposium.org/agenda

a result of the claim made through diplomatic channels, the USSR paid approximately \$3 million Canadian to Canada as a result of this damage on the Earth's surface, for which it was absolutely liable.⁵⁸ Although satellites have collided with each other, there have been no instances of claims made for damage occurring in outer space.

The Registration Convention

The Convention on Registration of Objects Launched into Outer Space⁵⁹ (Registration Convention) entered into force in 1975. The Registration Convention has 63 parties.⁶⁰ It further details the obligations of Article VIII of the Outer Space Treaty. The Registration Convention calls for the establishment of national registries and a register of space objects maintained by the United Nations.⁶¹ Pursuant to the Registration Convention, a launching state must advise the United Nations of the name of the launching nation, description or registration number, date and location of launch, basic orbital parameters, and general function of the space object.⁶² This registration must be made as soon as practicable after launch. There is no requirement, however, to update this registration information, and it is not particularly useful in determining where a registered space object may be in orbit at any particular time.

The Moon Agreement

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies⁶³ (Moon Agreement) entered into force in 1984.⁶⁴ There are 17 Parties to the Moon Agreement.⁶⁵ The United States and other space powers are *not* parties to this Agreement. The Moon Agreement applies to the Moon and all other celestial bodies in our solar system except for Earth. Many of its provisions are taken almost directly from the Outer Space Treaty. Aside from provisions relating to the commercial exploitation of natural resources, the Moon Agreement mainly reaffirms or slightly expands existing space law. The provisions regarding natural resources, however, are quite significant and far reaching. Nevertheless, they are mainly of academic interest given the absence of space powers as parties.

The key section of the Moon Agreement with regard to commercial exploitation of natural resources is Article XI, which reiterates the principle that the Moon is not subject to national appropriation. It also addresses property rights. Property such as equipment and installations may be placed on the Moon and moved freely, but its location does not create any rights of ownership to the area at which the property is located.⁶⁶ Additionally, property rights cannot be established over the surface or subsurface of the Moon, nor over natural resources "in place."⁶⁷ Use of the phrase "in place" is significant because it may permit the establishment of property rights over natural resources that have been extracted.⁶⁸ This coincides with the usufructuary nature of mining.

By far the most distinctive aspect of Article XI, however, is its declaration that the Moon and its natural resources are the common heritage of mankind (CHM). The CHM concept has been the subject of a great deal of literature.⁶⁹ Developing countries have frequently asserted that the CHM applies to all international common resources including those of the deep seabed, Antarctica, the Geostationary Satellite Orbit, and the radio frequency spectrum (the orbit/spectrum resource), as well as to celestial bodies. Nevertheless, both the definition of the CHM and its status in international law are debatable.

Over the past decades, two primary theories regarding the CHM have been advocated. One theory holds that the CHM establishes common ownership and that all countries are entitled to substantive property rights over the natural resources of an area that is the CHM.⁷⁰ In essence, this type of CHM regime would secure economic benefits for developing countries that may have cost them nothing. It is not surprising that many of the proponents of this theory are from developing nations. The other theory regarding the CHM is quite different. It considers that the above theory of the CHM is "foreign to existing international law and may even come into conflict with existing rules of international law."⁷¹ Instead, it holds that the CHM is simply a continuation of the concepts of *res communis* and the common interests

clause of the 1967 Outer Space Treaty.⁷² A more recent compromise position holds that "[t]he core of the principle of the 'common heritage of mankind' currently seems to be that the legal regime governing outer space resources must be international and not national."⁷³

In summary, the Moon Agreement is worded broadly enough to permit varying definitions of its CHM concept. Although these terms will continue to be advocated by developing nations, they will be largely irrelevant to the commercial exploitation of resources in space unless space powers adopt the Moon Agreement, which is highly unlikely.⁷⁴ The relevant discussion regarding legal issues relating to commercial exploitation of resources in space, such as asteroid mining and mining on the Moon, mainly involves the interplay between the Outer Space Treaty principles of freedom of use (Article I) and non-appropriation (Article II). This is, and likely will remain, a fertile area for debate among space lawyers.⁷⁵

UNGA Resolutions

In addition to the five treaties discussed above, the U.N. General Assembly has passed five Resolutions establishing declarations and principles applicable to the exploration and use of outer space. Although these Resolutions are nonbinding, they are generally followed and may sometime attain the status of customary international law. The five Resolutions are:

- The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space.⁷⁶
- The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting.⁷⁷
- The Principles Relating to Remote Sensing of the Earth from Space.⁷⁸
- The Principles Relevant to the Use of Nuclear Power Sources in Outer Space.⁷⁹
- The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries.⁸⁰

The first Declaration pre-dated the Outer Space Treaty and formed the basis for many of its principles. All other Declarations post-dated

the Outer Space Treaty and either elaborate on its principles or address specific uses of outer space in light of the Outer Space Treaty principles.

Other International Agreements


There are many other international agreements impacting the use and exploration of outer space. Details of these international agreements are beyond the scope of this article. These international agreements include:

- The International Telecommunication Union (ITU) Constitution, Convention, and Radio Regulations.⁸¹ The ITU is the specialized agency of the United Nations for communications and information technologies. The ITU allocates global radio spectrum and satellite orbits and develops technical standards to ensure that networks and technologies seamlessly interconnect.⁸²
- The International Space Station (ISS) Agreements.⁸³ These Agreements are:
 - ▶ The Intergovernmental Agreement (IGA), which is an international treaty between all ISS partner nations establishing a long-term cooperative framework for the design, development, operation, and commercial use of the ISS for peaceful purposes,

in accordance with international law.

- ▶ Four Memoranda of Understanding (MOUs) between NASA and the four other Cooperating Agencies (those of Europe, Russia, Canada, and Japan).
- ▶ Implementing arrangements developed as needed between space agencies such as NASA and ESA. They implement the general obligations in the IGA for specific issues and, among other things, enable trading of rights and duties.
- The Convention for the Establishment of a European Space Agency (ESA).⁸⁴ This Convention establishes an intergovernmental organization of 22 member states dedicated to the use and exploration of outer space. ESA has functions similar to those of national space agencies such as NASA.

Conclusion

Colorado occupies a predominant role in the aerospace economy. This economy impacts numerous industries and implicates many areas of law. Familiarity with space law will serve Colorado lawyers and their clients well. Stay tuned for part 2 of this series, which will evaluate U.S. laws applicable to the use and exploration of outer space. 



Milton "Skip" Smith is the chair of Sherman & Howard's Space Law Practice Group and has over 30 years' experience in aerospace, defense, and government contracts. He is on the board of directors of the International Institute of Space Law (IISL) and is a past chair of the Colorado Space Business Roundtable. During his Air Force career, Smith served as director of Space Law at Space Command and Chief of Space Law for the Air Force. He also served in Geneva as the legal advisor to the U.S. Delegation at the ITU Conference on the Geostationary Satellite Orbit. Smith is the 2016 recipient of the Lifetime Achievement Award from the IISL, and in 2017 the American Arbitration Association selected him as one of 26 arbitrators for its new Aerospace, Aviation & National Security Panel—msmith@shermanhoward.com.

Coordinating Editors: John Goehring—john.s.goehring@googlemail.com; Chance Hill, chill3@sherman.howard.com

NOTES

1. Zaleski, "How Colorado is trying to cash in on the multibillion-dollar space race," CNBC (July 11, 2017), www.cnbc.com/2017/07/11/colorado-is-cashing-in-on-multibillion-dollar-space-race.html.
2. More than 20 nations have fairly detailed national space laws and regulations. See, e.g., Jakhu, ed., *National Regulation of Space Activities (Space Regulations Library)* (Springer 2010); United Nations Office for Outer Space Affairs, National Space Law Collection, www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html.
3. 51 USC §§ 50901 et seq.
4. 15 USC §§ 5601 to 5672 (1992).
5. Pub. L. No. 114-90 (2015).
6. 35 USC § 105 (1990).
7. United Nations Office for Outer Space Affairs, COPUOS, www.unoosa.org/oosa/en/ourwork/copuos/index.html.
8. Outer Space Treaty, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205, www.state.gov/t/isn/5181.htm.
9. COPUOS, Status and application of the five United Nations treaties on outer space (Mar. 23 2017), www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2017_CRP07E.pdf.
10. Outer Space Treaty, *supra* note 8 at Articles 6 and 7.
11. *Id.* at Article 9.
12. *Id.* at Article 1. The common interests principle also appears in other areas of the

KEY PRINCIPLES OF INTERNATIONAL SPACE LAW

The key principles of international space law derived from international agreements that relate to the commercial use of outer space are:

- Space is free for use in exploration.
- Space is not subject to appropriation.
- States are responsible and liable for their outer space activities and the activities of their entities.
- Nations retain jurisdiction, ownership, and control of registered space objects.
- Nations are to avoid harmful contamination of outer space.

There is absolute liability for damages caused on the surface of the Earth and fault liability for damages caused in outer space.

Outer Space Treaty. See, e.g., Outer Space Treaty Preamble.

13. See *infra* notes 66–70 and accompanying text.

14. Gorove, “Implications of International Space Law for Private Enterprise,” 7 *Annals Air & Space L.* 319, 321 (1982). *But see* Matte, *Aerospace Law: Telecommunications Satellites* 78 (Butterworth Feb. 1983) (“[T]here is a basic obligation that falls upon States carrying out space activities to be responsive to the interests of developing countries and to provide for some method of distributing the benefits derived from such activities.”).

15. For example, to further world knowledge about the Moon, NASA has provided lunar sample materials to scientists in over 20 nations with a requirement that results of their analyses be published. See Staff of Senate Comm. on Commerce, Science, and Transportation, 96th Cong., Agreement Governing The Activities of States on The Moon and Other Celestial Bodies, 281 (U.S. Gov’t Printing Office 1980).

16. See generally Brownlie, *Principles of Public International Law* 238–40 (Oxford University Press 1979).

17. Outer Space Treaty, *supra* note 8 at Article 2.

18. *Id.* at Article 3.

19. *Id.* at Article 4.

20. 51 USC § 20102(a).

21. Outer Space Treaty, *supra* note 8 at Article 5.

22. *Id.* at Article 6.

23. *Id.*

24. *Id.* at Article 7.

25. *Id.* at Article 8.

26. *Id.*

27. Orbital debris includes useless man-made objects in earth orbit such as defunct satellites, spent rocket stages, and fragmentation debris. NASA, www.nasa.gov/mission_pages/station/news/orbital_debris.html.

28. Outer Space Treaty, *supra* note 8 at Article 9.

29. *Id.* at Article 10.

30. *Id.* at Article 11.

31. *Id.* at Article 12.

32. The Antarctic Treaty, Dec. 1, 1959, 402 U.N.T.S. 71.

33. Foust, “Is it time to update the Outer Space Treaty?” *The Space Review* (June 5, 2017), www.thespacereview.com/article/3256/1.

34. Rescue and Return Agreement, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119, www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/rescueagreement.html.

35. COPUOS, *supra* note 9.

36. Rescue and Return Agreement, *supra* note 34 at Article 2.

37. *Id.*

38. *Id.* at Article 5(2).

39. *Id.*

40. *Id.* at Article 5(3).

41. Liability Convention, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187, www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html.

42. www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2017_CRPO7E.pdf.

43. Liability Convention, *supra* note 41 at Article I.

44. *Id.* at Article II.

45. *Id.* at Article III.

46. *Id.* at Article V(1).

47. 51 USC §§ 50901 et seq.

48. 14 CFR Chapter III, Subchapter C.

49. 14 CFR § 440.17.

50. Liability Convention, *supra* note 41 at Article IX.

51. *Id.* at Article XIV.

52. *Id.* at Article XV.

53. *Id.* at Article XVI.

54. *Id.* at Article XIX.

55. *Id.* at Article XI.

56. *Id.*

57. See Settlement of Claim between Canada and the Union of Soviet Socialist Republics for Damage Caused by “Cosmos 954” (Released on Apr. 2, 1981), www.spacelaw.olemiss.edu/library/space/International_Agreements/Bilateral/1981%20Canada-%20USSR%20Cosmos%20954.pdf.

58. United Nations Office for Outer Space Affairs, Bilateral and Multilateral Agreements Governing Space Activities, www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/bi-multi-lateral-agreements/can_ussr_001.html.

59. Registration Convention, Nov. 12, 1974, 28 U.S.T. 695, 1023 U.N.T.S. 15, www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html.

60. COPUOS, *supra* note 9.

61. Registration Convention, *supra* note 59 at Articles II and III.

62. *Id.* at Article IV.

63. Moon Agreement, Dec. 18, 1979, 1363 U.N.T.S. 3, www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html.

64. United Nations Office for Outer Space Affairs, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html.

65. COPUOS, *supra* note 9.

66. Moon Agreement, *supra* note 63 at Article 11(3).

67. *Id.*

68. This interpretation is verified by the negotiating history of the phrase. See Menter, “Commercial Space Activities Under the Moon Treaty,” Proceedings of the 23rd Colloquium on the Law of Outer Space 35, 39 (1981).

69. See, e.g., Dupuy, “The Notion of the Common Heritage of Mankind Applied to the Seabed,” 8 *Annals of Air & Space L.* 347 (1983); Matte, “Limited Aerospace National Resources and their Regulations,” 7 *Annals of Air & Space L.* 379 (1982); Williams, The Exploitation and Use of Natural Resources in the New Law of the Sea and the Law of Outer Space, Proceedings of the 29th Colloquium on the Law of Outer Space 198 (1987).

70. One proponent of the CHM as it relates

to the law of the sea has stated that “[t]he common heritage of mankind is the common property of mankind. The commonness of the ‘common heritage’ is a commonness of ownership and benefit. The minerals are owned in common by your country and mine, and by all the rest as well If you touch the nodules at the bottom of the sea, you touch my property. If you take them away, you take away my property.” Allen and Craven, eds., *Alternatives in Deepsea Mining* 13 (Univ. of Hawaii 1979).

71. Wassenbergh, “Speculations on the Law Governing Space Resources,” 5 *Annals of Air & Space L.* 611, 621 (1980).

72. Finch and Moore, The 1979 Moon Treaty Encourages Space Development, Proceedings of the 23rd Colloquium on the Law of Outer Space at 13, 14 (1981).

73. Marboe, The End of the Concept of “Common Heritage of Mankind”? Proceedings of the International Institute of Space Law at 225 (2016).

74. The commercial exploitation of resources in space, such as asteroid mining and mining on the Moon, will have little to do with the Moon Agreement. The relevant discussion involves the interplay between the Outer Space Treaty principles of freedom of use (Article I) and non-appropriation (Article II).

75. See, e.g., Kfir, “Is Asteroid Mining Legal? The Truth Behind Title IV of the Commercial Space Launch Competitiveness Act of 2015,” Deep Space Industries, <http://deepspaceindustries.com/is-asteroid-mining-legal> (asserting that asteroid mining is legal under the Outer Space Treaty); Dunietz, “Floating Treasure: Space Law Needs to Catch up with Asteroid Mining,” *Scientific American* (Aug. 28, 2017), www.scientificamerican.com/article/floating-treasure-space-law-needs-to-catch-up-with-asteroid-mining.

76. G.A. Res. 1962 (XVIII) (Dec. 1963). This Declaration pre-dated the Outer Space Treaty and formed the basis for many of its Principles.

77. G.A. Res. 37/92 (Dec. 10, 1982).

78. G.A. Res. 41/65 (Dec. 3, 1986).

79. G.A. Res. 47/68 (Dec. 14, 1992).

80. G.A. Res. 51/122 (Dec. 13, 1996).

81. Collection of the Basic Texts of the International Telecommunication Union adopted by the Plenipotentiary Conference (2015), www.itu.int/pub/S-CONF-PLN-2015.

82. About ITU, www.itu.int/en/about/Pages/default.aspx.

83. United Nations Office for Outer Space Affairs, “The Legal Framework for the International Space Station,” presentation slides to COPUOS Legal Subcommittee (Apr. 17, 2013), www.unoosa.org/pdf/pres/lsc2013/tech-05E.pdf.

84. ESA Convention, www.esa.int/About_Us/Law_at_ESA/ESA_Convention.