CIRCUMNAVIGATING INTERNATIONAL SPACE LAW

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I. INTRODUCTION

Man's exploration of space is often analogized to his exploration of the ancient oceans. Ancient sea-explorers faced obstacles of uncharted oceans and land. They also faced difficulties in finding the means and financing to make their discoveries. Space industrial development suffers difficulties as well, however, many of the difficulties are legal obstacles. This author and numerous legal authorities have asserted that international space law presently hinders the commercial development of outer space, and thus, requires legal change. Vigorous space commercial development is crucial, however, not for intellectual development alone. It offers massive economic, medical, industrial, and humanitarian rewards.

3. See Twibell, supra note 1, at 1.
4. "[T]he current space industry today is a multi-billion dollar industry with revenues of $40 billion annually." Id. at 31. "Although these figures sound impressive, they are a result of small-scale, isolated space ventures which merely scratch the surface of what can be achieved given changes in the current legal regime." Id. at 32.
5. Advancements in the medical field have resulted from efforts in space endeavors such as artificial skin, "accelerated development of hospital monitoring devices and similar paramedic tools, heart pacemakers, and artificial skin. . . . In space biotechnology, purer biological preparations have been obtained for manufacturing non-allergenic medicines, more active and
Better vaccines and antibiotics can be produced in space in far greater quantities than on Earth. Mining the moons, asteroids, and comets provides answers to future energy depletion and would provide enormously less expensive construction of spacecraft and colonies than launching from Earth. Space industry also paves the way in addressing future crises both manmade and natural.

stable strains of antibiotics, vitamins for use in agriculture, and ultrapure serums and vaccines.” Id. at 39.

6. The electronics industry would benefit from space industry and some of these benefits are already being realized on a small scale much for the same reasons as developments in vaccines and antibiotics, see supra note 5, because of the vacuum and weightlessness of space unmatched by any attempt to replicate a similar vacuum on Earth. Ceramic oxide crystals grown in space have lead to developments in “computer memories, optical communications, optoelectronics, and ultrasonics . . .” Id. at 42.

Another compound, gallium arsenide, used for switching on computers, is estimated to have a worldwide market of $860 million by the year 2000. One company has contracted with NASA to produce gallium arsenide aboard the space shuttle and estimates $400 million could be realized with only ten percent of the market. Id.

7. Humanitarian rewards would result from the societal benefit from the improvements and products space industry has to offer. Space industry would also provide a strong foothold in space able to solve near-future crises. See infra note 13.

8. “The [space] environment enables, as demonstrated by experiments on the space shuttle, improved production over Earth bound laboratories at seven hundred times the quantity and four times the purity.” Twibell, supra note 1, at 38 (citing Nathan C. Goldman, American Space Law: International and Domestic 25 (1996)).

9. The Moon has numerous resources available such as iron, aluminum, copper, and Helium3. Id. at 44. Helium3, once nuclear fusion becomes controlled, exists on the Moon in massive quantities and barely exists on Earth because of the solar wind and Earth’s atmosphere. Helium3 would enable fusion to have virtually no dangerous radiation unlike the current use of fission.

10. A “one-kilometer-sized metallic asteroid will provide a billion tons of iron, 200 million tons of nickel, 10 million tons of cobalt, and 20,000 tons of platinum metals: net market value, about $1 trillion.” John S. Lewis & Ruth A. Lewis, Space Resources: Breaking the Bonds of Earth 105, 394 (1989).

11. Hydrocarbons, similar to petrochemicals and fossil fuels, exist in massive quantities throughout the solar system. For example, “Halley’s Comet hydrocarbon stores are comparable to Earth’s entire reserves.” Twibell, supra note 1, at 47 (citing A. Zuppero, Discovery of Abundant, Accessible Hydrocarbons Nearly Everywhere in the Solar System, in Stewart W. Johnson, 2 Engineering, Construction, and Operations in: Space V 791 (1996). Moreover, comets come closer to Earth than other celestial bodies and can be reached using current rocket technology. See id. at n.330.

12. Launching payloads into space is very burdensome and cumbersome construction of large spacecraft. Mining celestial bodies is the key.

Mining extra-terrestrial bodies, such as asteroids and the moon, is crucial for a substantive space industrialization, not for the immediate purpose of exportation back to Earth to supplement our resources — that is a need not to come for many decades or centuries — but for colonization and the construction of large projects in space. Such mining is the only feasible way
This paper seeks methods to overcome legal hurdles that inhibit mankind's motivation to develop a vigorous space industry. It also seeks to address concerns for endeavors that will ultimately challenge the current weaknesses in space law including colonization, space stations, and new to construct any space station, space ship, or other similar facility of any significant size. It is to inefficient and expensive to launch large amounts of raw materials into space. For example, it takes 100 tons of rocket propellant to get one ton of payload into geostationary orbit. Whereas, a mass driver — a sort of magnetic catapult already technologically feasible — on the moon or an asteroid could hurl mined materials into orbit for construction, lifting 100 times its own weight into orbit every year. This would lower the cost of building space facilities near earth by an amazing 20,000 times.

Id. at 45.

13. Established colonies in space would obviously create an escape route for world-wide man-made catastrophes such as nuclear holocaust. Space development would also pave the way for the development of new technologies that could address needs here on earth. Overpopulation is one inevitable problem. Nobel Laureate, Richard Smalley notes the population explosion as one reason to invest in nanotechnology research. The human population explosion is unique from any time in history. Smalley states that the human population has never decreased since year 1 A.D. It has remained constant on a global level and has exponentially increased over the past two centuries. Major wars and plagues that have been often cited as important in keeping the human population at a controllable level and that a major third world war or viral epidemic as inevitable in controlling the human population and that neither has existed for sometime. However, that assertion is a myth. Neither wars nor the Black Death (which killed a third of Europe) affected total world population levels. The total world population was approximately one billion until the 1800s. It slightly rose until the beginning of the twentieth century to almost two billion. The industrial revolution and advances in education were one of the main causes. After World War II the population was almost 3.5 billion. Today it is over six billion. The U.N. projects total world population levels by the middle of the next century to be approximately twelve to sixteen billion before leveling off. Smalley goes on to state that “keep in mind, four billion of today’s six billion live a lifestyle that many of us in this room would find abhorrent.” That fact, relatively speaking, probably will not change. The concerns of feeding fifteen billion are not such a problem, but energy consumption and carbon dioxide pollution resulting. See Richard Smalley lecture, University of Missouri-Kansas City, March 26, 1997. Space industrial development will be a necessary venture to help man’s population problem.

14. Natural occurrences, although perhaps far away and perceptively academic still merit attention.

The survival of mankind could ultimately depend on a well-developed foothold in space and commercial development. One day the Earth will die. It could be tomorrow or in a few billion years. Assuming the later occurs, the middle-aged sun will swell up into a red giant and swallow the Earth before it contracts into a white-dwarf or black hole. [But] there will also be environmental catastrophes beyond our control. For example, there are about 2,000 asteroids or other similar objects that will cross Earth's orbit, measuring at least one kilometer in size that threaten use with collision and mass global destruction and at least a documented 400 of these will certainly collide with Earth.

Twibell, supra note 1, at 31.
technologies such as nanotechnology and replicating technology. This hurdle is treaty-made, therefore, international legal analysis is required to jump over the hurdle. Dias, Gama, Columbus, Magellan, and Drake sought the safest or the shortest passages to a desired destination. Similarly, this paper will first focus on the safest or the shortest passage in jumping the legal hurdle of international corpus juris spatialis before proceeding to the longest and most difficult passage — circumnavigating the entire globe. In this instance, circumnavigating the entire globe is equivalent to the act of amending the treaty.

First, before exploring the best route of legal analysis, some groundwork will need to be laid. This paper provides a brief overview of the present body of international space law and will identify the problematic portion of that body of law. Then, the basic principles of international space laws primary source will be recognized while outlining the full extent of the problem. Finally, this article will present and analyze a series of vaccines (accepted methods for change in international treaty law) to determine which vaccine is best for ridding international space law of its virus.

II. THE INTERNATIONAL CORPUS JURIS SPATIALIS

The international corpus juris spatialis is a relatively new emerging area of law beginning roughly in 1957. Soon thereafter, an

15. In 1982 NASA proposed an automated self-replicating lunar facility. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION & AMERICAN SOCIETY FOR ENGINEERING EDUCATION, ADVANCED AUTOMATION FOR SPACE MISSIONS 189, NASA Conference Publication 2255 (1982). If implemented, a self-replicating system would have profound effects on law and society including displacing the entire global economy with cheap and accessible goods and creating liability and property issues from an artificially intelligent machine that converts res communis property into itself possible indefinitely. See infra text accompanying notes 79-81 (discussing the res communis nature of outer space). Nanotechnology is a fairly new field that deals with creating and manipulating substances and creating "machines on an atomic or molecular scale." There is "wet" and "dry" nanotechnology. Living things are of the "wet type." Living cells are "sacks filled with nanomachines." The dry kind, the kind most referred to when using the term nanotechnology, seeks to create a similar biological process utilizing molecular manipulation and artificial intelligence. Ralph Merkle, currently working for Xerox in formulating molecular modeling for nanotechnology, has stated that molecular manufacturing (basically nanotechnology) will replace the existing industrial infrastructure. For an article solely addressing the legal implications of nanotechnology, see Glenn H. Reynolds, Legal Problems of Nanotechnology: An Overview, 3 S. CAL. INTERDISC. L.J. 593 (1994).


17. Derived from the Latin meaning body of space law.

18. Most commentators mark 1957 — the year the U.S.S.R. launched the first satellite, Sputnik — as the year space law began to develop. See, e.g., GOLDMAN, supra note 8.

"Until then, the legal status of activities in space was a speculative matter rather than an immediate practical problem.” Twibell, supra note 1, at 9 citing C. WILFRED JENKS, SPACE LAW 3 (1965)).
immediate series of United Nations resolutions and international treaties swiftly emerged leading to the development of the 1967 Space Treaty. Even today, almost thirty years later, this is the primary space treaty which is often referred to as “the cornerstone of international space law.”

Three other treaties emerged soon after the 1967 Space Treaty’s passage, the last coming into being in 1975, which formed the main corpus juris spatialis that exists today. These three new treaties addressed more
specific concerns than those of the 1967 Space Treaty.\textsuperscript{24} For example, it addressed liability for damage caused by space objects\textsuperscript{25} and the procedures and protections afforded astronauts should they land or crash on foreign soil.\textsuperscript{26} Accordingly, as time went on until now, both multilateral\textsuperscript{27} and bilateral treaties\textsuperscript{28} were formed to meet the pressing needs of space exploration\textsuperscript{29} and a growing multi-billion-dollar industry.\textsuperscript{30}

Twibell, supra note 1. For a fuller understanding of property rights discussion as part of the premise for seeking the change this paper advocates, see infra, text accompanying notes 29-44.


25. See, e.g., 1972 Convention on International Liability, supra note 23, art. V. ("Whenever two or more States jointly launch a space object, they shall be jointly and severally liable or any damage caused.").

26. See, e.g., 1968 Rescue and Return of Astronauts Agreement, supra note 23, art. IV ("If, owing to accident, distress, emergency, or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of any State, they shall be safely and promptly returned to representatives of the launching authority.").

27. See Convention on the International Maritime Satellite Organization [hereinafter INMARSAT], July 16, 1979, 31 U.S.T. 1. This treaty seeks to benefit all "ships of all nations through the most advanced suitable space technology available, for the most efficient and economic facilities possible consistent with the most efficient and equitable use of the radio frequency spectrum and of satellite orbits." Id. preamble. It also seeks to "make provision for the space segment necessary for improving maritime communications, thereby assisting in improving distress and safety. . . . " Id. art. 3(1). See also Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, Jan. 17, 1980, 31 U.S.T. 333 art. I, II (regulating "environmental modification techniques" — the deliberate manipulation of . . . natural process[es] — in outer space).


29. Although the 1979 Moon Treaty is not a main component of international space law because it has been signed by so few countries, it serves as a good example of foreseen new demands on the legal system caused by future space exploration. See 1979 Moon Treaty, supra note 23. For example, the Treaty foresaw the eventual exploitation of the resources of the Moon and other celestial bodies. See id. preamble.
telecommunications and the commercial launch industry are two examples. As a result, an immense body of international law has developed in a span barely over thirty years. Its fast growth represents the pace of modern society and the growth of communications and new technology. This growth is unparalleled in authoritative doctrines and institutional practices. This explosive growth is not limited to the international realm; United States domestic law has also experienced an equally explosive growth in its own corpus juris spatialis, and similarly, the domestic law of other nations has experienced much growth.

30. The current space industry is estimated to have revenues totaling upwards to $40 billion dollars annually. Twibell, supra note 1, at 30; see also, supra text accompanying notes 4-8.


34. Agency development, statutory law, and case law has flourished in the United States. Major government agencies regulate outer space: The National Aeronautics and Space Administration (most famous regulator of space activity and forerunner of the United States space industry), the Department of Defense (this department's space budget almost exceeds NASA's entire budget), the Department of Transportation (regulates and licenses launching vehicles), and the Department of Commerce (promotes the commercialization of space via its Office of Air and Space Commercialization). See generally Twibell, supra note 1, at 2, 17. There has been an appreciable amount of growth in the statutory realm as well. See, e.g., 35 U.S.C.A § 105 (West 1997) (regulating the patentability of inventions in outer space); 15 U.S.C.A § 4201 (West 1997) (regulating land remote-sensing commercialization); 17 U.S.C.A. § 901 (West 1997) (regulating the protection of semiconductor chips --such chips are produced efficiently in the vacuum of outer space); The Commercial Space Launch Act of 1984, Pub. L. No. 98-575, (1984) (codified as amended in 49 U.S.C. § 70101 et. seq. (1984)); and the National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 Stat. 426 (1958) (codified as amended in 42 U.S.C. § 2451 (1994) (forming NASA and instituting its directives and policies). See also National Space Port Act Bill, 141 CONG. REC. H4915 (May 12, 1995) (statement of Rep. Seastrand) ("a bill to encourage the development of the commercial space industry by promoting State-run spaceports"); and The Space Business Incentives Act of 1995 (H.R. 1953) introduced on June 28, 1995 (encouraging United States commercial space industry) as cited in Congressional Notes, 23 J. SPACE L. 204 (1995). The ever slow developing United States space case law is developing at a modest pace. Professor Stephen Gorove notes that United States space case law began in 1946. See Gorove, supra note 33, at 3 (citing States v. Causby, 328 U.S. 256 (1946) (hinting that the ancient doctrine cujus est solum, ejus est usque ad coelum (he who owns the land, owns it to the skies) may apply to outer space)). Since 1946, United States space case law has developed in the areas of torts and contracts, environment (e.g., Fla. Coalition for Peace and Justice v. George Herbert Walker Bush, Civil Action No. 89-2682-OG) (D.D.C. 1989) (involving the Galileo spacecraft and environmentalists claiming it used dangerously large amounts of plutonium), taxation (e.g. COMSAT v. Franchise Tax Board, 156 Cal. App. 3d 726 (Cal. App. 1st Dist. 1984) (holding that "satellites were 'tangible personal property owned and used' in the state by the taxpayer"), intellectual property (e.g. Hughes
Unfortunately, as stated in the forefront of this paper, despite the immense growth and adaptation of space law to space activities, space law lacks certainty and proper incentives, and, as a result, fails to effectively promote aggressive space enterprise. Further, international law’s failure in these two respects will render it thoroughly incapable of regulating new technologies that could take the world by storm.\textsuperscript{36}

This brings the discussion of "\textit{International Corpus Juris Spatialis}" to its main issue — which part (or parts) of this immense body of space law is the culprit? Fortunately, the culprit is one simple basic section — the 1967 Space Treaty's no-sovereignty clause.\textsuperscript{37} This provision, analogous to a computer virus, has spread throughout international law and permeated every other subsequent agreement including United States domestic law. How, and to what degree, this virus has spread is where this paper now turns.

III. THE OVERARCHING EFFECT OF THE 1967 SPACE TREATY'S NO-SOVEREIGNTY PROVISION: IDENTIFYING THE DEGREE OF INFECTION

A computer virus spreads by replicating itself in other computer programs until the programs are smothered by the overwhelming memory storage requirements of the replicating virus. The no-sovereignty virus, however, has only to replicate itself once to do its damage. And instead of attacking computer programs, it attacks international legal documents.

Before discussing how to get rid of this virus, it is necessary to evaluate what programs it has infected. But first, the virus itself will be discussed.

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Aircraft Co. v. United States, 29 Fed. Cl. 197 (1993) (holding that certain statutory claims did not extend to outer space), \textit{id.} at 5, 12, 15-16, and constitutional law (\textit{e.g.}, O'Hair v. Paine, 312 F.Supp. 434 (W.D. Tex. 1969) holding that religious activities, statements, and objects that occurred or were placed aboard NASA's Apollo spacecraft did not constitute violations of the Establishment Clause of the First Amendment). \textit{See} Twibell, \textit{supra} note 1, at 16.

35. Much of this development in foreign domestic law is attributed to the regulation of growth in various country's space industrial infrastructure. Russia, China, the Ukraine, India, Israel, Japan, Australia, Pakistan, and Brazil have established space industries. \textit{See} Twibell, \textit{supra} note 1, at 1.

A multitude of other countries are involved in Space. For example, Canada has its own space agency. Chile also has a space program. Some countries are becoming involved in space for the sake of their own peoples' survival. Meterological satellites are crucial for countries such as Ethiopia which need improved weather forecast and early warning systems to [predict agricultural crises]. Kenya requires remote sensing for many of the same reasons. \textit{Id.} at n.237.


37. \textit{See} 1967 Space Treaty, \textit{supra} note 21, art. II ("Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.").
The 1967 Space Treaty sought to instill into international law a common consensus of views on the proper course for humanity to take in space endeavors. The concepts it developed would permeate all international law that followed. The basic concepts it instilled into customary international law were the following:

1) Freedom of exploration and use of outer space and celestial bodies;
2) Non-appropriation of outer space or celestial bodies;
3) Exploration and use of outer space and celestial bodies in accordance with the fundamental principles of international law, including the basic principles of the United Nations Charter;
4) Partial demilitarization of outer space and total militarization of celestial bodies;
5) Retention by states of sovereign rights over space objects launched;
6) International responsibility of states for national activities in space, including liability for damage caused by space objects;
7) Prevention of potentially harmful consequences of experiments in outer space and on celestial bodies;
8) Assistance to personnel of spacecraft in the event of accident, distress, or emergency landing; and
9) International cooperation in the peaceful exploration and use of outer space and celestial bodies.

Most of these concepts will not be dealt with herein. However, it must be noted that states retain jurisdiction and ownership of satellites and spacecraft. Therefore, some level of property rights do exist, but only on

38. See 1967 Space Treaty, supra note 21, art. XIII which states that it would affect all law and space activities as articulated in the following.

The provisions of this treaty shall apply to the activities of States Parties of the Treaty in the exploration and use of outer space, including the moon and other celestial bodies, whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international inter-governmental organizations. Any practical questions arising in connection with activities carried on by international inter-governmental organizations in the exploration and use of outer space, including the moon and other celestial bodies, shall be resolved by the States Parties to the Treaty either with the appropriate international organization, which are parties to this Treaty.

Id.

39. GENNADY ZHUKOV & YURI KOLOSOV, INTERNATIONAL SPACE LAW 39-40 (1984) (Professors Zhukov and Kolosov are former soviet scholars who played a role in the development of international space law and have analyzed this treaty extensively).

40. See 1967 Space Treaty, supra note 21, art. VII. See also, text accompanying note 39. It is this type of jurisdiction that is analogous to maritime law where states retain jurisdiction over their ocean-going vessels in international waters. For a more extensive analysis of the analogies between maritime law and space law, see GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 27-47 (1989). There are also analogies to the law regarding Antarctica. See Beattie v. United States, 756 F.2d 91, 99 (1985)
the spacecraft itself. Thus, a lunar colony or facility would likely have its sender nation, or nations, retain jurisdiction over it. However, if it becomes a mining operation, would the parameters immediately adjoining the facility and the mined material, once it is removed, become the property of the sender nation(s)? That is the issue where space entrepreneurs become concerned. Hence, the main concept is the non-appropriation of outer space or celestial bodies as Professors Zhukov and Kolosov have termed the no-sovereignty provision.

The no-sovereignty provision is Article II of the Space Treaty. It explicitly states that “[o]uter space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” This provision, along with the other less- or non-restraining concepts (regarding space industrial development), has replicated itself throughout international law. Most international multilateral and bilateral agreements contain references to the 1967 Space Treaty, and, invariably, the no-sovereignty provision contained within the Treaty has spread, infecting all international law and domestic law following it. Even if a treaty or law does not contain reference to the 1967 Space Treaty or no-sovereignty provision, it is still guided by it because the 1967 Space Treaty has become part of the

(noting that the legal framework governing Antarctica is frequently analogized to the law of outer space). Moreover, not only are the principles analogous, but the wording from the 1967 Space Treaty was borrowed from the Antarctic Treaty and the Nuclear Test Ban Treaty. See Twibell, supra note 1, at 3.


42. Most international legal multilateral treaty documents cited herein refer to the 1967 Space Treaty: 1968 Rescue and Return of Astronauts Agreement, supra note 23, preamble (noting the importance of the 1967 Space Treaty and “desiring to develop and give further concrete expression of [those] duties . . .” within the 1967 Space Treaty); 1972 Convention on International Liability, supra note 23, preamble (“recalling” the 1967 Space Treaty); 1975 Registration Convention, supra note 23, preamble (“recalling” the 1967 Space Treaty and noting how the 1967 Space Treaty reaffirms the idea that states bear responsibility for their spacecraft (presumably referring to Article VII of the 1967 Space Treaty)); and the Convention on the International Satellite Organization (INMARSAT), supra note 27, preamble (“considering the relevant provisions” of the 1967 Space Treaty); 1979 Moon Treaty, supra note 23, preamble (“recalling” the 1967 Space Treaty and other space treaties—although it seeks to strengthen the no-sovereignty provision). Although some treaties, such as The Operating Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT), supra note 31, do not explicitly refer to the 1967 Space Treaty, the Treaty is part of customary international law, and therefore, if any of the aspect of such agreement still operates within the confines of the Space Treaty. See infra text accompanying note 44.

43. See European, Japanese, and Canadian Space Station Agreement, supra note 28, preamble (including the four major multi-lateral space treaties and specifically, the 1967 Space Treaty); U.S./Italy Space Station Agreement, supra note 28, Preamble (recognizing the 1967 Space Treaty and specifically its Article III).
customary international law." In conclusion, the virus is the no-sovereignty provision in the 1967 Space Treaty and it has spread throughout the global legal framework. Before addressing what vaccine can be used to disinfect international law of this virus, some specific issues and changes will be presented because if changes in the corpus juris spatialis are to be employed, it is necessary to be specific about what changes are needed instead of the simply calling for the elimination of the no-sovereignty provision. Otherwise, where now there is some

44. It has been said that the formation of treaties itself is the result of customary practice. See Mark E. Villager, Customary International Law and Treaties 29 (1985). Although developments and practices in regards to outer space can hardly be regarded as customary, certainly the analogies and origins derived from the law of Antarctica and the sea have customary origins. This paper advocates that indeed the 1967 Space Treaty and its no-sovereignty provision are part of not only statutory international law, but customary international law because, first, it is the cornerstone of four treaties that unanimously adhere to it in their preambles. See supra note 42. Secondly, these four documents are considered to be the primary corpus juris spatialis. See supra note 23. Although there was no "gradual hardening of practice into law," id., there was a formation of treaty law that now is common practice. The analysis here may seem to be more proper in discussing the effect of a treaty (here, the 1967 Space Treaty) over subsequent law, and indeed that is the next issue, however, space law development is unique to other areas of law. It never had a chance to develop customary law before that custom became ingrained in treaties. Unlike the oceans and polar regions, space was not being explored and settled for centuries before the advent of law. Rather, space law practically arose simultaneously with exploration. Technological and financial restraints made space travel a rare occurrence allowing the legal system, in one of very few instances, to catch up or develop at the at the same pace of an entirely new endeavor (although this paper advocates that it now, or will very soon fall behind in space development). Therefore, space law has given rise to the simultaneous formation of both treaty law and customary law. This conclusion is important because it removes the additional analysis of determining whether the customary rule or the treaty prevails. See cf. id. at 34.

Professor Verdross mentions one main process for a rule to go through in order to be considered customary international law and it has three stages: (1) States engage in a given practice or whatever reason; (2) states react to other state action in adhering or not adhering to the practice "in the expectation that other states still again accord reciprocity;" and (3) the law becomes customary law by states not only adhering to the rule but stating that it is a rule. Id. at 29-30. Have these rules occurred in respect to no-sovereignty? Well, that is difficult to determine at least for the second two stages. It was stated as a rule first via treaty law and no states have violated the Treaty, so it is difficult to determine how states will react. However, no-sovereignty began the space age in the form of treaty law which has been adhered to for 30 years. It at the very least approaches customary international law. Finally, the 1967 Space Treaty tends to state existing law from the analogous areas of law such as maritime law and the law of Antarctica.

uncertainty, without the clause and nothing to replace it, uncertainty would be resoundingly present. 46

The need for the industrialization of outer space has been briefly established, 47 and if any argument remains, a thorough analysis of that issue should be left for a separate discussion. 48 At this point, the need for a change in the legal framework supporting space industrialization is going to be assumed. Accordingly, the legal discussion now turns to what exact changes are desired to promote outer space development.

IV. DESIRED CHANGES IN INTERNATIONAL SPACE LAW: IDENTIFYING THE VIRUS

The changes in international space law required for vigorous space development can also be the subject of in-depth discussion. However, since this paper focuses on how to implement changes, those changes are going to be very brief and are hoped to be commonsensical, at least as it relates to the premise of this paper. The following are the specific changes generally recommended to be instituted in international space law:

1) Appropriation of celestial property to national or private entities at some agreed upon level. The agreed upon level should, at a minimum, include the ownership of mining operations, mining claims, mined material once removed, and reasonable parameters of mining operations; 49

2) Determination of liability in automated and replicating systems; 50 and

46. The counter argument of this proposition is that states or entities could own celestial property after the removal of this provision. However, as discussed in supra note 44, restrictions of ownership could be part of customary international law. Although if such a provision's removal indeed perceived enough support to make its removal possible, certainly that fact would support the creation of customary law. However, if it was not replaced even with an affirmative approval of celestial property rights, the only clear indication would be uncertainty on the status of property rights and thus, uncertainty would continue although property rights advocate would have one more argument in their favor.

47. For an indepth discussion of the need for property rights in space and how they would increase incentive for investment, see Twibell, supra note 1, and Keefe, supra note 2. See also supra text accompanying notes 3-14.

48. See supra note 2; Wayne N. White, Jr., Mining Law for Outer Space in SPACE MANUFACTURING 8: ENERGY & MATERIALS FROM SPACE 83 (Barbara Faughnan & Gregg Marniak eds., 1991).

49. See supra note 2; Ty S. Twibell, Comment, Replicators and the Law: Analysis of the Legal Consequences of Replicating Nanotechnology, UMKC L. REV. (forthcoming 1997). See also supra note 15 (discussing legal
Formation of an international regime to oversee space activities, address technical issues, and enforce international space regulation.  

V. ANALYSIS OF THE ALTERNATIVES IN INSTITUTING CHANGE IN INTERNATIONAL SPACE LAW: DEVELOPING A VACCINE

There are a number of vaccines available to rid international space law of legal viruses. In international legal thinking, many vaccines are available to combat, for whatever reason, treaty-made law. These vaccines are variations of the terms modification or termination. Termination could be used quite properly as a vaccine. However, it makes no sense to simply terminate a provision when the true objective is to improve the law, making it adaptable to new issues entirely unseen in human history. There must be something to replace the no-sovereignty provision’s absence. That rationale is exactly the purpose behind the preceding section above — including changes that not only remove the sovereignty provision, but the additional framework creating legal certainty for space industrialists and perhaps, society as well. Therefore, legal attempts to remove the no-sovereignty provision for its own sake are inadequate. However, since United States unilateral action is one possible route for the 1967 Space Treaty’s modification, the United States could certainly terminate its own obligations and provide answers to the additional issue through its municipal law. Hence, a termination analysis will be provided as a subcategory of unilateral action analysis below.

Fortunately, legal thought in this area is well-developed. This obviousness is based on the fact that probably the most difficult issue in international law’s young history — enforcing state compliance to what repercussions of replicating systems and nanotechnology); Thomas L. McKendree, Planning Scenarios for Space Development in SPACE MANUFACTURING 10 (Barbara Faughnan & Gregg Marniak, eds., 1996) (providing hypothetical situations involving “squatters” claiming celestial property with great ease despite the property right constraints of international space law because of technological advances in replicating nanotechnology). See generally Fredrick A. Fiedler & Glenn H. Reynolds, Legal Problems of Nanotechnology: An Overview, 3 S. CAL. INTERDISC. L.J. 593 (1994).

51. For authors asserting the formation of some sort of legal regime to oversee property right distribution, see Keefe, supra note 2; Baca, supra note 2 (concluding that the “efficient and equitable property system on Earth . . . should be extended into space for the exploitation of celestial resources”); Paxson, supra note 45.


53. See id.

54. See supra text accompanying notes 49-51.

55. See infra text accompanying notes 128-135.

56. See HENKIN ET AL., supra note 52.
little international law that exists. A survey of a variety of international literature leads now to the following two commonsensical methods of changing international space law:

1) United States unilateral action — including the subcategories *rebus sic stantibus* (reinterpretation), and unilateral denunciation (termination of treaty); and

2) multilateral action — developing a new treaty to supersede the 1967 Space Treaty; and Amendment to the 1967 Space Treaty.

Strategies for vaccination should first begin with the simplest and less revolutionary of doctrines which require the least amount of state concerted effort — United States unilateral action.

A. United States Unilateral Action

1. Vaccine I: Implementing the *Rebus sic Stantibus* Doctrine

*Rebus sic Stanibus* is a doctrine that reminiscent of contract law in that it states that circumstances of the contracting parties may change to

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57. This proposition does not pertain to the seriousness of this problem, because for the most part, nations do comply with international law. See Professor Oliver J. Lissitzyn, *Preface in BHEK PATI SINHA, UNILATERAL DENUNCIATION OF TREATY BECAUSE OF PRIOR VIOLATIONS OF OBLIGATIONS BY OTHER PARTY XIX* (1966); Mary Ellen O’Connell, *Enforcement and the Success of International Environmental Law*, 3 IND. J. GLOBAL LEGAL STUD. 47-48 (1995) (noting the general view that “international law is a monument to successful laws, without requiring much enforcement”). The widespread compliance with international law is probably due to the fact that international law is simply an embodiment of what nations do and have done over a long period of time. See HENKIN, INTERNATIONAL LAW POLITICS, VALUES AND FUNCTIONS, in HENKIN ET AL., supra note 52, at 1-2 (stating “International Law . . . is a construct of norms, standards, principles, institutions, and procedures.”). So, rather, the proposition embodies the “difficulty” of the issue of enforcement. See generally O’Connell, *supra* note 67 (discussing the difficulties of enforcing international environmental law).

58. This is comparatively speaking to state domestic law. Because of the increasing development of international law and increasing global acceptance and participation in the United Nations over the past twenty years, this proposition may soon be negated.

59. Multilateral action certainly could have the same subcategories as United States unilateral action. However, the analysis of those subcategories demonstrates they would fail for the United States. Correspondingly, multilateral actions would fail for the same reasons. See infra text accompanying notes 62-136. Therefore, it would be impractical to repeat the analysis for multi-lateral action.

60. The use of this concept in changing international law was taken from DANIEL PATRICK O’CONNELL, 1 INTERNATIONAL LAW 296 (1965) (presenting the doctrine as a legal possibility for “revision of treaties.”). See also International Law Commission Report in HENKIN, *supra* note 52, at 516, 517 (“[T]he acceptance of this doctrine [*rebus sic stantibus*] in international law is so considerable that it seems to indicate a recognition of a need for this safety-valve in the law of treaties.”); Anglo-Iranian Oil Co. v. Iran, 1952 I.C.J. 93, 126 (stating that *rebus sic stantibus* is a well-known concept in international law).
such an extent that their obligation to each other ends.61 This doctrine might provide the basis for interpreting the 1967 Space Treaty to allow some degree of property rights in space. Professor Daniel Patrick O’Connell claims Phillimore describes *rebus sic stantibus* best in the following excerpt: “When that state of things which was essential to, and the moving cause, the promise or engagement, has undergone a material change, or has ceased, the foundation of the promise or engagement is gone and their obligation has ceased.”62

Although this is a valid doctrine, many commentators frown on its use because treaty formation is largely based on political notions and “changes in political circumstances are notoriously difficult to assess.”63 Further, problems result from partially performed contracts and equitable adjustment.64 Most importantly, perhaps, is the risk to security of treaties.65 However, domestic courts have occasionally found in favor of *rebus sic stantibus* under the use of executive abrogation.66 In more recent cases, although its recognition is accepted, it seldom is the winning factor for private parties.67 International courts recognize the doctrine, but have never ruled in its favor.68

Professor O’Connell is correct in his assertion regarding the inequity and difficulty in determining change in political climates, which should be obstacles against a proper decision favoring *rebus sic stantibus*.

61. See, e.g., O’CONNELL, supra note 60, at 296.
62. Id.
63. Id.
64. Id.
66. O’CONNELL, supra note 60, at 299 (citing Hooper v. U.S., 22 Ct. Cl. 408 (1887)).
67. See, e.g., HENKIN, supra note 52, at 519.
68. See id. (International Tribunals, while recognizing the principle of *rebus sic stantibus* have generally avoided giving it affect, usually on the ground that it was not applicable to the facts on hand (citing *RESTATEMENT (SECOND) OF FOREIGN RELATIONS LAW OF THE UNITED STATES*, cmt. to art. 153 (1965)); O’CONNELL, supra note 60, at 299 (citing Russia v. Turkey, Scott, 1 H.C.R. 297, 317 (1916)); Nationality Decrees in Tunis and Morocco, 1925 P.C.I.J., (Ser. B) No. 4, at 29 (Feb. 7); Ser. C., No. 2, 140, 187 (1923); A.J., THE PERMANENCE OF TREATIES (1928). The modern trend upholds O’Connell’s assertion since his 1965 text. See generally Denmark v. Norway, 1993 I.C.J. 38, 217 (June 14); Nicaragua v. United States, 1984 I.C.J. 392, 621 (Nov. 26); Belgium v. Spain, 1970 I.C.J. 3, 310 (Feb. 5).
However, the situation of today's post-Cold War world is perhaps less difficult. In fact, it is so drastically different from other political environments, that it may give the strong, legally valid, although seldom successful, *rebus sic stantibus* a fighting chance to receive credence.

In beginning the analysis of *rebus sic stantibus*, the definition to be used will be the International Court of Justice's 1949 articulation of *res sic stantibus* which, unlike Phillmore, is in much simpler terms. It states that "[a] state may refuse to execute a treaty if the conditions have substantially changed." To analyze the phrase *substantially changed*, the International Court of Justice in *Cambodia v. Thailand* stated that *rebus sic stantibus* "contemplates two different situations: the one existing when the treaty was signed and the new one created by conditions and circumstances posterior to the treaty."

First, the circumstances during the time of the formation of the 1967 Space Treaty should be brought to light. The change from that environment to today's environment is very clear. Only two superpowers existed — the United States and the Soviet Union. Both nations possessed massive military industrial complexes and economies capable of vigorous space programs, and were the only two space powers at the time. They were already in conflict in many areas on earth — the Korean War, the Vietnam War, and the Cuban Missile Crises were the most notable examples of major Soviet Union/United States confrontations. Soviet President Nikoli Krushev was famous for his mighty display at a session of the United Nations General Assembly, where he removed his shoe and struck it on the table, shouting that the Soviet Union would crush the United States. This mood permeated well into the 1980s, when President Ronald Reagan referred to citizenry of the Soviet Union as barbarians. Star Wars was also a major issue during the Reagan Era and it epitomized the extension of the Cold War confrontation into outer space. Never had the world witnessed a political conflict guide world policy to such a fantastic degree. It has been stated that the effect of the Cold War and superpower rivalry was one of the principle reasons behind the development of the no-sovereignty provision.

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71. The proposition that the United States has the largest economy in the world is undisputable. However, in light of today's understanding of the Soviet Union's economic condition throughout its brief history, especially since its weak economy substantially contributed to its downfall, the proposition in regards to the Soviet Union may seem less valid. Nevertheless, this same Soviet Union had one of the most massive economies based on its sheer size and total volume of currency regardless of how its relatively weak economy compared to smaller nations.
The no-sovereignty provision was viewed as the means of preventing the spread of the Cold War into space, as well as resulting territorial claims by the United States and the Soviet Union while non-space faring nations stood idly by.\textsuperscript{72} Certainly times have changed. The Union of Soviet Socialist Republics no longer exists. The Cold War is gone and has been for some time. There could not be a clearer demarcation of a change in the political arena. Certainly, Professor O'Connell and others would agree. Further, other substantial global changes have taken place since the advent of the 1967 Space Treaty. Not only has the Cold War ceased, but more and more nations have developed the technological and economic capability to become space faring nations.\textsuperscript{73} Professor Reynolds has eloquently articulated the mood of this new era:

Today, space is not the sole preserve of the United States and the Soviet Union (or its successor states). A potent European space program now exists. Japan has a rapidly growing program, and Third-World opinion leaders like China, India, and Brazil have important space programs too. Nor are these states the only ones. Although the programs of the United States and the former Soviet Union retain significant leads, those leads no longer appear unassailable. When significant exploitation of space resources begins, many nations will be participating.\textsuperscript{74}

It would seem that times have dramatically changed since the signing of the 1967 Space Treaty. Political tides and economic boundaries have shifted dramatically that fact is clear. However, substantial argument exists against supporting the removal of the no-sovereignty provision via \textit{rebus sic stantibus}.

Although third-world economies have improved to the extent that many have viable space industries,\textsuperscript{75} they are nowhere near approaching the level of space infrastructure possessed by the United States, or the former Soviet provinces — namely Russia. The People’s Republic of China, at least in potential, has already demonstrated a strong presence in the commercial launch market.\textsuperscript{76} Nations such as Kenya\textsuperscript{77} or Australia could

\begin{itemize}
  \item \textsuperscript{72} Reynolds, \textit{supra} note 2, at 229-30.
  \item \textsuperscript{73} See \textit{GOLDMAN, supra} note 8, at 110; Reynolds, \textit{supra} note 2, at 231; Twibell, \textit{supra} note 1, at 33-34.
  \item \textsuperscript{74} Reynolds, \textit{supra} note 2, at 231.
  \item \textsuperscript{75} The following countries have viable space industries: Brazil, China, India, Israel, Pakistan, the Ukraine, Australia, Canada, and Japan. See Twibell, \textit{supra} note 1, at 1, n.5.
\end{itemize}
theoretically launch a spacecraft and claim part of the moon and perhaps begin a mining operation, but what Kenya could do, the United States would certainly be capable of doing many times over and faster. The United States or other conglomerate of nations, such as the European Space Agency would certainly begin reaping profits long before Kenya ever would. Third-world nations are not in a different situation than thirty years ago. They are certainly close equals to the space powers regarding such space endeavors as telecommunications and spacecraft launching, however, such participation in the space industry is minuscule in comparison to the economic and technological requirements of an Apollo-like mission to the Moon. The Apollo Missions were draining on the massive United States economy and required the concerted effort of the richest nation on Earth. Today, such an endeavor would still be very expensive for the United States. Professor Reynolds is correct that third-world countries have vigorous space industries, but in regards to a situation existing where they would directly benefit from celestial property claims, that notion is unrealistic — third-world nations are likely to be equally as skeptical of space power domination of space as they were twenty or thirty years ago. Moreover, there are four space powers which exist today.78

The assertion that a third-world resistance to property rights in space probably still exists should not be confused with the likelihood of implementing changes in space law or policy or whether third-world opinion should have such a substantial impact on the acts of the major space powers. The assertion only demonstrates the argument that circumstances may not have fundamentally changed in certain respects for triggering the rebus sic stantibus doctrine.

There are two arguments remaining against rebus sic stantibus which have not been put forth. The first is that the assumption that the no-sovereignty provision being based on Cold War fears and superpower domination of space may not be the only substantial reason for the inclusion of the no-sovereignty provision in the 1967 Space Treaty. One strong reason for its inclusion is the notion of peace in space — the desire not to bring man’s problems into space with him, and most notably, the res communis doctrine.

77. Kenya has demonstrated a vital need for remote sensing for predicting disastrous weather conditions for agriculture. See Twibell, supra note 1, at 34, n.237.

78. The four major space powers are the United States, Russia, Japan, and Europe (as the European Space Agency). See Twibell, supra note 1, at 16 (citing Goldman, supra note 8, at 15).
Res communis means that certain property should belong to all people of the world. This concept applied to outer space is generally accepted. Further, treaties and bilateral agreements seem to support this notion. Truly, the great deal of expense involved in space activities is likely to prevent one nation from acting in such a manner and violating the res communis character of space. This fact allows the commonly held perception of res communis to remain, peremptorily leaving no room for visible deviation from the doctrine. Thus, if the no-sovereignty provision is rooted in the res communis doctrine rather than the then existence of the two super powers and since nations have not appeared to deviate from that doctrine, the fact that times have changed in regard to the Cold War may have no meaning in the rebus sic stantibus analysis.

79. Res Communis in international space law is a combination of res omissum communis (meaning community ownership rather than a general right-of-use law) and res extra commercium ("applied typically to the peacetime use of the high seas without claims of ownership, special exclusive interests, or unilateral control."). See S. Houston Lay & Howard J. Taubenfield, The Law Relating to Activities of Man in Space, 52-53 (1970).

80. See generally supra note 2.

81. Article 62 of the Vienna Convention on the Law of Treaties Between States and International Organizations provides a basis for analysis for the use of "fundamental change of circumstances" that is much more extensive than the International Court of Justice put forth in Cambodia. It sets forth the following guidelines:

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

2) A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty between two or more States and one or more international organizations if the treaty establishes a boundary.

3) A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty if the fundamental change is the result of a breach by the party invoking it either or an obligation under the treaty or of any other international obligation owed to any other party to the treaty.

4) If, under the foregoing paragraphs, a party may invoke a fundamental change of circumstances as a ground for terminating or withdrawing from a treaty it may also invoke the change as a ground for suspending the operation of the treaty.


The end of the superpower struggle of demise of either the United States or the U.S.S.R. was probable very unforeseen. It definitely shocked the world until very close to the time the Soviet Union did fall. And certainly, the change was of "fundamental character." However, the third prong of the Restatement test is where the argument above fails as well, see supra text accompanying notes 71-85, that the change in circumstances must be "an essential basis to be
The second argument against *rebus sic stantibus* is the most severe. Both the International Court of Justice and commentary agree that the presence of withdrawal provisions in treaties negates the need for *rebus sic stantibus* because most modern treaties have a provision where states can seek a legal out. The 1967 Space Treaty has such a provision: "any State Party to the Treaty may give notice of its withdrawal from the Treaty one year after its entry into force by written notification to the Depository Governments. Such withdrawal shall take effect one year from the date of receipt of this notification."

With this clause, the contractual provision is instilled for proper and internationally recognized denunciation. Simply, if the United States bound by the treaty. The 1967 Space Treaty makes no mention of the superpower presence. The superpower aspects seems, and probably rightfully so, to be a theory built on intuition. The *res communis* character or reasoning behind the no-sovereignty provision seems to be more firmly rooted in the actual text of the treaty, and certainly times have not changed in regard to those principles. Note the following provisions from the Treaty:

- Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes,
- Believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development,
- Desiring to contribute to broad international co-operation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes,
- Believing that such co-operation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and people.

1967 Space Treaty, *supra* note 21, preamble. "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." *Id.* art. I. As one can easily see, several references are made that would seem to uphold the res communis basis for the no-sovereignty provision or any other provision for that matter in the Treaty such as the words *peaceful purposes*, *co-operation*, *common interest of all mankind*, and *benefit of all people irrespective of the degree of economic or scientific development*. Economic and technological developments are still issues of today that have not left with the absence of the Cold War and no where in the treaty is there any mention of superpower domination.

82. Modern treaty provisions are *inherently terminable*. *See cf.* Nicaragua, 1984 I.C.J., 392, 621 (Nov. 26). "It is only necessary to look at the texts of the large number of . . . treaties to see how almost invariably they are concluded either for a fixed term or for renewable terms subject to right of denunciation, or are made terminable upon notice . . . ." *Id.*

83. *International Law Commission Report in Henkin et al., supra* note 52, at 517. The majority of modern treaties are expressed to be of short duration, or are entered into for recurrent terms of years with a right to denounce the treaty at the end of each term, or are expressly or implicitly terminable upon notice. In all these cases either the treaty expires automatically or each party, has the power to terminate the treaty and has the power also to apply pressure upon the other party to revise its provisions.

*Id.*

84. 1967 Space Treaty, *supra* note 21, art. XVI.
decided that it should have property rights and wanted to exercise those rights, it could do so a year after withdrawing from the 1967 Treaty. However, the United States certainly might experience international political repercussions if it behaved in such a way. These repercussions will be dealt with in depth in a following discussion — United States denunciation of the 1967 Space Treaty.  

a. Conclusion and General Observations of Vaccine I

The rebus sic stantibus doctrine fails to be an effective vaccine for the sought-after changes in international space law. Times have substantially changed, however, those times may not be the reason behind the no-sovereignty provision. If they were, it is not included in the preamble. It only exists in the realm of scholarly thought. Also, many third-world nations would likely object to the sudden creation of property rights without some sort of structure development outside of simple reinterpretation. Finally, the withdrawal provision negates the need in modern times for the implementation of rebus sic stantibus.

2. Vaccine II: Reinterpretation of the No-sovereignty Provision — 150 Year-Old Treaty Interpretation Analysis Applied to the Space Age

Probably one of the easiest methods of reconciling the difficulties of the 1967 Space Treaty is simply reinterpreting the Treaty, condoning a certain level of celestial property rights. Reinterpretation would have

85. See infra text accompanying notes 128-136.

86. See Monsieur de Vattel, The Law of Nations 260-61 (1852) (discussing methods of treaty interpretation and exceptions to prior conceived interpretation of treaties (rebus sic stantibus)); Henkin et al., supra note 52, at 473, n.2, n.3 (a unilateral interpretation of a treaty has an "advisory" effect (citing Ste. Ruegger et Boutet v. Ste. Weber et Howad, [1933-34] Ann. Dig. 404 (No. 179) (Trib. Civ. de la Seine, France), whereas if most or all of the signatories interpret a treaty in a certain way it is an authentic interpretation having almost the binding effect of an additional clause to the treaty.) Cf. O'Connell, supra note 60, at 282-83 (referring to travaux pr'paratoires--looking to the intent of the parties at the time the document was signed--while noting that its danger was that "[s]tates which adhere to a treaty after it has been formulated are bound by an abstraction expressed in words independent of the intent of those who shaped the treaty.") Thus, even if the intent of the parties at the signing of the 1967 Space Treaty was against any form of national property rights, the words themselves are the deciding factor—if there is room for property rights in the words of the Treaty, there is room for interpreting the Treaty in such a fashion regardless of the intent of the signatories.

The Restatement states that treaty interpretation depends on whether the parties have agreed to accept a particular entity's interpretation. Restatement (Second) Foreign Relations Law of the United States § 148(1) (1965). Otherwise, it is not binding. Id. § 148(2). However, as the Restatement indicates, it is the interpretation that affects the effect of the agreement or treaty. See id. § 146.
substantially fewer intricacies than amending the Treaty or creating an entirely new one. In addition, it would pose fewer international repercussions and less time, which would be required for formulating and passing a new legal regime with a global consensus. Moreover, treaty reinterpretation is a generally accepted method of treaty modification. However, before a nation, or nations, can lawfully interpret a treaty, a certain state of things is required. What does certain state of things mean?

**Certain state of things** refers to legal rules of treaty interpretation. De Vattel recognized that certain maxims for treaty interpretation must exist. Due to the lack of precision of the written word and language in general. Without these maxims, treaty interpretation would be subject to much abuse by the selfish motives of the signing parties. The four general maxims of treaty interpretation as designed by De Vattel almost 150 years ago are as follows:

I. Interpret only that which needs interpretation.
II. If a party has certain interpretations of a treaty or provision and they had a full opportunity to assert such interpretations at the signing of the treaty and did not, it is to their own detriment.
III. Signatories do not have a right to interpret treaties according to their own “fancy.”
IV. What is sufficiently declared is to be taken as true.
V. The interpretation ought to be made according to certain rules.

88. See infra text accompanying notes 138-42 (discussing Vaccine IV — changing or nullifying the 1967 Space Treaty by passing a new and different treaty).
89. As discussed infra, text accompanying notes 112-27, the accepted method of treaty interpretation by its very nature should at the most create minimal negative international reaction.
90. See supra note 86.
91. See DE VATTEL, supra note 86, at 261.
92. See id. at 244-74.
93. See id. at 243-44.
94. “[F]raud seeks to take advantage even of the imperfection of language, and that men, designedly throw obscurity and ambiguity into their treaties, in order to be provided with a pretense for eluding them upon occasion.” Id. at 244.
95. Id. at 244-46. The first three maxims were paraphrased from the originally written following maxims: “1st general maxim: it is not allowable to interpret what has no need of interpretation.”; “2d general maxim: if he who could and ought to have explained himself has not done it, it is to his own detriment.”; and “3d general maxim: Neither of the contracting parties has a right to interpret the treaty according to his own fancy.” Id. at 244-45.

De Vattel’s rules for treaty interpretation are used for illustration because it makes for an interesting analysis of judging space age dilemmas with an analysis developed over 150 years ago when automobiles did not even exist. His standards are still valid and virtually the same.
De Vattel outlines some of the certain rules referred to in his fifth maxim. For example, whenever obscurity in language occurs, one must look to the ideas of those who drew up the deed, and interpret it accordingly. Regarding the meaning of terms, common usage guides. Interpretation leading to absurdity should be rejected. Absurdities would likely include contradiction of one portion of a treaty to another portion rendering it inconsistent or invalid. In terms of a rule relating to interpreting the no-

Note the similarity of the Restatement's criteria for treaty interpretation as compared to De Vattel's analysis discussed herein (compare the general maxims and other rules required by the fifth maxim infra text accompanying notes 112-27; see also DE VATTEL, supra note 86, at 267-74 (establishing 10 more specific rules of treaty interpretation similar of the Restatement Second as articulated below):

Criteria for Interpretation:

1) International law requires that the interpretive process ascertain and give effect to the purpose of the international agreement which, as appears form the terms used by the parties, it was intended to serve. The factors to be taken into account by way of guidance in the interpretive process include:
   a) the ordinary meaning of the words of the agreement in the context in which they are used;
   b) the title given the agreement and statements of purpose and scope included in the text;
   c) the circumstances attending the negotiation of the agreement;
   d) drafts and other documents submitted for consideration, action taken on them, and the official record of the deliberations during the course of the negotiation;
   e) unilateral statements of understanding made by a signatory before the agreement came into effect, to the extent that they were communicated to, or otherwise known to, the other signatory or signatories;
   f) the subsequent practice of the parties in the performance of the agreement, or the subsequent practice of one party, if the other party or parties knew or had reason to know of it;
   g) change of circumstances;
   h) the comparability of alternative interpretations of the agreement with (i) the obligations of the parties to other states under general international law and other international agreements of the parties, and (ii) the principles of law common to the legal systems of the parties or of all states having reasonably developed legal systems;
   i) comparison of the texts in the different languages in which the agreement was concluded, taking into account any provision in the agreement as to the authoritativeness of the different texts.

RESTATEMENT (SECOND) FOREIGN RELATIONS LAW OF THE UNITED STATES, § 147 (1965).

96. Id. at 247
97. Id. at 248.
98. Id.

99. See id. This is an old concept forming the legal Latin phrase omnis interpretatio si fieri potest ita fienda est in instrumentis, ut omnes contrarietatis amoveantur, or "[e]very interpretation, if it can be done, is be so made in instruments that all contradictions may be removed." BLACK'S LAW DICTIONARY 1087 (6th ed. 1990).
sovereignty provision of the 1967 Space Treaty, interpretations should be guided by the “reason of the . . . treaty.”100

According to De Vattel, there is one main exception to these rules. This exception is analogous to rebus sic stantibus, termed by De Vattel in this instance as conventio omnis intelligitur rebus sic stantibus.101 Recall rebus sic stantibus: That state of things alone, in consideration of which promise was made, is essential to the promise; and it is only by a change in that state, that the effect of the promise can be lawfully prevented or suspended.102 Therefore, if reinterpretation of the 1967 Space Treaty’s no-sovereignty provision cannot pass analysis under the rules of treaty interpretation, the exception to the standard rules on treaty interpretation remains. But first, the determination of whether the no-sovereignty provision can be reinterpreted.

a. First General Maxim: It Is Not Allowable to Interpret What Has No Need of Interpretation103

The no-sovereignty provision probably has plenty of room for interpretation. Note the clause again: “outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”104 The first part of Article II makes clear that all space objects — moons, asteroids, comets — and even empty space itself, is the target of the action or command. Issues will arise if objects are removed, such as by mining or some other sort of extraction. The words “is not subject to national appropriation” are vague. For example, appropriation could mean to include a variety of celestial body utilizations.105 It could mean merely physical occupation or any other sort of taking.106 However, the words have a qualifier, by claim of sovereignty, by means of use or occupation and by any other means must certainly be descriptive of claim of sovereignty because they define possible modes of claiming sovereignty. Thus, a taking in the guise of a national taking — a national control at some level over outer space or any celestial body is prohibited. These

100. DE VATTEL, supra note 86, at 255.
101. Id. at 261-62. The Restatement has the same exception. See RESTATEMENT (SECOND) supra note 95, § 153 cmt. (“[Section 153] is often referred to as the doctrine of rebus sic stantibus.”).
102. Id.
103. Id. at 244.
104. 1967 Space Treaty, supra note 21, art. II.
106. Id.
types of takings or appropriations are described with very broad, over-inclusive terms. The provision basically in a sense states that states may not exercise any control over empty space or any celestial body.

In a strict sense, this clause has already been violated in the past, and will certainly be violated in a direct way in the future. Further it is impossible not to violate the provision. The Apollo lunar landing for a time took direct control by the United States of a very small portion of the Moon for a very small amount of time. Realistically, even a strict interpretationist of the no-sovereignty provision would probably not object. Although the United States placed its flag there, it made no claim of sovereignty — it was merely symbolic. However, future plans will do the same, but the operation will be larger and will last over a longer period of time. What would a strict no-sovereignty provision interpreter say then?

The coming international space station\textsuperscript{107} will in effect be taking up a portion of empty space by use, occupation, and any other means — although under the jurisdiction of a conglomerate of states instead of one as the clause seems to semantically direct. If empty space is not clearly demonstrative, imagine the implications of a lunar or Martian colony. Those endeavors would undoubtedly challenge the no-sovereignty provision. For one, it would be somewhat permanent. Even if it only lasted for a few months or years, the effect would be taking a portion of the Moon under United States claim of national sovereignty according to the plain language of the Treaty. At first, retention of United States jurisdiction would be less problematic if the first stage of the lunar colony was launched from Earth. Then the vehicle as it first becomes a colony could arguably retain a ship/vessel type of national jurisdiction consistent with Article VII of the Space Treaty. However, gradually the line will become more obscure as additional modules are built and connected to the original earth-launched vehicle or as the original vehicle becomes entrenched into the lunar surface. When does it stop becoming a lunar vehicle and become a colony? Once it becomes a colony, does Article VII cover those types of situations? Complicating matters further, what would be the impact of replicating nanotechnology — a technology that does not mine the Moon, but rather, \textit{converts} lunar material into itself?

Thus, a situation develops where maritime-vessel type jurisdiction might exist at the first launched component, but the component replicates and converts non-sovereign material into sovereign material. Macrotechnological replicating facilities likely could be classified as an initial space craft, but the more probable implementation of nanotechnology is more difficult. Nanotechnology functions at a molecular

\textsuperscript{107} See \textit{supra} note 28 (bilateral agreements regarding space station).
level. Would the introduction of nanotechnology on the Moon likely be classified as a space craft, a man-made type of pseudo-biological substance, or something else entirely?

Most commentators, space law theorists, and third-world interests have predicted similar ambiguity in the 1967 Space Treaty and its difficulty in applying to new realities of space development such as celestial mining, therefore believing the 1967 Space Treaty requires revision or that a new treaty should be implemented. The 1979 Moon Treaty is an example of some of those concerns. Although maritime law analogy does not effectively address space issues such as colonization,108 Antarctic law could foreseeably answer questions. Antarctica is a sovereignless territory and many countries have installations not unlike colonies within which they retain national jurisdiction. However, adjudication would only uncover and implement such analogy because no reference to these procedures or applicable Antarctic law is mentioned in any space treaty, much less the 1967 Space Treaty. Moreover, some other issues remain. For example, when celestial mining becomes feasible, will mining countries have to split the profits? Once a substantial portion of a celestial body has the potential to be mined or begins to create large profits, could third-world nations cite to the preamble and article I asserting that regardless of their economic or technological status that they should be entitled to the benefits of the exploitation?109

In conclusion, the 1967 Space Treaty’s no-sovereignty provision does include much vagueness worthy of interpretation. This vagueness has been demonstrated by both semantics and potential application to old and new scenarios. At the time the 1967 Space Treaty was formed, mining celestial bodies was viewed as a near-future event. However, now celestial property issues will be imminent within the next ten or twenty years and the time for reinterpretation is ripe.

108. Cf. Jefferson H. Weaver, Illusion or Reality? State Sovereignty in Outer Space, 10 B.U. INT’L L.J. 20 (1992) (stating that regions of the sea can be claimed by virtue of sovereignty via fleet domination (or by use of power exercised from the adjacent coast)).

109. One might argue that third-world nations should have access to one or a few exploiting nations’ space industry profits or other rewards. However, since space investment carries much risk and expense in comparison with other terrestrial investments, entities would even be less likely to invest knowing they would have to split their hard-earned rewards with nations who have stood idle. This argument is especially strong when space industry is in its infancy. Otherwise, no nation may benefit from the rewards of space industry and humanity in general will suffer a loss. On the other hand, if the United States or other conglomerate of nations maintains a high-rewarding space industry for many years harming other nations economies with some sort of monopoly, certainly adjustments may have to be made. But the key is getting hard-to-start industry started, especially an industry that could be crucial for the survival of mankind.
b. Second General Maxim: If He Who Could and Ought to Have Explained Himself Has Not Done It, It Is to His Own Detriment

There is little analysis under this second maxim. If the United States, or any other nation, had a different interpretation or desire for property rights in space, there was no evidence supporting this notion. Rather, almost all were strictly against such notions. Even if there was any sort of prevailing view on property right concepts, it would be to their own detriment and thus, ineffective as an excuse for reinterpreting the Treaty.

c. Third General Maxim: Neither of the contracting parties has a right to interpret the treaty according to his own fancy

If the United States was the only nation to benefit from a liberal view of the 1967 Space Treaty's no-sovereignty provision, this third general maxim would negate United States efforts at reinterpretation. However, as stated above, the reinterpretation should favor all nations, not just the United States. But many third-world nations would certainly view the interpretation as only favorable to the space faring nations because of the economic and technological status of third-world nations. While such status prevents them from exploring and exploiting space, it is not a valid argument in determining the why of a nation's own fancy. Thus, despite potential third-world arguments, a pro property interpretation asserted by, for example, the United States, would not necessarily be to its own fancy.

The interpretation would benefit all nations, especially when third-world nations catch up technologically and economically. Further, the lead taken by the space faring nations would make it easier for third-world nations to enter the same endeavors. Today's space industry is a firm example. Once, several nations took a lead in certain industries such as telecommunications and the commercial launch industry, third-world nations have entered and are becoming competitive; today, Europe takes a greater market share of commercial launch contracts over the United States. Third-world nations reap the benefits of remote sensing and the Global Positioning System. Future space industry would be no different. The creation of Solar Power Satellites would fuel the nations most in need.

10. The Global Positioning System, (hereinafter GPS), is a constellation of satellites formerly used by the military that can be used to pinpoint any object’s location on Earth within only a few meters. See Twibell, supra note 1, at 35. BMW and Mercedes Benz, for example, use the GPS systems for guidance systems in their cars which have detailed road maps with extreme accuracy which keep track, via satellite, exactly where the car and driver are on the maps. Id.

11. Solar Power Satellites are technologically feasible satellites that can gather larger amounts of sunlight in space than on Earth and transmit the energy via microwave back to Earth
need — third-world nations. Third-world space craft manufacturers could contract to less expensive space craft or stations to be made in space by the space faring nations. Hence, space could be more accessible to all nations.

d. Fourth General Maxim: What Is Sufficiently Declared Is to Be Taken for True

This fourth general maxim analysis includes many arguments in the first general maxim — if "it is sufficiently declared to be taken for true" it is probably not overly vague, and therefore, not necessary to interpret. However, if something is vague, it is difficult to take it for true. While Article II states that there shall be no claim of national sovereignty and this should be taken for true, it does not indicate what degree of sovereignty should exist, such as in the case of colonization. Therefore, if Article II cannot apply to a given situation with certainty, how can it be taken for true? This is where any effort at reinterpretation will primarily lie for it is the near-presence of space ventures and property issues for which reinterpretation will be sought. However, if any reinterpretation should happen to include claims for sovereignty where it was claimed a nation could acquire a portion of the Moon and call it its own, Article II is clear on this issue and it would certainly be taken for true that a nation could not make such a claim.

e. Fifth General Maxim: The Interpretation Ought to Be Made According to Certain Rules

It is not disputed that the interpretation of the no-sovereignty provision commanding that no nation shall appropriate celestial property is a valid interpretation (evidenced by lack of dispute in scholarly work over this interpretation),¹¹² but does an interpretation allowing national appropriation violate certain rules? It probably does not.

For one, interpreting the no-sovereignty provision to include some level of national appropriation would violate the 1967 Space Treaty’s Preamble and create absurdity and contradictions within the Treaty.¹¹³ The preamble states that "space exploration and use of outer space should be carried out for the benefit of all peoples irrespective of their economic or scientific development."¹¹⁴ This seems to contradict any notion of the United States or any other major space power taking a portion of a moon or asteroid and reaping the rewards of their resources. Thus, this use of

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¹¹² But see Reynolds, supra note 2, at 241.
¹¹³ See supra text accompanying notes 96-100.
¹¹⁴ See 1967 Space Treaty, supra note 21, preamble.
outer space would likely be construed as not benefiting peoples in lower economic and scientific development and therefore violative of the provision.

Secondly, Article I would be contradicted. Article I transforms the portions of the Preamble immediately discussed above into commands. It also states that all areas of "the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind on the basis of equality." A major mining operation on the Moon retaining jurisdiction and ownership over mined material certainly would easily entertain arguments that other states were being deprived of their use and exploration of that area. The larger the colony and the more lucrative the industry, the more likely the argument would prevail. Thus far, the interpretation creating limited property rights would seem to contradict other provisions in the Space Treaty, violating general rules of treaty interpretation and the notion of *omnis interpretatio si fieri potest ita fienda est in instrumentis, ut omnes contrarietaties amoveantur.* However, this analysis is purely academic — using general rules of treaty interpretation, semantics, and research. Some space law academics disagree with this conclusion of the incompatibility of property rights and the 1967 Space Treaty.

Professor Glen Reynolds believes that a minimal level of property rights can exist as they do with the *res communis* character of the oceans. He asserts that a state can recognize national jurisdiction over commercial recovery of mineral resources without violating accepted principles of international law. This jurisdiction does not include any claim of sovereignty over areas or resources in an area, only extracted resources and the freedom to explore. Reynolds proceeds to assert that an analogous scheme applied to outer space "would not constitute the extension of sovereignty to outer space" nor does it "even constitute the creation of full-fledged property rights." Rather, such right would be termed "an extraction right" — a "mineral right, or right of use." Therefore, the no-sovereignty provision under Reynolds interpretation

115. *See id.,* art. I.

116. "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and is in the interests of all countries, irrespective of their degree of economic or scientific development and shall be the province of all mankind." *Id.*

117. *Id.*

118. Reynolds, *supra* note 2, at 234; *see supra* text accompanying notes 79-81.

119. *Id.*

120. *See id.*

121. *Id.*

122. *Id.*
simply mandates that states "refrain from acts that involve national appropriation" and that "methods of creating incentives for space development involving [certain levels of property rights] and even involving methods in which enterprises do acquire absolute title to land."\textsuperscript{123}

Despite Professor Reynold's valid assertions, it is very likely other nations would disagree especially since such an interpretation of the no-sovereignty provision creating some level of property rights in space would seem to violate at least three of the general maxims on treaty interpretation. However, there still may be a chance for such interpretation to prevail, and this is the exception — \textit{omnis intelligitur rebus sic stantibus}.\textsuperscript{124} The \textit{rebus sic stantibus} failed in the analysis above regarding the Treaty as a whole, but would it prevail for only a particular portion of the Treaty? Probably not.

The reason behind this conclusion is that if there was a violation or a need to reinterpret the 1967 Space Treaty, the no-sovereignty provision would probably be the only culprit. It would be difficult to imagine many violations of the Treaty's other provisions with their humanitarian and cooperative values that primarily encompass the rest of the treaty. Furthermore, most nations encourage cooperation\textsuperscript{125} and space exploration for the whole of mankind.\textsuperscript{126} Much of this reasoning is often based on the need to combine international ingenuity, technology, and financing for expensive space projects never embarked on before. A simple change of the Cold War climate might invoke some nations to argue De Vattel's warning regarding the use of \textit{rebus sic stantibus}:

\begin{quote}
[\textit{W}e ought to be very cautious and moderate in the application of the present rule; it would be a shameful perversion of it, to take advantage of every change that happens in the state of affairs, in order to disengage ourselves from our promises were such conduct adopted, there could be no dependence place on any promise whatever.].\textsuperscript{127}
\end{quote}

Therefore, the analysis of the no-sovereignty provision in respect to this special case of \textit{rebus sic stantibus} has the same ill fate of the \textit{rebus sic

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\textsuperscript{123} Reynolds, \textit{supra} note 2, at 234; \textit{see supra} text accompanying notes 79-81.
\textsuperscript{124} \textit{See supra} text accompanying notes 86-102 (discussing the exception to the general rules of treaty interpretation).
\textsuperscript{125} \textit{See supra} notes 42-43 (treaties and bilateral agreements supporting international cooperation and freedom of space exploration in their preambles).
\textsuperscript{126} \textit{See, e.g., supra} note 28.
\textsuperscript{127} \textit{DE VATTEL}, \textit{supra} note 86, at 261.
\end{flushleft}
stantibus applied to the Treaty as a whole since the no-sovereignty provision is the only provision likely to be the provision violated.

f. Conclusion and General Observations for Vaccine II

There is certainly much room for interpretation of the 1967 Space Treaty’s no-sovereignty provision as allowed by the general maxims of international law. However, the particular interpretation that includes a certain level of property rights is not so compatible with certain rules of treaty interpretations under the fifth general maxim. The one exception to these general rules, rebus sic stantibus, shows little likelihood for success either. It fails for the 1967 Space Treaty in general and for the no-sovereignty provision by itself because it is the only portion of the 1967 Space Treaty that would need reinterpretation or likely to be affected by the substantial change in the state of things. Furthermore, it is unneeded because of the withdrawal provision. Thus, this vaccine does not provide the answer.


This vaccine, because of the 1967 Space Treaty’s withdrawal clause, is irrelevant in regards to the legality and international perception of whether it was a proper withdrawal from the 1967 Space Treaty. If no such provision existed, the United States could only legally withdraw from the Treaty if other parties had breached the Treaty, or only if such breach was substantial. Some authorities believe a violation of a treaty by one party never terminates the obligations of the other parties no matter how significant the violations. Other authorities believe nations always have an absolute right to terminate a treaty no matter how significant the violation. Today, there appears to be no grounds for the United States to terminate its obligations under the Treaty under any sort of analysis of these schools of thought. Absolutely no asserted breaches of the 1967 Space Treaty exist to even fall within the most liberal category of permissible treaty denunciation. However, contractually under Article

128. See 1967 Space Treaty, supra note 21, art. XVI; see also supra text accompanying notes 82-85.

129. See BHEK PATI SINHAI, UNILATERAL DENUNCIATION OF TREATY BECAUSE OF PRIOR VIOLATIONS OF OBLIGATIONS BY OTHER PARTY 1 (1966).

130. Id. at 2.

131. Id.

132. Id.
XVI, any signatory can withdraw from the Treaty. As previously discussed, this is why treaty denunciation is becoming less common.\footnote{133}{See supra text accompanying notes 82-83.}

Thus, the United States can legally denunciate the Treaty. That is not the issue.\footnote{134}{For some of the issues arising from denunciation where there is no withdrawal provision, see SINHAI, supra note 129, at 2-3 (e.g., "Are all types of treaties subject to the rule of unilateral denunciation?"; "Does a party to the treaty have the right or prerogative to act as the sole judge and interpreter of the occurrence, the nature and consequences of a violation of an obligation or part of another treaty?"; and, "Does an innocent party have the right to abrogate the whole of a treaty, or only that part which is affected by violations?").}

The issue is the potential impact and negative repercussions an Article XVI withdrawal would have on the international community.\footnote{135}{See Reynolds, supra note 2, at 233 ("[T]he possibility of the United States simply repudiating the Outer Space Treaty's no-sovereignty provision . . . would probably lead to ugly international repercussions.") However, Reynolds leaves to speculation exactly what those repercussions are.}

If the United States properly withdrew from the 1967 Space Treaty, it may not be free to act in violation of the Treaty’s principles. The political consequences of a proper unilateral withdrawal would not be the withdrawal itself, but fear in the international community over what the United States might do once it felt it had a right to allocate itself celestial property. Nations today, including the mighty United States, operate less in a vacuum than they did years ago. Every state action creates ripples in the international community at an extremely higher rate than years ago. Nations do not act or fail to act based on the military repercussions of their actions. States are intricately tied transnationally via communication, economics, and government. Note the United Nations’ participation in global conflicts since the breakup of the Soviet Union and the formation of the European Economic Community. The United States must be very careful when it takes any act that might have negative international repercussions, especially with something such as space activities which are so expensive and require substantial international cooperation.

Additionally, this Treaty and its accompanying principles may have become ingrained in international law to such a degree that they have become universally accepted as a rule of positive international law or even customary international law.\footnote{136}{See supra text accompanying note 44; Weaver, supra note 108, at 230 (suggesting some scholars assert that "the principle of freedom of outer space was 'universally accepted as a rule of positive international has and has never been challenged by any state' [except for geostationary orbit claims of empty space] by equatorial countries").}

Finally, since most multilateral agreements have embraced the 1967 Space Treaty in their Preambles, the United States withdrawing from the 1967 Space Treaty might cause concerns that the United States might be withdrawing or disaffirming its other agreements that refer to the treaty.
a. Conclusion and General Observations of Vaccine III

Unilateral denunciation from a legal standpoint is not problematic for the United States provided it uses Article XVI for withdrawal. However, non legal repercussions may ensue from the international community. These repercussions would not be in the United States best interest in not only space commercialization, but in other non related realms as well. Any nation embarking on space ventures likely requires international support and cooperation. Further, withdrawal does not implement a regime to govern property acquisition or questions concerning liability of intelligent machines, replicating technology, or nanotechnology utilization in space. The United States might certainly be negatively affected by another nation’s use of such technology. Every state has an interest in certainty and a structured legal environment in space. Treaty withdrawal accomplishes none of those things; it only removes barriers to property right acquisition.

B. Multilateral Action


This vaccine addresses the issue of whether the 1967 Space Treaty can be simply ignored and another treaty passed that addresses the needed changes in international space law. Can this be done? Would it be proper for addressing needed changes in space law? It can be accomplished, however, the key is getting the same parties who have signed the 1967 Space Treaty to sign the new treaty.9 If they are the same parties, they are clearly competent and in the position to address the problems of the 1967 Space Treaty.9 They must also make clear their intentions regarding the prior treaty. Otherwise, the 1967 Space Treaty might remain in effect.10 The 1967 Space Treaty has ninety-eight signatories11 and if enough support was garnered to draw up a new treaty creating property rights, enough support can be garnered to amend the 1967 Space Treaty.

137. HENKIN ET AL., supra note 52, at 505.
138. “Where the parties to the two treaties are identical, there can be no doubt that, in concluding the second treaty, they are competent to abrogate the earlier one. . . .” Id.
139. Id.
140. Certain questions must be answered to determine whether the first treaty remains in force. “This question is essentially one of the construction of the two treaties in order to determine the intentions of the parties with respect to the maintenance in force of the earlier one.” Id.
141. See Twibell, supra note 1, at 8.
If only some of the parties create the new treaty, it will remain questionable whether the no-sovereignty provision remains in effect.\textsuperscript{142}

\textit{a. Conclusion and General Observations of Vaccine IV}

Thus far, Vaccine Four appears to be the most valuable in implementing the needed changes in international space law. A document can simply be created and passed that embodies the needed changes. This creates some difficulties such as time constraints and may take some great motivation to suddenly get the document to pass international scrutiny \textit{before} implementation of a high-level space industry or the advent of nanotechnology. However, it provides the needed results. The main problem with this vaccine is that the 1967 Space Treaty has permeated international law at many levels via international agreement preambles and possible international positive and customary law. Therefore, the 1967 Space Treaty itself will inevitably need to be addressed.

\textit{2. Vaccine V: Amendment of the 1967 Space Treaty}\textsuperscript{143}

Vaccine Five does not suffer the same fate of the previous vaccines. It is the most rational, although it will perhaps take more time for generating its formulation and international consensus as was the difficulty in the passage of a subsequent treaty (Vaccine Four). It may even be more difficult because the no-sovereignty provision will be addressed directly and the property rights issue will be directly subject to criticism, especially with the large number of signatories to the Treaty. However, in the long-run, it could be less time consuming because it could be implemented much more efficiently than the United States trying to enforce its vision of space economic theory via internationally destabilizing means such as withdrawal or non-compliance. Furthermore, time may not be a crucial factor as perhaps normal treaty amending processes — the formation of the 1967 Space Treaty was rather immediate. It formed through a series of resolutions immediately after the launch of Sputnik. Hence, sudden advances in technology could make the amendment process much faster. Since amendment is likely needed,\textsuperscript{144} an increased or improved likelihood of the viability of space enterprise could easily generate resolutions or actual binding international agreements addressing property right issues and developing a legal regime. It must be conceded that the principle argument against amendment and the drive toward

\textsuperscript{142} If the signatories did not intend to terminate or suspend the earlier treaty, the first treaty has the priority of inconsistent obligations. \textit{See id.} at 506.

\textsuperscript{143} \textit{See HENKIN ET AL., supra} note 52, at 456.

\textsuperscript{144} \textit{See supra} text and conclusions accompanying notes 60-142.
finding other means for seeking change in international law is that it gives grave disincentive to space industry now. Industry would be forced to wait for legal development, or at least lack of legal incentive would slow space technological development or industrial proliferation. However, amending the 1967 Space Treaty solves dilemmas unanswerable by any other vaccine. It would directly address the viral infection of corpus juris spatialis and lend an opportunity for instilling a legal regime and certainty into law without simply creating a void by ridding international law of the Space Treaty’s Article II. If such great effort is taken to reinterpret, withdraw, repudiate, or create an entirely new treaty, that effort needs to be directed at all the needed changes.

Unprotected property rights in space could cause more havoc for space investors than no property rights at all. The United States might tell investors to “go ahead and claim half of the Moon, but beware we will have to militarily protect you because the rest of the world does not recognize your rights.” There could also be a mad rush toward staking claims in space. Moreover, legal inaction and fast technological development might cause a mad rush of squatters in space regardless of international legal prohibitions.

Economic development in space will likely require a structured environment such as the structure and regulation of industry terrestrially. Amending the 1967 Space Treaty by removing the no-sovereignty clause, elaborating it or perhaps removing it and creating another treaty, solves many problems in implementing desired changes in space law. These qualities make it the best vaccine available. It has its problems in not creating motivation until amendment is completed and it is slow, but there may be methods to improve the efficacy of this vaccine and ridding it of its drawbacks. That key is United States domestic policy.

3. Improving the Efficacy of Vaccine Six — A Vigorous United States Domestic Policy

Unlike Congress and state legislatures, the United Nations does not have an analogous lobbying structure to implement legislative change. People are not salaried solely for the purpose of winning and dining United Nations ambassadors to have their views affect United Nations decision making. United Nations lobbyists are the states themselves (although they may be acting on behalf of internal or domestic lobbying interests). The

145. Referring to the four previous vaccines beginning with the simplest to accomplish.

146. See McKendree, supra note 52.

147. See Twibell, supra note 1, at 53, n.376 (stating that strong national policy may be the key for changing space law and that some commentators outside the legal field firmly advocate this course of action).
United States could be a lobbyist for the space and property right cause by promoting its own space industry and preparing to do so. Such maneuvers of the world's largest economic and technological giant would not go unnoticed, rather, it would send a message of an impending need for a new international space regime. Other nations would observe the United States preparing for massive space ventures that could question the 1967 Space Treaty's no-sovereignty provision. They would then be extremely motivated to act upon their concerns and address property right issues before the United States foreseeably quashes their opportunities — perceptively to them anyway. Further, other nations would necessarily and inevitably work in conjunction with the United States in its space endeavors, paving the path further or international legal change.

VI. CONCLUSION — CIRCUMNAVIGATING INTERNATIONAL SPACE LAW

When the early space explorers dreamed of traveling from one side of the globe to the other, they envisioned vast riches and short navigable routes to reach those riches. Christopher Columbus sought a shortcut to India, only to have found the longest route to what was really India. Magellan took a route through the Straits of Magellan and the Pacific Ocean only to find the Pacific Ocean was eighty percent larger than he thought, resulting in Magellan practically circumnavigating the globe.148 Captain Cook's voyages took him around the world and he took no shortcuts.149 He was a great navigator and knew the oceans well. His voyages were very profitable.150 In this paper, shortcuts were sought as well in finding the best direct route to needed legal change in international space law. Similarly to the early explorers, the best route was the direct route often requiring a long path, or rather, circumnavigation of the world. Some of the shortcuts, as the shortcuts sought by the ancient ocean explorers, may really be the longest route to the desired destination. Amendment of the 1967 Space Treaty may take us the long way around the world, but it is the most direct route. Albeit the route is long and hard, it is the best route for instituting needed legal change in the international corpus juris spatialis. Further, it will be strong United States policy that persuades Queen Isabella to fund and make the long voyage a reality — a voyage that will not only bring economic and humanitarian prosperity to Portugal or Europe, but to all the world.

149. See id. at 278-89.
150. See id.