

A NEW HOPE FOR INTERNATIONAL SPACE LAW: INCORPORATING NINETEENTH CENTURY FIRST POSSESSION PRINCIPLES INTO THE 1967 SPACE TREATY FOR THE COLONIZATION OF OUTER SPACE IN THE TWENTY-FIRST CENTURY

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INTRODUCTION

Legend has it that a friend once asked Mark Twain what he should invest in, and the good-humored author responded “Buy land; they’ve stopped making it.”¹ The author’s advice was given more than 100 years ago and it still makes good sense. If a resource is scarce, it is almost always going to become more valuable.² It is

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¹ A search of the Lexis and Westlaw databases, as well as the World Wide Web, demonstrates that hundreds of newspapers and Web sites have attributed this quote or some similar version to Mark Twain. See, e.g., Clinton J. Fynes, “Ambassadorial Role” *Leads Ian to Property*, COURIER-MAIL, Oct. 12, 1990 (relaying the story of Mark Twain advising his friend to “Buy land, they’re not making any more of it.”); Tom Fegely, *Lack of Action on Tag Fees Pinches Gamelands Purchases, Maintenance*, MORNING CALL (Allentown, PA), Sept. 29, 1998, at C4 (quoting Twain as saying “Buy land; They’ve stopped making it.”). A thorough search of Mark Twain quote books and databases, however, revealed no such quote. Even so, a requested verification from scholars at the Mark Twain Archive at Elmira College revealed that, although scholars are aware of the fact that legend has attributed the quote to Mark Twain, they have not been able to determine whether or not the quotation is a misnomer. Similar quotations are also attributed to Will Rogers, but again, lack the necessary verification to determine whether he is the source of the quote. It truly seems to be a legend accredited to one of America’s great authors.

² Carol M. Rose, “Enough, and as Good” of What?, 81 NW. U. L. REV. 417, 429 (1987). The value of property hinges on a property regime that allows people to invest labor into their resources and on a commercial system that allows people to trade resources to anyone who desire them more. *Id.* Once certainty exists in property and commercial law, people can safely invest labor into their resources, which makes people try harder to acquire them and tender more for them—which in

amazing that even in the nineteenth century, when vast areas of land on all seven continents had not yet been settled,³ it was foreseeable that land would become even more precious than it already was to a rapidly developing United States.⁴

Yet, land has become more precious—especially as it has been converted to food-producing land to accommodate a rapidly growing world population.⁵ Overgrazing, deforestation, urbanization, and pollution have severely damaged as much as one-tenth of the world's fertile soil⁶ and depleted its natural resources.⁷ Consider that each day, about 250,000 people are added to the more than 6.2 billion who already exist.⁸ Moreover, the world's population doubled during the past forty-five years, and it is projected to double again within the next fifty years.⁹ Many economic theorists are now worried that if the world population continues to rise, the Earth will be depleted of all of its resources and the ecosystem will not be able to support the number of people needing supplies.¹⁰ The assumption for many theorists is that the more heavily populated Earth becomes, the more the Earth's resources will be depleted, resulting in increased environmental problems.¹¹ Essentially, Earth has a limited number of

turn makes resources scarcer and more valuable. *Id.*

³ See GYULA GÁL, *SPACE LAW* 122 (1969). By the end of the nineteenth century, however, the distribution of the world was complete, and no territory but Antarctica lay free from a claim of sovereignty. *Id.*

⁴ See John F. Beggs, *The Theoretical Foundations of the Takings Clause and the Utilization of Historical Conceptions of Property in the Ecological Age*, 6 *FORDHAM ENVTL. L.J.* 867, 900-01, 903 (1995).

⁵ See Anne Ketover, *Fouling Our Own Nest: Rapid Population Growth and its Effect on the Environment*, 7 *TUL. ENVTL. L.J.* 431, 437-39 (1994).

⁶ *Id.* at 439.

⁷ See generally Robert M. Hardaway, *Environmental Malthusianism: Integrating Population and Environmental Policy*, 27 *ENVTL. L.* 1209 (1997) (arguing that overpopulation has degraded the environment and depleted the Earth's natural resources).

⁸ David Pimentel, *Last Orders Please . . . Room Is Running Out At The Global Dinner Table*, *SYDNEY MORNING HERALD*, July 12, 2002, at 11, available at 2002 WL 23873376.

⁹ *Id.*

¹⁰ See generally Paul R. Ehrlich & Anne H. Ehrlich, *The Population Explosion: Why We Should Care and What We Should Do About It*, 27 *ENVTL. L.* 1187 (1997) (noting that humanity must take immediate action to reduce the impact of overpopulation on the environment or be threatened with eventual environmental disaster).

¹¹ See *id.* In *THE POPULATION BOMB*, Ehrlich implored that population control is the key to resolving the Earth's environmental troubles, noting that "[w]e must rapidly bring the world population under control, reducing the growth rate to zero or making it go negative." PAUL R. EHRLICH, *THE POPULATION BOMB* 131 (1968). The Washington, D.C.-based organization Population Action International currently supports and focuses on these ideas. See generally ROBERT ENGELMAN, *STABILIZING THE ATMOSPHERE: POPULATION, CONSUMPTION AND GREENHOUSE GASES* (1994) (suggesting that population and environmental problems are closely linked), available at

resources, and its population is growing too quickly to sustain current use.¹²

It seems only natural that as Earth's resources diminish, nations will look elsewhere to meet their needs for food, fresh water, quality soil, energy, and biodiversity.¹³ Luckily, technology has continued to offset resource depletion for the past century,¹⁴ and the world has never run out of an important commodity because, before it does, a substitute is found.¹⁵ Where will mankind find a new energy source, a "black gold" to keep modern Malthusian doomsday scenarios¹⁶ from becoming reality? Within the next half-century, the technological and energy-harvesting innovations that could help slow the dwindling of Earth's resources most effectively may exist in the utilization of resources appropriated from outer space.¹⁷

Within the last few years, scientists have discovered deposits of water ice¹⁸ and other valuable mineral deposits—including helium-3,

<http://cnie.org/pop/CO2/intro.htm> (last visited Apr. 2, 2004).

¹² Robert W. Hahn, *Toward a New Environmental Paradigm*, 102 YALE L.J. 1719, 1726-27 (1993).

¹³ See Diane L. Slifer, *Growing Environmental Concerns: Is Population Control the Answer?*, 11 VILL. ENVTL. L.J. 111, 115-16 (2000).

¹⁴ Alex Taylor III, *Oil Forever*, FORTUNE, Nov. 22, 1999, at 193. Taylor explains how technology has continued to offset resource depletion:

The discovery of oil meant that the mines of the U.S. and England weren't stripped of their coal. The discovery of coal kept Western Europeans from turning every forest tree into firewood Simple economics also dictates that oil will not become a scarce resource. Whenever production starts to lag, market pressures push prices higher. That, in turn, leads to better conservation efforts, wider use of previously uneconomical oil fields, and *an expanded search for oil substitutes*.

Id. (emphasis added).

¹⁵ Andrew D. Ringel, *The Population Policy Debate and the World Bank: Limits to Growth vs. Supply-side Demographics*, 6 GEO. INT'L ENVTL. L. REV. 213, 220 (1993). Ringel notes that population issues have been hotly contested in the public policy community. *Id.* at 214. Two sides have emerged in the debate. *Id.* The "limits to growth" school of thought holds that increases in population aggravate depletion of natural resources and environmental destruction and strains the limits on sustainable development. *Id.* at 216. The "supply-side demographics" school of thought, on the other hand, argues that increases in population help to promote economic development by compelling "technological innovation, societal re-organization and more efficient resource allocation to sustain the increases in population." *Id.*

¹⁶ See generally THOMAS R. MALTHUS, AN ESSAY ON THE PRINCIPLE OF POPULATION OR A VIEW OF ITS PAST AND PRESENT EFFECTS ON HUMAN HAPPINESS (Ward, Lock and Co., 6th ed. 1890) (noting that rapid population increases would rapidly overtake available food supplies, even if he assumed that Earth had an unlimited capacity to produce food). Modern Malthusians expand Malthus' arguments to the depletion of energy resources. See Hardaway, *supra* note 7, at 1211.

¹⁷ See JOHN S. LEWIS, MINING THE SKY 217-35 (1996).

¹⁸ Richard A. Kerr, *Cheapest Mission Finds Moon's Frozen Water*, SCIENCE, Mar. 13,

the ideal fuel for fusion power¹⁹—on the Moon and Mars; and whereas Earth has limited resources, outer space, in theory, has an unlimited abundance of resources that could satisfy supply requirements forever.²⁰ Naturally, colonization of space will also raise the value of the land that the resources sit on.²¹ And with new land available for acquisition for the first time since the nineteenth century—land with no claims of sovereignty²²—it is also natural that questions will arise as to how this extraterrestrial land and its valuable resources will be appropriated amongst the nations of Earth.

These issues will likely materialize very soon, especially in light of President George W. Bush's new space initiative, set forth on January 15, 2004.²³ President Bush has set a goal for another manned mission to the Moon for 2020, with a manned mission to Mars to come in an unspecified time afterwards.²⁴ NASA officials and other preeminent scientists, however, have often predicted that a manned mission to Mars is *feasible* as early as 2020,²⁵ with these missions laying the foundation for colonization.²⁶ More importantly, *actual NASA documents* denote a 2020 launch date for a manned mission to Mars.²⁷

1998, at 1628; R. Cowen, *Craft Finds Evidence of Ice on the Moon*, SCIENCE NEWS, Mar. 14, 1998, at 166. See also WILLIAM K. HARTMANN, A TRAVELER'S GUIDE TO MARS: THE MYSTERIOUS LANDSCAPES OF THE RED PLANET 107 (2003) (noting that "[f]undamentally, Mars is a very wet planet, except that the water is hidden in three places: the permanent polar ice caps, ground ice under the surface, and water molecules trapped in minerals within the soil.").

¹⁹ LEWIS, *supra* note 17, at 137-38.

²⁰ *Id.* at xi.

²¹ See SUSAN J. BUCK, THE GLOBAL COMMONS 27, 173 (1998).

²² See *id.* at 21-29. The United States Bureau of the Census officially announced the closing of America's frontier in 1890, as some political jurisdiction governed all land between the Atlantic and Pacific Oceans. *Id.* at 40.

²³ *Excerpts from Bush's Speech on the Exploration of Space*, N.Y. TIMES, Jan. 15, 2004, at A26.

²⁴ David E. Sanger & Richard W. Stevenson, *Bush Backs Goal of Flight to Moon to Establish Base*, N.Y. TIMES, Jan. 15, 2004, at A1. Although the press posited a target date of 2030 for a mission to Mars, President Bush carefully did not set a firm date. Jeffrey Kluger, *Mission to Mars*, TIME, Jan. 26, 2004, at 42-43.

²⁵ Fenella Saunders, *Introduction: Vision 2100*, in SPACE 2100: TO MARS AND BEYOND IN THE CENTURY TO COME 12 (Popular Science 2003).

²⁶ See Barb Berggoetz, *Indiana's Purdue University Wins \$10 Million NASA Grant*, KNIGHT-RIDDER TRIB. BUS. NEWS, Mar. 13, 2002, available at 2002 WL 15914609. Cary Mitchell, the director of the advanced life support technologies center at Purdue University (whose mission is to develop a system that will enable people to live in biospheres on the Mars or Moon), has said that "[s]pace colonies, or perhaps a 1,000-day mission to Mars, could become a reality as early as the 2020s, after 15 years or so of practicing the technologies [of advanced life support systems] on the ground." *Id.*

²⁷ Erik Baard & Jeffrey Winters, *First Stop: Mars*, in SPACE 2100: TO MARS AND BEYOND IN THE CENTURY TO COME 58 (Popular Science 2003).

Consequently, NASA has already started laying the groundwork for sending scientists and other human explorers to Mars.²⁸ Consistent with these goals, the United States launched two land rovers, the Spirit and Opportunity, for Mars exploration approximately six weeks before August 27, 2003,²⁹ when Mars came closer to Earth than it will be anytime in the next 200 years.³⁰ Mars is theoretically the second safest place for humans in the Solar System after Earth,³¹ and the Spirit and Opportunity probes have relayed many images that confirm this notion.³² Furthermore, NASA has also granted money to universities to develop advanced life support systems that will enable people to live in enclosed biospheres on Mars, where they will grow crops and live.³³

It is equally important that on October 15, 2003, China entered the space race by becoming the third nation to send a human being into space.³⁴ China plans to send "taikonauts"³⁵ into space regularly and build a space lab.³⁶ The Chinese space program eventually aspires to send a man to the Moon,³⁷ with the first unmanned lunar

²⁸ Alisha Oakes, *Mars Rocks / Earthlings Celebrate Landing on Red Planet*, HOUS. CHRON., Jan. 15, 2004, at 1, available at 2004 WL 57800735. NASA hopes that the land rovers Spirit and Opportunity will help discover the exact makeup of the Martian surface, which is important for determining the parameters of using soil as a resource for fuel and building during manned missions. *Id.*

²⁹ *Newly Launched "Opportunity" Follows Mars-Bound "Spirit,"* NASA NEWS (National Aeronautics and Space Administration, Kennedy Space Center, Florida), July 7, 2003, available at <http://www-pao.ksc.nasa.gov/kscpao/release/2003/2003-095.htm> (last visited Apr. 2, 2004). In addition to the two American spacecraft, the European Space Agency also took advantage of the fact that Mars was only thirty-five million miles from Earth (the nearest it has come since 57,617 B.C.) and launched a Martian explorer to examine Mars' thin atmosphere. Mike Batistick, *The Five-Minute Guide to Mars*, ESQUIRE, Jan. 2004, at 112.

³⁰ Kitta MacPherson, *Mars Proves Ready For Its Close-Up*, STAR-LEDGER (NEWARK, N.J.), Aug. 27, 2003, at 1, available at 2003 WL 18724465. Mars was also closer to Earth than it had been in over 50,000 years. *The Best Photos of the Year*, TIME, Dec. 22, 2003, at 109.

³¹ Paul Davies, *Life (and Death) on Mars*, N.Y. TIMES, Jan. 16, 2004, at A33.

³² See Sarah Boxer, *With Close-Ups of Mars, the Mystery Gets Lost in Space*, N.Y. TIMES, Feb. 17, 2004, at F3.

³³ Berggoetz, *supra* note 26. NASA has recently granted Purdue University \$10 million to perfect an advanced life support system that will enable scientists and other human explorers to live in biospheres on Mars or the Moon, where they will grow their own crops and live in enclosed habitats. *Id.*

³⁴ Jim Yardley, *China in Space: the Return*, N.Y. TIMES, Oct. 16, 2003, at A10.

³⁵ *Id.* China calls its space explorers "taikonauts." See *id.*

³⁶ Michael A. Lev, *China Puts Man in Space; Secrecy Prevails as Beijing Launches its 1st Astronaut*, CHI. TRIB., Oct. 15, 2003, at C1.

³⁷ John Pomfret, *China Ready for Leap into Orbit; Manned Spaceflight Would Put Country in Elite Club*, WASH. POST, Oct. 9, 2003, at A1.

landing scheduled within the next six years.³⁸ Senior officials within China's program have explicitly said that China's goal is to explore outer space and take advantage of outer space resources.³⁹ Additionally, Japan, India, Brazil, Russia, the Ukraine, and the European Space Agency already have important space programs, mostly in the satellite launching industry.⁴⁰ Some of these countries, like India, have aspirations to follow China's lead and move beyond the satellite launching industry.⁴¹ Finally, according to the United Nations' Office for Outer Space Affairs, more than fifty nations have a national space program to some degree or another.⁴² With all of these nations investing money into outer space and some recognizing the benefits of developing a space program that may eventually lead to colonization, it must be asked what technology is required to make a trip to Mars.

From time to time, NASA engineers generate an outline for the Mars Reference Mission, a detailed plan for transporting astronauts to Mars, in the event that the President and Congress green light the mission.⁴³ For many decades, the Reference Mission proposed that an enormous spacecraft would be built in low-Earth orbit—just like the International Space Station was assembled—and this spacecraft would race to Mars and orbit there while tiny manned “landers” would journey to the Martian surface for quick expeditions.⁴⁴ These intricate plans called for a burdensome \$600-billion mission—a cost far too great for any nation to validate.⁴⁵

In 1990, however, aerospace engineers Robert Zubrin and David Baker devised a drastically different strategy called Mars Direct.⁴⁶

³⁸ Kluger, *supra* note 24, at 44. China named its new lunar program “Chang’e,” which references “the story of the lonely Chinese fairy who fled to the moon after stealing her husband’s immortality pills.” *Id.*

³⁹ Lev, *supra* note 36, at C1.

⁴⁰ See James L. Reed, *The Commercial Space Launch Market and Bilateral Trade Agreements in Space Launch Services*, 13 AM. U. INT’L L. REV. 157, 171-73, 210-12 (1997) (noting that market forces continue to pressure satellite companies to contract with non-Western launch services based in non-market economy nations).

⁴¹ Peter Pae, *3rd World Sets Sights on Space*, L.A. TIMES, Oct. 14, 2002, at A1, available at 2003 WL 2441307.

⁴² *Id.* Countries like Pakistan and South Korea are striving to create the technology necessary to launch space rockets domestically, as they recognize that launching a rocket or satellite puts them into a special class, “like being a nuclear power without all the politics of having a nuclear program.” *Id.*

⁴³ Baard & Winters, *supra* note 27, at 58.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.* at 59. For a full description of Zubrin’s plans, see generally ROBERT ZUBRIN, THE CASE FOR MARS: THE PLAN TO SETTLE THE RED PLANET AND WHY WE MUST (1996)

Zubrin and Baker rejected the “mother ship” plan and alternatively recommended that astronauts departing from Earth have the ability to fly directly to—and land directly on—the Martian surface.⁴⁷ Zubrin and Baker also solved the one possible shortcoming to Mars Direct: how to transport sufficient fuel to Mars’ surface for a return trip to Earth.⁴⁸ The former aerospace engineers posited that all the materials necessary for rocket fuel exist in minerals found on Mars’ surface; thus, if a miniature chemical factory is sent ahead of time, astronauts could make all the fuel necessary for a trip home.⁴⁹ Furthermore, Zubrin and Baker’s approach could be accomplished with available modern technology at one-twentieth the cost of the “mother ship” approach.⁵⁰ Zubrin and Baker’s plan has influenced the Mars Reference Mission tremendously, as NASA plans now emulate large parts of the Mars Direct mission outline, including the months-long interval on the Red Planet.⁵¹

Hence, with dozens of countries possessing space technology,⁵² the incentive to acquire the abundant resources available in space due to the Earth’s ongoing resource depletion,⁵³ and the ability to implement the publicly available plan to travel to Mars cheaply,⁵⁴ the day will soon be upon us where one or more nations colonize the celestial bodies closest to Earth. Treaties do exist as to how the law of outer space should be governed.⁵⁵ These treaties rest in large part on the principle that outer space is *res communis* and not subject to

(hereinafter “ZUBRIN, THE CASE FOR MARS”).

⁴⁷ Baard & Winters, *supra* note 27, at 59.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.* NASA, however, is more technologically motivated. Baard & Winters, *supra* note 27, at 59. Designs for nuclear rockets that will power the spacecraft and reactors that provide energy to the landing site—even though they have yet to be invented—still exist in plans for the Mars Reference Mission. *Id.* Nevertheless, the new Mars Reference Mission is a great advance over mission profiles from fifteen years ago. *Id.*

⁵² Pae, *supra* note 41, at A1.

⁵³ See *supra* notes 8-41 and accompanying text for a discussion of the Earth’s resource depletion and the countries that have an incentive to exploit space resources.

⁵⁴ ROBERT ZUBRIN, ENTERING SPACE: CREATING A SPACEFARING CIVILIZATION 104 (1999) (hereinafter “ZUBRIN, ENTERING SPACE”). Zubrin notes that if his Mars Direct plan formed the basis of a mission to Mars, such a journey could be accomplished for somewhere between \$20 and \$30 billion, a sum easily affordable by the United States, Europe, or Japan. *Id.*

⁵⁵ See *infra* notes 182-186 and accompanying text for a list of the treaties that govern outer space.

national appropriation.⁵⁶ While this approach is laudable in theory, it is problematic in application, as it fails to create an adequate incentive for space exploration and colonization. Furthermore, the existing legal scheme provides no legal certainty to resolving property issues that will arise⁵⁷ because it overturns centuries of international law by rejecting the longstanding principle of national sovereignty; the space treaties have widely varying interpretations that differ from the original intentions of their authors;⁵⁸ and today some nations view the treaties only as a roadmap for future treaties—not as law themselves.⁵⁹

This Comment examines the problems attendant to the existing legal scheme and proposes that nations implement a property rights-based system that relies on the doctrine of first possession. Section I provides the compelling reasons for the United States to journey to Mars and eventually the rest of our Solar System, based on available resources and lessons from history. Section II presents an overview of space law as it stands today and a perspective on the ideologies that inspired nations to create treaties to govern activities in outer space. Section III reveals how the current body of international space law is riddled with problems, including open-ended treaty interpretations, the uncertainty created by rejecting the concept of sovereignty, and issues with terrestrial nations making policy for the good of all mankind in outer space while serving terrestrial interests. Finally, section IV argues for the reemergence of nineteenth century first possession doctrines, statutes, and case law to govern the colonization of outer space. Furthermore, this section offers a method for implementing these principles in a manner that is economically beneficial to all nations as the world sets out into the twenty-first century.

⁵⁶ See *infra* note 189 and accompanying text for a discussion of the overarching principles intended to guide space exploration.

⁵⁷ See generally BUCK, *supra* note 21, at 25-29, 142-153 (explaining the history of property issues based on Western legal thought, notions of national sovereignty, and the Common Heritage principle, and then relating these issues to the development of an outer space regime and the outer space treaties).

⁵⁸ See NANDASIRI JASENTULIYANA, INTERNATIONAL SPACE LAW AND THE UNITED NATIONS 33 (1999).

⁵⁹ See Jefferson H. Weaver, *Illusion or Reality? State Sovereignty in Outer Space*, 10 B.U. INT'L L.J. 203, 227 (1993).

I. REASONS TO EXPLORE THE CELESTIAL LANDSCAPE AND THE UNITED STATES' CURRENT EFFORTS

The Earth is the cradle of mankind, but one cannot stay in the cradle forever.

Konstantin Tsiolkovsky, 1895.⁶⁰

Popular reasons for why humans should colonize space vary: “[l]ife naturally expands; humans naturally explore; overcoming challenges spurs creativity and technological innovations; space is abundant in energy and raw materials; having a human foothold elsewhere in the solar system creates a genetic reservoir as a back-up in case of asteroid ‘extinction events.’”⁶¹ Simply, there are just as many motives to explore, exploit, and colonize space as there are people who have dreamed about the voyage.⁶² Vast amounts of technology and knowledge will likely be created through journeys to unexplored celestial bodies, which will be invaluable.⁶³ Potential profits beckon humans to space as well,⁶⁴ although humans do not need an economic motive to travel to space.⁶⁵ As Zubrin notes, “[f]undamentally, humanity’s entry into space is not about profits, or even knowledge—it’s about social reproduction [and], as in all truly meaningful activities, . . . our *posterity*. We are planting orchards: For us is the sense of accomplishment and the delight in watching the seedlings grow. The fruit is for our children.”⁶⁶ The question becomes where should we plant ourselves—i.e., what planet should become man’s home away from Earth? More importantly, given the compelling reasons to make such a journey, why has one not yet occurred? To answer these questions, the advantages and disadvantages of the celestial bodies most often identified as ripe for colonization must be understood, and the causes for why such a voyage has not yet occurred must be revealed.

⁶⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 3.

⁶¹ Wendy L. Schultz, *Humans in Space*, in SPACE 2100: TO MARS AND BEYOND IN THE CENTURY TO COME 109 (Popular Science 2003).

⁶² *Id.*

⁶³ ZUBRIN, ENTERING SPACE, *supra* note 54, at 79.

⁶⁴ Schultz, *supra* note 61, at 109. “Albert A. Harrison, author of SPACEFARING: THE HUMAN DIMENSION, reminds us that ‘every dollar spent on the Apollo Moon program translated into seven to eight dollars returned to the economy in new goods and services.’” *Id.*

⁶⁵ ZUBRIN, ENTERING SPACE, *supra* note 54, at 79.

⁶⁶ *Id.* (emphasis added).

A. *The Benefits that May be Reaped from Exploiting Space Resources*

Space has an infinite number of resources.⁶⁷ Through exploration of the Solar System and application of soon-to-be-developed technologies, it is likely that Earth can be relieved of its energy problems, huge numbers of raw materials can be made available, and the world's living standard can be raised.⁶⁸ All that humanity must find is the inspiration to exploit these resources.⁶⁹

1. The Moon

Earth's Moon has a surface area roughly equal to that of Africa, thus illuminating lunar colonization theorist Krafft Ehrlicke's characterization of the natural satellite as our "eighth continent."⁷⁰ As the first target for space settlement, the Moon has a definitive advantage in being the nearest major celestial body, accessible with extant chemical propulsion technology in a three-day voyage.⁷¹ It is also apparent that humans have the competence and ability to establish permanent lunar bases—after all, astronauts had piloted lunar craft before "VCRs, hand calculators, microwave ovens, or push-button telephones" had been invented.⁷²

The Moon's surface holds enormous quantities of "oxygen, silicon, iron, titanium, magnesium, calcium, and aluminum."⁷³ Although these minerals are bound tightly into rocks as oxides, they are still present and able to be used.⁷⁴ These natural resources grant the Moon a tremendous advantage as a target for settlement over geocentric orbital space, where no resources exist at all.⁷⁵ These minerals could be utilized to manufacture "consumables, rocket

⁶⁷ LEWIS, *supra* note 17, at xi.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 79.

⁷¹ *Id.* at 80.

⁷² *Id.* For those who believe that mankind does not yet have the technology to perform the task of lunar colonization, it should prove interesting that NASA's space shuttle still runs on computer chips (IBM 386s) that were outdated (by commercial consumer standards) in the early 1990s, and the installation of these chips were an upgrade that only took place in 1997, before which the Shuttle flew with ferrite-core, 1970s-era computers. *Id.* at 25. Furthermore, practical and feasible conceptions of lunar bases existed as early as the 1970s; the technology of the twenty-first century would obviously make these concepts more viable today. See Paul D. Lowman, *Lunar Bases: A Post-Apollo Evaluation*, in LUNAR BASES AND SPACE ACTIVITIES OF THE 21ST CENTURY 40 (1986).

⁷³ ZUBRIN, ENTERING SPACE, *supra* note 54, at 80.

⁷⁴ *Id.*

⁷⁵ *Id.*

propellants, power systems, and building or shielding materials” to support colonization of the Moon.⁷⁶ The lunar surface also contains sparse, but accessible, reserves of helium-3, an isotope that is virtually nonexistent in its natural form in the inner Solar System.⁷⁷ Helium-3 provides a number of significant advantages for fueling a thermonuclear fusion reactor (when combined with deuterium, it produces no radioactive waste),⁷⁸ thereby giving a potential lunar colony a source of cash export goods.⁷⁹ Combined with the fact that it is easier to launch spacecraft from the Moon’s surface than that of Earth due to the Moon’s weaker gravitational pull and its vacuum environment, the Moon may be the optimal point of departure for expeditions to other planets within our Solar System.⁸⁰

There are, however, obstacles to overcome. While lunar rocks and soils hold sufficient amounts of oxygen and numerous vital metals, the surface minerals are completely deficient in essential elements like “organics, hydrates, carbonates, nitrates, sulfates, phosphates, and salts.”⁸¹ The crucial biogenic elements—such as hydrogen, carbon, and nitrogen—exist on the lunar surface, but generally in exceptionally small quantities imbued by means of the solar wind.⁸² Furthermore, because virtually no atmosphere exists on the Moon, the lunar surface is unprotected against solar flares.⁸³ Thus, human settlements and agricultural greenhouses must be

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ ZUBRIN, ENTERING SPACE, *supra* note 54, at 87-88. The reaction of deuterium with helium-3 offers an economically cheap fusion reaction that is virtually free from radioactive waste. *Id.* The reaction produces no neutrons, which is important because neutrons from deuterium and tritium reactions cause damage to and create radioactive reactor walls. *Id.* at 87. The reaction creates 18 million electron volts of energy, or about ten million times more energy than a typical chemical reaction. *Id.* at 86-87. Thus, the first wall in a deuterium-helium-3 nuclear reactor will last much longer. *Id.* at 88. Moreover, since no steam pipes or lithium blanket will be needed to capture and release the neutron’s energy (since none are produced, unlike the deuterium-tritium reaction), the energy produced by the reactor can be converted directly into electricity at greater than twice the efficiency of any other nuclear generator system. *Id.* at 87-88.

⁷⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 80. Helium-3 is estimated to sell at \$1 billion per ton, but its “energy cost” is equivalent to selling oil at only \$7 a barrel. Kelly M. Zullo, *The Need to Clarify the Status of Property Rights in International Space Law*, 90 GEO. L.J. 2413, 2434 (2002). Furthermore, it is estimated that all of Earth’s electricity needs in the year 2000 could have been satisfied by 150 tons of helium-3. *Id.* at 2433-34.

⁸⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 80.

⁸¹ *Id.* at 81.

⁸² *Id.*

⁸³ *Id.*

located either beneath the surface or, if above ground, underneath glass domes with walls roughly ten centimeters in thickness.⁸⁴ This necessary structure makes the formation of considerable quantities of habitable living space and arable soil relatively complicated.⁸⁵ Given the complications of lunar bases and the already rising cost of space shuttle missions, new paradigms emerged in the 1980s and 1990s that sidestepped Moon bases altogether and suggested sending explorers directly to Mars.⁸⁶

2. Mars

Mars lies beyond the Moon⁸⁷ and is the crucial step in mankind's journey into the cosmos.⁸⁸ Inimitably among our Solar System's celestial bodies, Mars possesses all the resources necessary to sustain both life and the flowering of a technological civilization.⁸⁹ Mars' atmosphere exists in stark contrast to the relative desert of our Moon.⁹⁰ The Red Planet has "oceans of water frozen into its soil as permafrost, as well as vast quantities of carbon, nitrogen, hydrogen, and oxygen, all in forms readily accessible to those clever enough to use them."⁹¹ Since Mars has an atmosphere that protects the Martian surface against solar flares as well as a 24-hour day-night cycle, the Red Planet is the only celestial body in our Solar System that will

⁸⁴ *Id.*

⁸⁵ ZUBRIN, ENTERING SPACE, *supra* note 54, at 81. "Supergreenhousing" of lunar domes to scorching temperatures during the two-week lunar day as well as adaptation of terrestrial plants to grow "in the Moon's two-week light / two-week dark cycle" are both serious concerns. *Id.* Unless there is a breakthrough in genetic engineering, lunar crops must be grown utilizing artificial light; however, using artificial light sources to grow huge quantities of crops is nearly impossible. *Id.* Zubrin points out that the amount of sunlight that illuminates all plant life in the state of Rhode Island (which is not generally known for its foliage or agricultural industry) is approximately 2,000,000 MW, "which is comparable to the total electric power currently generated by all of human civilization." *Id.*

⁸⁶ Schultz, *supra* note 61, at 110.

⁸⁷ ZUBRIN, THE CASE FOR MARS, *supra* note 46, at xiv. Mars is fifty percent farther from the Sun than Earth and is the fourth planet in our Solar System. *Id.* Earth is also twice the size of Mars, but the two planets have roughly the same dry land area. HARTMANN, *supra* note 18, at 4.

⁸⁸ ZUBRIN, ENTERING SPACE, *supra* note 54, at 101.

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *Id.* Although there is a lack of liquid water on the surface, photographs taken from spacecraft reveal dry riverbeds, meaning that at some point in its history, Mars was a much warmer and wetter planet than it is at present. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at xiv. Now that scientists know that Mars was once a wet, warm planet, with "lakes, rivers, active volcanoes and a thick atmosphere—all conditions conducive to life," it is also believed that some microbes may still be alive in the liquid aquifers that lie deep beneath the permafrost. Davies, *supra* note 31, at A33.

easily permit sizable greenhouses to be lit by natural sunlight.⁹² Naturally lit greenhouses have the capability of supporting human settlements.⁹³

Already the United States has developed all of the technologies necessary for commencing an aggressive, ongoing campaign for human-lead Mars exploration, in which the first manned mission can reach Mars within ten years.⁹⁴ A general plan for Mars exploration shows that the first manned expedition will be performed by only four scientists who would be given equipment to survive a one-way trip and establish an initial colony.⁹⁵ By using a nuclear reactor and a rover vehicle to gather materials, astronauts could make their own oxygen,⁹⁶ grow food, and build new structures using Martian materials.⁹⁷ Pursuant to the plan, the colonists will be sent fresh supplies from the window opened by Earth and Mars' overlapping orbits every two years.⁹⁸ This early outpost could form the basis for a more ambitious colonization program in which new astronauts and new equipment would be sent to join the original pioneers.⁹⁹

Although the primary exploratory and base-building missions on

⁹² ZUBRIN, ENTERING SPACE, *supra* note 54, at 101. Earth and Mars' axes and days are comparable: Mars rotates on a 24-degree angle and revolves every 24 hours and 37 minutes, which are both nearly identical to that of Earth. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at xiv. A Mars year is 669 days long (which is equal to 686 Earth days), meaning that each Martian season is almost twice the length of the same season on Earth. *Id.*

⁹³ See ZUBRIN, ENTERING SPACE, *supra* note 54, at 101. For more information regarding the importance of naturally lit greenhouses and the deficiencies of artificially lit greenhouses, see *supra* note 85 and accompanying text.

⁹⁴ *Id.* at 102.

⁹⁵ Davies, *supra* note 31, at A33.

⁹⁶ *Id.* See also HARTMANN, *supra* note 18, at 5 (noting that breathing on Mars would be difficult at first because Mars' atmosphere is as thin as Earth's at 110,000 feet, where military spy planes can fly but oxygen is almost nonexistent, therefore necessitating explorers spending all their time outdoors in a spacesuit, and also because the frigid air ranges from 125 degrees below zero at night to thirteen degrees below zero in the afternoon); ZUBRIN, ENTERING SPACE, *supra* note 54, at 225-28 (discussing how man will have to drastically improve Mars' natural environment to create more Earthlike conditions—also known as “terraforming” Mars—by using artificial greenhouse gases to create an acceptable temperature, atmospheric pressure, and liquid surface water); ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 269-70 (explaining how “terraforming” Mars will eventually lead to the creation of an oxygen atmosphere that can support human life).

⁹⁷ Davies, *supra* note 31, at A33. Martian colonists, unlike the colonists anywhere else in the Solar System, will be able to dwell on the surface rather than in tunnels, and therefore grow crops in sunlight and travel freely on the planet. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 222. Mars, therefore, can develop a genuine civilization and not solely be used as a scientific settlement or mining colony. *Id.*

⁹⁸ Davies, *supra* note 30, at A33.

⁹⁹ *Id.*

Mars could be sustained by government funds, a successful colony must ultimately develop into an economically self-sufficient society.¹⁰⁰ Fortunately, Mars contains the resources to establish feasible human settlements and the means exist whereby colonies could generate the income necessary to further develop.¹⁰¹ Practically all components important to manufacturing and commerce exist on Mars,¹⁰² which gives the Red Planet an incredible advantage over the Moon and asteroids, because Mars can eventually be self-reliant in food and all essential, mass-produced simple manufactured goods.¹⁰³ Although in the beginning some advanced-technology Earth imports¹⁰⁴ will be necessary, a Martian colony could pay for these supplies by selling Earthlings resources, minerals, and ideas.¹⁰⁵

Similar to Earth,¹⁰⁶ Mars' geologic history has been complex, which has allowed the formation of rich mineral ores.¹⁰⁷ Unlike Earth, however, Mars has been devoid of humans scavenging every plentiful surface-mineral deposit for the past five millennia; abundant, unexploited deposits of "gold, silver, uranium, platinum, palladium, and other precious metals" likely lie on Mars' surface.¹⁰⁸

¹⁰⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 106-07.

¹⁰¹ *Id.* at 107-08.

¹⁰² *Id.* at 101.

¹⁰³ *Id.* at 107. All industrial metals, including copper, sulfur, and phosphorus—all of which are extraordinarily important to industrial society—exist in abundance on Mars, whereas the Moon is deficient in roughly half of the important industrial metals, including these three fundamental metals. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 220.

¹⁰⁴ Mike Allen & Greg Schneider, *Industry Hopes Soar with Space Plan*, WASH. POST, Jan. 16, 2004, at A1. The private oil and gas industry already recognizes the advantages to Mars exploration and colonization, as the industry would be called upon to develop the technology, "including the tools, the miniaturization, the drilling mechanism, the robotic systems and the control systems" necessary to drill on the Martian surface. *Id.*

¹⁰⁵ ZUBRIN, ENTERING SPACE, *supra* note 54, at 107.

¹⁰⁶ ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 220-21. Specifically, Mars' geologic history has been equated to that of Africa, including the confident conjecture that Mars contains comparable mineral wealth. *Id.*

¹⁰⁷ ZUBRIN, ENTERING SPACE, *supra* note 54, at 107. Early in its evolutionary history, Mars experienced massive internal melting, which helped form its compact core, mantle, and low-density silicate crust. LEWIS, *supra* note 17, at 147. Volcanic activity generated gases, which accumulated to form an atmosphere, hydrosphere, and weak magnetic field. *Id.* Geological activity that has been occurring for over 3.3 billion years is likely still ongoing today, meaning that ores are still forming. *Id.* at 150.

¹⁰⁸ ZUBRIN, ENTERING SPACE, *supra* note 54, at 107. If clusters of metals that have a value equal to or greater than silver, like "silver, germanium, hafnium, lanthanum, cerium, rhenium, samarium, gallium, gadolinium, gold, palladium, iridium, rubidium, platinum, rhodium, europium, and a host of others" are found on Mars, these metals could be exported to Earth for a considerable profit. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 223.

More importantly, Mars is also already known to hold an essential resource that will one day act as a profitable commercial export:¹⁰⁹ deuterium, a hydrogen isotope presently valued at roughly \$10,000 per kilogram, is five times as plentiful on Mars as it is on Earth.¹¹⁰ Deuterium is the essential fuel for fusion reactors, and when fusion eventually becomes the key to Earth's energy trade, deuterium's market will expand significantly.¹¹¹ Moreover, any inventions or innovations in the areas of energy, automation, robotics, and biotechnology, which would all be created to harvest resources and sustain life on Mars, could be sold to Earthlings for a profit.¹¹² Finally, an additional revenue source may come from the sale of developed and undeveloped *real estate* to colonists, business entities, and speculators.¹¹³

3. The Outer Planets of the Solar System

Although global industrialization is slowing the trend of increasing world population, it is probable that Earth's population will, at a minimum, double prior to stabilization.¹¹⁴ If the energy requirements of a developing human civilization are compared with the magnitude of those resources, it is certain that Earth and its Moon's energy reserves will be completely depleted in the next two centuries—even by totally ignoring the ecological problems connected with nuclear fission and burning fossil fuels.¹¹⁵ In the future, where mankind's energy needs will be tens to hundreds of times more than it is today, nuclear fusion will be the most cost efficient method of energy production.¹¹⁶ In roughly 100 years,

¹⁰⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 107.

¹¹⁰ *Id.* Deuterium's current market value means that it is seventy percent as valuable as gold or roughly fifty times more valuable than silver; but in a post-fusion economy, the price of deuterium will increase significantly. ZUBRIN, THE CASE FOR MARS, *supra* note 46, at 224.

¹¹¹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 107.

¹¹² *Id.* Since Mars will experience a rampant labor shortage similar to that faced by colonial America and the nineteenth-century United States (which previously propelled Yankee ingenuity and a deluge of inventions), on Mars the circumstances of severe labor shortage (blended with a technological society) will push Martian ingenuity to innovate and invent in the areas of energy, automation, robotics, and biotechnology. *Id.* All these inventions would be licensed to Earth and could finance Martian industry as its society revolutionizes terrestrial living standards as vigorously as America changed Europe in the 1800s and eventually the entire world. *Id.*

¹¹³ *Id.*

¹¹⁴ ZUBRIN, ENTERING SPACE, *supra* note 54, at 159.

¹¹⁵ *Id.* at 160.

¹¹⁶ *Id.*

nuclear fusion—using the deuterium-helium-3 reaction that produces no radioactive waste—likely will be mankind’s principal source of energy, and the giant outer planets likely will be known as “the Persian Gulf of the solar system,”¹¹⁷ since, apart from the Sun, the largest quantities of helium-3 within our Solar System reside on Jupiter, Saturn, Uranus, and Neptune.¹¹⁸ Although colonization of the outer giant planets is far into the future,¹¹⁹ it seems logical that whatever legal system prevails on Mars will also serve as a blueprint for the rest of our Solar System.

B. The Inadequacy of the United States’ Current Efforts

The United States has been poised to exploit its enormous preliminary advantage in space exploration ever since Neil Armstrong first walked on the Moon on July 20, 1969.¹²⁰ Instead of exploiting its initial lead through groundbreaking advances, such as building lunar bases, dispatching manned missions to Mars, and establishing permanent Martian bases, the United States has spent the last thirty years spinning in low-Earth orbit examining the effects of zero-G nausea.¹²¹ By choosing not to zealously explore outer space, the United States has left the door open for other nations to catch up, leap, and far exceed its successes. Such weakness and apathy has led to global power-shifting in the past, and with this knowledge in mind, can be avoided in the present.

The Ming Dynasty, for example, had the opportunity to exert its influence on all of Earth’s societies in the fifteenth century, but due to a lack of vision, turned its back on the world and became isolationist.¹²² “History,” as the well-known proverb reminds us, “repeats itself”.¹²³ the United States in the 1960s and 1970s had the opportunity to settle outer space, but due to politicking, reverted to remaining a terrestrial society.¹²⁴ Most recently, President George W.

¹¹⁷ *Id.*

¹¹⁸ LEWIS, *supra* note 17, at 205.

¹¹⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 158.

¹²⁰ NASA, *Apollo 11 30th Anniversary*, at

<http://www.hq.nasa.gov/office/pao/History/ap11ann/introduction.htm>
(last visited Sept. 12, 2004).

¹²¹ See Charles Krauthammer, *Our Goal in Space: To the Moon and Beyond*, DESERET NEWS (Salt Lake City, UT), Feb. 9, 2003, at AA02 (noting that the United States can honor the space shuttle Columbia’s astronauts by revamping the space program and its goals). See also *infra* notes 143, 166-167, and 171-172 and accompanying text for a discussion of NASA’s lack of exigency over the past three decades.

¹²² LEWIS, *supra* note 17, at 2-3; ZUBRIN, ENTERING SPACE, *supra* note 54, at 18-20.

¹²³ OXFORD DICTIONARY OF QUOTATIONS 602 (5th ed. 1999).

¹²⁴ LEWIS, *supra* note 17, at 3-4; ZUBRIN, ENTERING SPACE, *supra* note 54, at 9-14.

Bush revealed a new outer space vision,¹²⁵ but careful scrutiny of his plans shows that humanity's status as a terrestrial species is unlikely to change in the near future. It is time, however, for the United States to learn a lesson from the Ming Dynasty so that it does not share its fate.

1. The Historical Parallel of the Ming Dynasty in the Fifteenth Century to the United States in the Twenty-First Century

The European age of exploration began in 1419 with a Portuguese voyage to the Madeira Islands, which eventually led to the unlocking of Africa, India, the Americas, and East Asia by European political, economic, religious, and military influences.¹²⁶ European expeditions to all these areas eventually led to England, Spain, France, and Portugal exercising dominion over most of the world's populations.¹²⁷ Much of Earth became subjugated by European culture;¹²⁸ yet European domination of the world was not inevitable.¹²⁹

Beginning sometime between 1403 and 1405, Emperor Yung Lo of Ming China dispatched his navy on a succession of exploratory journeys that brought ships in the fleet to Java, Sumatra, Ceylon, Siam, the East Indies, the Maldive Islands, the Persian Gulf, the Red Sea, Mogadishu in Somaliland, and even to the coast of Zanzibar.¹³⁰ The Indian, Arabian, and East African coasts were opened to Chinese trade.¹³¹ Later Ming expeditions proceeded to round the Cape of Good Hope and head north to the bulge of West Africa.¹³² Yet, just as China was about to discover the Mediterranean Sea and become the first global civilization, the Emperor passed away, allowing Confucian bureaucrats—who disdained the new ideas that accompanied world exploration and meetings with new cultures—to recall the fleet, command an end to exploration, and order the destruction of the ships.¹³³ By 1433, China had once again become isolated from the

¹²⁵ *Excerpts from Bush's Speech on the Exploration of Space*, *supra* note 23, at A26.

¹²⁶ LEWIS, *supra* note 17, at 2.

¹²⁷ *Id.*

¹²⁸ *Id.* at 3. Indeed, the United States, Canada, Australia, New Zealand, India, and many African nations came to speak English; West Africa came to speak French; and the Americas south of the Rio Grande through Antarctica became dominated by the Spanish and Portuguese. *Id.* at 2.

¹²⁹ *Id.* at 3.

¹³⁰ LEWIS, *supra* note 17, at 3; ZUBRIN, *ENTERING SPACE*, *supra* note 54, at 18.

¹³¹ LEWIS, *supra* note 17, at 3.

¹³² *Id.*

¹³³ *Id.*; ZUBRIN, *ENTERING SPACE*, *supra* note 54, at 19.

rest of the world.¹³⁴ China stood to become the dominant power on Earth and Mandarin Chinese the single language of the world when it decided to give up her enormous preliminary advantage while Europe leaped forward by embracing and generating new ideas.¹³⁵

The United States now faces similar choices in the beginning of the twenty-first century.¹³⁶ The United States, like the Ming Dynasty, has completed great expeditions: twelve astronauts have walked on the Moon, and fleets of exploratory spacecraft have mapped the Moon and Mars and have even sailed by the giant outer planets of Jupiter, Saturn, Uranus, and Neptune.¹³⁷ Also like the Chinese fleet's news of riches in Africa and India, reports of the extraordinary riches available in outer space in the forms of energy, natural resources, and raw materials have trickled into the mainstream of American society.¹³⁸ Most unfortunately, just as the death of the Ming emperor signaled an end to Chinese greatness, the death of space's champion—President John F. Kennedy—vanquished his leadership and caused NASA to flounder without progress or goals for the last three and a half decades.¹³⁹

Throughout the 1960s, the United States Space Program was infinitely more fruitful than it is at present because NASA had direction—landing Americans on the Moon.¹⁴⁰ President Kennedy set forth his exploratory goals and space leadership in his 1962 speech to Rice University.¹⁴¹

We choose to go to the Moon! We choose to go to the Moon in this decade and do the other things, not because they are easy but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win . . . This is in some measures an act of faith and vision, for we do not know

¹³⁴ LEWIS, *supra* note 17, at 3.

¹³⁵ *Id.*; ZUBRIN, ENTERING SPACE, *supra* note 54, at 20.

¹³⁶ *See* LEWIS, *supra* note 17, at 3.

¹³⁷ *Id.*

¹³⁸ *Id.* at 4.

¹³⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 10. *See also* Charles Krauthammer, *A Modest Proposal*, WASH. POST, Jan. 16, 2004, at A19 (recognizing that President Bush's new space proposal attempts to reconfigure a "totally dysfunctional government agency" that "gave us the glory of Apollo, then spent the next three decades twirling around in space in low Earth orbit studying zero-G nausea"); Frank Sietzen Jr. & Keith L. Cowing, *Beyond the Moon: Inside Bush's Space Plan*, U.P.I., Jan. 16, 2004, at Part 3 of 3 (reporting that both Republicans and Democrats have recently questioned NASA's vision, or lack thereof).

¹⁴⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 10.

¹⁴¹ *Id.* at 12

what benefits await us But space is there and we are going to climb it.¹⁴²

With President Kennedy's mandate in place, NASA managed to make it to the Moon two years before its deadline.¹⁴³ President Kennedy required *results* from NASA.¹⁴⁴

The 1960s also provided the unique historical backdrop for steady imperative success,¹⁴⁵ as the Cold War was a crucial component presenting exigency to NASA's programs throughout the decade.¹⁴⁶ Although the competition between the United States and the Soviet Union did not *cause* the Apollo program, it did provide the decisive motivation required to marshal the American political system's backing.¹⁴⁷

With the goals of settling outer space firmly in place and the nation mobilized around the common socio-political goal of defeating the Russians in the Cold War, an assembly of National Security and State Department officials sought to quash President Kennedy's plans and eliminate this inspirational force.¹⁴⁸ To do so, these officials initiated, negotiated, and pushed through ratification of the 1967 Space Treaty.¹⁴⁹ The 1967 Space Treaty prohibits any country from asserting sovereignty over any celestial body, thereby eradicating global international rivalry as a key ingredient in space exploration.¹⁵⁰ The intent of the 1967 Space Treaty's authors was to eliminate outer space from the galvanized sphere of Cold War politics, thereby collapsing the space program so that its funding could be reallocated to other projects.¹⁵¹ Two years after the Treaty's

¹⁴² *Id.*; ZUBRIN, THE CASE FOR MARS, *supra* note 46, at xiii.

¹⁴³ LEWIS, *supra* note 17, at 158. It is also significant that in 1964, when NASA had not yet put a man on the Moon, it already had a detailed schedule for building a lunar base in the 1970s, dispatching its first manned mission to Mars in 1980, constructing a permanent base on the Red Planet by the late 1980s, and sending astronauts to explore Jupiter's moons by 2001. *Id.*

¹⁴⁴ ZUBRIN, ENTERING SPACE, *supra* note 54, at 11.

¹⁴⁵ *Id.* at 12.

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 12. For more information regarding the 1967 Space Treaty, see *infra* notes 188-213 and accompanying text.

¹⁵⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 12.

¹⁵¹ *Id.* In a December 9, 1966, classified secret memo entitled "Space Goals after the Lunar Landing," which was prepared by the State Department and released for discussion by Secretary of State Dean Rusk, the motivation for proposing the 1967 Space Treaty was revealed for the first time due to the 1997 Freedom of Information Act:

[W]e see no compelling reasons for early, major commitments to such

ratification, NASA's funding plunged twenty-six percent; four years later, financial support decreased by forty-five percent; and funding for the space program was down sixty percent within six years.¹⁵²

The 1967 Space Treaty was devastating because it sapped away the drive that the final two decades of the Cold War could have sparked for space exploration.¹⁵³ Had the Apollo program's momentum continued, the United States would likely have set up permanent bases on the Moon and Mars during the 1980s, and the United States would likely be a multi-planet civilization today, with humanity being a multi-planet species.¹⁵⁴ No President or Congress since President Kennedy has given NASA firm goals, adequate funding, or any necessity for imminent and imperative success due to international competition.¹⁵⁵ Hence, the remaining sizeable space projects, like the International Space Station, have continued to limp along in the name of international cooperation.¹⁵⁶ The problem is that competitions like the Space Race—not global cooperation—have proven to compel the greatest accomplishments in outer space.¹⁵⁷

2. President George W. Bush's Space Plan is Inadequate to Galvanize Immediate Space Exploration and Colonization

President Bush's space program, with its goal of returning to the Moon by 2020 and using a lunar base as a stepping-stone to Mars, may provide some direction to NASA and reinvigorate the drive for colonizing the Moon and Mars.¹⁵⁸ It is more likely, however, to fail, be delayed, or have severe cost overruns—just like every other great

[space exploration] goals, or for pursuing them at the forced pace that has characterized the race to the moon. Moreover, if we can de-emphasize or stretch out additional costly programs aimed at the moon and beyond, resources may to some extent be released for other objectives [W]hether our over-all space effort can be prudently conducted at a more deliberate pace in the future may depend in part on de-fusing the space race between the U.S. and the Soviets.

Id. at 13. For more information regarding President Lyndon Baines Johnson's view of the 1967 Space Treaty, see *infra* note 203.

¹⁵² ZUBRIN, ENTERING SPACE, *supra* note 54, at 14. "While rising GNP since the early 1980s has allowed U.S. space absolute expenditures to gradually drift back up to Apollo levels, they remain a much smaller portion of the national budget, and, more important, the apparent urgency for accomplishment has been removed." *Id.*

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *See id.*

¹⁵⁶ ZUBRIN, ENTERING SPACE, *supra* note 54, at 14.

¹⁵⁷ *See id.* at 9-14.

¹⁵⁸ Sanger & Stevenson, *supra* note 24, at A1.

space initiative since President Kennedy's clear vision for outer space exploration—than be a clear success.¹⁵⁹ President Bush's plan is strikingly similar to the plan his father proposed in 1989, which was a disaster due to escalating mission costs of over \$400 billion.¹⁶⁰ Furthermore, President Bush's plan defers the need for spending increases until well after his second term in office ends.¹⁶¹ Essentially, President Bush has promised a return voyage to the Moon, but left future presidents to deal with the prospectively huge costs of such a program.¹⁶² Finally, President Bush's plan to use the Moon as a base before venturing to Mars has already been recognized as a potentially extremely costly sideshow in terms of both time and money—especially given the desert-like conditions on the Moon—while delaying the premier event: Mars.¹⁶³ As such, President Bush's new space program has been met with skepticism within the scientific community.¹⁶⁴

Most space initiatives sail off course due to insufficient discipline and sincerity.¹⁶⁵ First, to develop the technology necessary to meet President Bush's goals, NASA and the space program must be restructured to become more focused than it has been for the last thirty years.¹⁶⁶ Second, NASA must also see an era of technological advance and savvy management that has not been seen since Presidents Kennedy and Lyndon Baines Johnson's leadership from 1961 to 1966.¹⁶⁷ Third, any space program that has goals more than

¹⁵⁹ William J. Broad, *Bold Visions, Many Pitfalls*, N.Y. TIMES, Jan. 15, 2004, at A1.

¹⁶⁰ *Id.* The first President Bush's plan for a manned mission to Mars was never even presented to Congress. LEWIS, *supra* note 17, at 158-59.

¹⁶¹ Broad, *supra* note 159, at A1.

¹⁶² *Bush's Space Vision Thing*, N.Y. TIMES, Jan. 15, 2004, at A32. Future presidents' problems will be exacerbated by their need to manage severe revenue losses caused by President Bush's tax cuts. *Id.*

¹⁶³ Davies, *supra* note 31, at A33.

¹⁶⁴ Broad, *supra* note 159, at A1.

¹⁶⁵ *Id.*

¹⁶⁶ *Id.* NASA has been criticized for focusing too much on the "Administration" portion of its name rather than the "National Aeronautics and Space" portion, considering that it has operated as an entitlement program rather than as an aggressive trendsetter and trailblazer for the last thirty years. LEWIS, *supra* note 17, at 159.

¹⁶⁷ Broad, *supra* note 159, at A1. It is significant that NASA has made space less accessible today than it was when President Kennedy first called for space exploration in 1961, as spaceflight costs have risen, rather than fallen, with experience. LEWIS, *supra* note 17, at 159. Moreover, with President Bush's proposal targeting a date of 2020 for a lunar landing, and the current year being 2004, that leaves sixteen years between his directive and the mission completion date. See Sanger & Stevenson, *supra* note 24, at A1. Given that it only took NASA eight years to successfully send a man to the Moon after President Kennedy outlined his vision of a

ten years away is doomed to fail because it is beyond any politician's horizon, and therefore will lack the excitement and formation of political constituencies to support the program.¹⁶⁸ Fourth, President Bush's plan—unlike President Kennedy's Cold War call to excellence—tackles no national political issue, and may have been an election year ploy and a dangerous hedge against the possibility that China will journey to the Moon.¹⁶⁹

Furthermore, if the history of cooperation in the space program is any indication of success, President Bush has likely already steered the United States down the wrong path¹⁷⁰ by calling his vision “a journey, not a race” and by calling on “other nations to join us on this journey in a spirit of cooperation and friendship.”¹⁷¹ The International Space Station—the bastion of cooperation in space—has been a fiscal and schedule disaster, with cost overruns between \$30 and \$100 billion and a final timeframe of sixteen years, neither of which President Ronald Reagan envisioned when he called for the station to be built in 1984 for \$8 billion and to be completed within a decade.¹⁷² Certainly, cooperation can be useful, since groups may achieve jointly what no nation could ever achieve single-handedly.¹⁷³ Solely from a funding and resources standpoint, the ability for all nations with significant space programs to unite their efforts presents an unparalleled opportunity for mankind to achieve great deeds in space very shortly.¹⁷⁴ *Cooperation alone, however, can never stimulate progress.*¹⁷⁵ Moreover, mankind's greatest achievements in space have

lunar landing in 1961, “[w]e are twice as far from the Moon now as we were in 1961. How the mighty have fallen!” LEWIS, *supra* note 17, at 158 (emphasis in original). See also Donald Lambro, *To Mars . . . and Beyond*, WASH. TIMES, Jan. 19, 2004, at A16 (noting that the Apollo Program of the 1960s was truly stunning since NASA developed most of the plans, vehicles, and procedures for that program from scratch in eight short years).

¹⁶⁸ Broad, *supra* note 159, at A1.

¹⁶⁹ *Id.*

¹⁷⁰ See *id.*

¹⁷¹ Sanger & Stevenson, *supra* note 24, at A1. Under President Bush's space initiative, the International Space Station will remain a priority until 2010 so that the United States can fulfill its obligations to its fifteen international partners—and, consequently, will continue to drain valuable resources that could be used immediately for a mission to the Moon or, more importantly, Mars. See *Excerpts from Bush's Speech on the Exploration of Space*, *supra* note 23, at A26.

¹⁷² Broad, *supra* note 159, at A1; see also Lambro, *supra* note 167, at A16 (calling the International Space Station a “glorified Tinker Toy in search of a mission”); Krauthammer, *supra* note 139, at A19 (calling the International Space Station a “financial sinkhole whose only purpose is its own existence”).

¹⁷³ ZUBRIN, ENTERING SPACE, *supra* note 54, at 14.

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

been due to competition and the Space Race.¹⁷⁶ Likewise, because all of the space treaties are built upon the foundation of international cooperation,¹⁷⁷ one can easily see how they destroyed the United States' drive for unrelenting, progressive space exploration and colonization. Without adequate incentives and legal certainty to reap the fruits of one's labor, the 1967 Space Treaty has halted all space exploration that focuses on development and exploration.

II. THE CURRENT STATUS OF SPACE LAW

On October 4, 1957, the Soviet Union launched its first Sputnik satellite into orbit, forever awakening the world to the legal repercussions of space activities.¹⁷⁸ Immediately thereafter, the United States Representative to the United Nations requested that the General Assembly establish an ad hoc Committee on the Peaceful Uses of Outer Space ("COPUOS").¹⁷⁹ The request was granted in 1958, and COPUOS became a permanent United Nations body in 1959.¹⁸⁰ Eventually, the committee became responsible for extending the United Nations Charter into international space law.¹⁸¹ As a result of its efforts, COPUOS has created the foundation for modern space law by crafting five major treaties that enumerate various principles governing activities in space: (1) the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies [hereinafter "1967 Space Treaty"];¹⁸² (2) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer

¹⁷⁶ See *id.* at 9-14.

¹⁷⁷ See *infra* notes 189, 221, and 241 and accompanying text for discussions of the overarching principle of cooperation in the space treaties.

¹⁷⁸ NASA, *Sputnik and the Dawn of the Space Age*, at <http://www.hq.nasa.gov/office/pao/History/sputnik> (last visited Apr. 2, 2004); see also MANFRED LACHS, *THE LAW OF OUTER SPACE* 1 (1972) (recounting the list of explorers who made the first voyages into outer space, including the dog Layka, the chimpanzee Eros, the cosmonaut Yuri Gagarin, and astronauts Alan B. Shepherd and Virgil Grissom).

¹⁷⁹ See generally Phillip C. Jessup & Howard J. Taubenfeld, *The United Nations Ad Hoc Committee on the Peaceful Uses of Outer Space*, 53 AM. J. INT'L LAW 877 (1959) (explaining the formation and history of COPUOS).

¹⁸⁰ See G.A. Res. 1472, U.N. GAOR, 14th Sess., Supp. No. 10, at 5, U.N. Doc. A/4354 (1959).

¹⁸¹ See BRUCE A. HURWITZ, *THE LEGALITY OF SPACE MILITARIZATION* 10-24 (1986). For a complete discussion of the history and organization of COPUOS, see CARL Q. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 13-20 (1982).

¹⁸² Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410 (entered into force with respect to the United States Oct. 10, 1967) [hereinafter "1967 Space Treaty"].

Space [hereinafter "1968 Rescue Agreement"];¹⁸³ (3) The Convention on International Liability for Damage Caused by Space Objects [hereinafter "1972 Liability Convention"];¹⁸⁴ (4) The Convention on Registration of Objects Launched into Outer Space [hereinafter "1975 Registration Convention"];¹⁸⁵ and (5) the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies [hereinafter "1979 Moon Treaty"].¹⁸⁶ Of these, the two agreements most directly relevant to the colonization of celestial bodies and the exploitation of resources are the 1967 Space Treaty and the 1979 Moon Treaty.¹⁸⁷

A. *The 1967 Space Treaty*

The 1967 Space Treaty is the keystone space law treaty on which the other four space treaties are based.¹⁸⁸ The 1967 Space Treaty provides a number of overarching principles intended to guide space exploration and utilization, including that (1) there should be international cooperation to reserve space exploration and use for peaceful purposes, including demilitarization; (2) international law, including the basic principles of the United Nations Charter, applies to space activities; (3) space should be free for use and exploration by all; (4) States retain sovereign rights over space objects launched by them; and (5) both space and celestial bodies are not subject to national appropriation.¹⁸⁹ The final and most important principle, i.e., that nations cannot appropriate portions of space, stems from

¹⁸³ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, April 22, 1968, 19 U.S.T. 7570 (entered into force with respect to the United States Dec. 3, 1968) [hereinafter "1968 Rescue Agreement"].

¹⁸⁴ Convention on International Liability for Damage Caused by Space Objects, Sept. 1, 1972, 24 U.S.T. 2389 (entered into force with respect to the United States on Oct. 9, 1973) [hereinafter "1972 Liability Convention"].

¹⁸⁵ Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695 (entered into force with respect to the United States Sept. 15, 1976) [hereinafter "1975 Registration Convention"].

¹⁸⁶ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 18 I.L.M. 1434 (entered into force Jul. 11, 1984) [hereinafter "1979 Moon Treaty"].

¹⁸⁷ See 1967 Space Treaty, *supra* note 182, at Art. I-IV; 1979 Moon Treaty, *supra* note 186, at Art. I-11.

¹⁸⁸ See BESS C.M. REIJNEN, THE UNITED NATIONS SPACE TREATIES ANALYZED 85 (1992).

¹⁸⁹ GENNADY ZHUKOV & YURI KOLOSOV, INTERNATIONAL SPACE LAW 39-40 (Boris Belitzky trans., Praeger Publishers 1984). Zhukov and Kolosov also identify principles of international responsibility for a State's space activities, the prevention of potentially harmful experiments in space, and assistance to astronauts in the event of a malfunction or disaster, as present in the 1967 Space Treaty. *Id.* at 40.

the idea that outer space is *res communis*.¹⁹⁰

The Romans applied *res communis* to community property (i.e., things that were not subject to dominion and control and therefore not legally property, like air and flowing water).¹⁹¹ Under Roman law, the idea of *res communis* sharply contrasted that of *res nullius*¹⁹²—the view that certain property, while not yet possessed by any one individual, was still fully capable of possession.¹⁹³ In the negotiations of the 1967 Space Treaty, both developed nations (those with space-faring technology) and undeveloped nations (those without space-faring technology) supported a community property-based treaty that prevented any country from declaring sovereignty over any celestial

¹⁹⁰ Ty S. Twibell, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 UMKC L. REV. 589, 618 (1997).

¹⁹¹ Lynda L. Butler, *The Commons Concept: An Historical Concept with Modern Relevance*, 23 WM. & MARY L. REV. 835, 847 & n.50 (1982). Butler delineated the two main branches that developed in Roman law: the *jus publicum* and the *jus privatum*. *Id.* at 847. The *jus publicum* was the public law controlling interactions between the citizen and the state; the *jus privatum* was the law controlling interaction between individuals. *Id.* The *jus privatum* also regulated property rights. *Id.* To do so, the *jus privatum* classified property according to whether it was *in commercio* (i.e., within one's estate or sphere of trade), or whether it was *extra commercium* (i.e., outside of one's estate or sphere of trade). *Id.* The nature of the *extra commercium* property determined whether an individual could exercise dominion and control over the property. *Id.* The four categories were:

- (1) *Res divine*, or things dedicated to and vested in the control of the gods;
- (2) *Res publicae*, or things open for public use and subject to state regulation, but incapable of exclusive individual ownership;
- (3) *Res omnium communes*, or things legally not property because they were incapable of dominion and control; and
- (4) *Res nullius*, or things not possessed by an individual but capable of possession.

Id. The latter concepts of *res communis* and *res nullius* will be most important to how rights in space should be allocated.

¹⁹² Arthur W. Blaser, *The Common Heritage in its Infinite Variety: Space Law and the Moon in the 1990s*, 5 J.L. & TECH. 79, 81 (1990). Furthermore, even in the modern world, nations assessing global commons have applied the fundamental international legal concepts of *res nullius* and *res communis* to those areas. Douglas Miller, *Who Has the Right of Exploitation, and the Right to Prevent Exploitation, of the Minerals in Antarctica?*, 79 AM. SOC'Y INT'L L. PROC. 58, 65 (1985). *Res nullius*, which international lawyers translate to mean "property belonging to no one," indicates that such property is capable of appropriation or exploitation by any nation, organization, or individual able to perform those acts. *Id.* Nations asserting internationally-recognized claims over uninhabited lands must demonstrate sovereignty through "discovery (which establishes claim to title), and effective occupation through permanent settlement . . . (which establishes proof to title)." *Id.* Once this international practice is complete, *res nullius* lands become property owned by a sovereign. *Id.* *Res communis*, on the other hand, is a signal to international lawyers that suggests the property in question cannot be owned by anyone and can be used by everyone. *Id.* Territories regarded as *res communis* cannot be appropriated by private individuals; nor can they be claimed by any sovereign or nation. *Id.*

¹⁹³ Butler, *supra* note 191, at 847.

body (including the Moon) and that called for the continued peaceful exploration of space.¹⁹⁴ In essence, both developed and developing nations supported the *res communis* approach to property recognized by international lawyers.¹⁹⁵ Developed countries like the United States and the Soviet Union supported the *res communis* theory of property to protect themselves against the possibility that the other might reach the Moon first and claim sovereignty over it, thereby becoming the dominant property owner in space¹⁹⁶ and also achieving a military advantage.¹⁹⁷ Developing countries, on the other hand, advocated a *res communis* approach to outer space¹⁹⁸ due, in part, to the principles of open and common access to resources and celestial bodies,¹⁹⁹ as well as the fact that the non-space powers would no longer have to risk completely losing out on the opening of an untainted frontier.²⁰⁰ Furthermore, by declaring outer space and its celestial bodies as *res communis*,²⁰¹ the 1967 Space Treaty attempted to preclude any chance of Earth-style colonialism from expanding into outer space.²⁰² Finally, developing countries also desired that the arms race of the Cold War stay on Earth and not be extended into outer space, thereby allowing only peaceful and freely accessible uses of space.²⁰³

¹⁹⁴ BIN CHENG, *STUDIES IN INTERNATIONAL SPACE LAW* 220 (1997); JASENTULIYANA, *supra* note 58, at 131-35; see also Heidi Keefe, *Making the Final Frontier Feasible: A Critical Look at the Current Body of Outer Space Law*, 11 SANTA CLARA COMPUTER & HIGH TECH. L.J. 345, 360 (1995) (noting that every world leader who helped negotiate the 1967 Space Treaty backed the view that outer space would be characterized as *res communis* so as to permit for the broadest access to space for exploration, use, and exploitation).

¹⁹⁵ See Blaser, *supra* note 192, at 81 (defining *res communis* as “property of the community, not subject to appropriation or sovereignty”).

¹⁹⁶ Glenn H. Reynolds, *International Space Law: Into the Twenty-First Century*, 25 VAND. J. TRANSNAT’L L. 225, 230 (1992).

¹⁹⁷ Twibell, *supra* note 190, at 612.

¹⁹⁸ See JASENTULIYANA, *supra* note 58, at 135 (noting that developing countries played a major role in drafting the 1967 Space Treaty, especially in designating outer space as a part of the global commons).

¹⁹⁹ Kevin V. Cook, *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO. INT’L ENVTL. L. REV 647, 662-63 (1999).

²⁰⁰ Reynolds, *supra* note 196, at 230. Reynolds also recognizes that the United States and Soviet Union avoided the resentment that Third World nations were starting to feel over the possibility of superpower expansion into an area not accessible to any other nation, resentments that could have impacted Cold War diplomacy. *Id.*

²⁰¹ Twibell, *supra* note 190, at 618.

²⁰² CHENG, *supra* note 194, at 229; Keefe, *supra* note 194, at 346. Keefe also notes that the 1967 Space Treaty represented a vision of all mankind working in harmony while exploring outer space and developing its resources; thus it was an attempt for the entire world to work in accord to reach a common goal. *Id.*

²⁰³ JASENTULIYANA, *supra* note 58, at 132-33. Interestingly, President Lyndon Baines Johnson primarily viewed the 1967 Space Treaty as an arms control

In the final version of the 1967 Space Treaty, *res communis* was explicitly articulated in the Preamble and Articles I and II, and implicitly expressed in Articles III and IV.²⁰⁴ The Preamble highlights the “prospects” and “common interest” of mankind, and recommends that the “exploration and use of outer space” are to be “for the benefit of all peoples.”²⁰⁵ Article I reiterates the intentions stated in the Preamble, stating that “the exploration and use of outer space . . . 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*.”²⁰⁶ Article II eliminates and outlaws any claims of “national appropriation by claim of sovereignty [or] by means of use or occupation” in outer space and its celestial bodies.²⁰⁷ Article III demonstrates a respect for the *res communis* concept in international law by declaring that parties to the Treaty shall conduct their activities in outer space “in accordance with international law” and “in the interest of maintaining international peace and security.”²⁰⁸ Article IV, by extension of its proclamation that “the moon and other celestial bodies shall be used . . . exclusively for peaceful purposes,” may be read as a *res communis* section in that it prohibits weapons of mass destruction in outer space;²⁰⁹ hence, any nation’s efforts to apportion outer space for non-peaceful uses or lay claim to property rights in a geostationary orbit²¹⁰ for aggressive military uses are expressly prohibited.²¹¹ The

agreement. Blaser, *supra* note 192, at 90. President Johnson called the Treaty “the most important arms control development since the limited test ban treaty of 1963” and showed his enthusiasm for this project by holding a signing ceremony on January 27, 1967, at the White House for sixty State’s representatives. *Id.* For more information regarding the influence of Cold War politics on the 1967 Space Treaty, see *supra* notes 149-154 and accompanying text.

²⁰⁴ See generally 1967 Space Treaty, *supra* note 182.

²⁰⁵ 1967 Space Treaty, *supra* note 182, at Preamble.

²⁰⁶ *Id.* at Art. I (emphasis added).

²⁰⁷ *Id.* at Art. II.

²⁰⁸ See *id.* at Art. III.

²⁰⁹ See *id.* at Art. IV.

²¹⁰ For a brief definition and discussion of geostationary orbits, see Charles Biblowit, *International Law and the Allocation of Property Rights in Common Resources*, 4 N.Y. INT’L L. REV. 77, 83 (1991) (defining the geostationary orbit as “a band, 22,300 miles above the equator, in which satellites travel at the same speed as the earth rotates, therefore remaining in a fixed position in relation to the earth,” and noting that this orbit is most desirable for communications satellites, because three properly located satellites can allow a nation to send signals to the entire globe).

²¹¹ 1967 Space Treaty, *supra* note 182, at Art. IV. Both Susan Buck and Nandasiri Jasentuliyana recognize that the Treaty likely permits non-aggressive military uses of outer space. BUCK, *supra* note 21, at 148; JASENTULIYANA, *supra* note 58, at 104.

fact that ninety-eight states have ratified the 1967 Space Treaty²¹² is a testament to the steadfastness of the general principles advocated by the Treaty and the degree to which it has provided space law with a practical foundation.²¹³

B. The 1979 Moon Treaty

In 1970, Professor A.A. Cocca, Argentina's representative to COPUOS, perceived the need for a new treaty governing the use of outer space resources immediately after the United States Apollo program returned from the Moon with lunar samples.²¹⁴ Cocca, noting that "the use of the Moon's natural resources had already begun," was disturbed by the seemingly apparent exploitation of significant quantities of lunar resources.²¹⁵ Cocca thus offered a proposal to COPUOS that would protect the interests of all parties: he submitted a draft proclaiming that "the natural resources of the moon and other celestial bodies shall be the common heritage of mankind."²¹⁶ Although the Common Heritage of Mankind concept extends from the Roman law idea of *res communis*,²¹⁷ it is really a new type of property that Latin American lawyers identify as *res communis humanitatus*.²¹⁸ Proponents of the Common Heritage of Mankind

²¹² United Nations Office of Outer Space Affairs, *United Nations Treaties and Principles on Space Law*, available at <http://www.oosa.unvienna.org/SpaceLaw/treaties.html> (last visited Mar. 9, 2004) [hereinafter "Status of International Agreements"].

²¹³ See Fred Kosmo, *The Commercialization of Space: A Regulatory Scheme that Promotes Commercial Ventures and International Responsibility*, 61 S. CAL. L. REV. 1055, 1070-72 (1988). Kosmo posited that the language regarding the commitment of space to "the benefit of all mankind," although not binding law, is a legitimate expression of policy aimed towards avoiding conflict and improving mankind's general welfare. *Id.* The 1967 Space Treaty is also considered by some to be "a landmark in the establishment and progressive development of . . . international space law." ZHUKOV & KOLOSOV, *supra* note 189, at 38.

²¹⁴ David Everett Marko, *A Kinder Gentler Moon Treaty: A Critical Review of the Current Moon Treaty and a Proposed Alternative*, 8 J. NAT. RESOURCES & ENVTL. L. 293, 301-02 (1993); Grier C. Raclin, *From Ice to Ether: The Adoption of a Regime to Govern Resource Exploitation in Outer Space*, 7 NW. J. INT'L L. & BUS. 727, 735 (1986). For more details on the origins of the 1979 Moon Treaty, see CHENG, *supra* note 202, at 358-62; REIJNEN, *supra* note 188, at 279-85.

²¹⁵ Marko, *supra* note 214, at 301 & n.60.

²¹⁶ *Id.* at 302. Although Professor Cocca was responsible for introducing the Common Heritage of Mankind principle into space law, *id.* at 301-02, the concept was first advanced as a principle of international law in 1967 by Arvid Pardo, Maltese ambassador to the United Nations, to govern deep sea resources. Raclin, *supra* note 214, at 737.

²¹⁷ See REIJNEN, *supra* note 188, at 3.

²¹⁸ See Blaser, *supra* note 192, at 81. Buck describes *res communis humanitatus* as "a wholly new concept of property rights, a modern alternative to the traditional ideas

principle categorize some resources as belonging to all of humanity, and since the global population already holds the property rights in these resources, no individual or State can legally appropriate them.²¹⁹ *Res communis humanitatus* allows property to be used,²²⁰ which notably was an idea that was not part of the original *res communis* theory of property, and imposes additional requirements as well, such as common administration of Common Heritage areas as well as peaceful and equitable use of and access to those areas.²²¹

By explicitly adding the Common Heritage concept into the realm of space law,²²² it soon became apparent that the non-space powers truly envisioned a realm of space law vastly different than what the space-faring nations supported.²²³ Non-space faring nations still feared that developed countries would dominate space through commercialization, lunar mining, and colonization.²²⁴ The 1979 Moon Treaty gave Third World nations the instrument to establish their premise that the *res communis* doctrine should be extended beyond the most important principles of the 1967 Space Treaty (i.e., using outer space for peaceful purposes, restricting any form of national appropriation, prohibiting aggressive military uses of outer space, and applying international law to outer space activities)²²⁵ and into the realm of *res communis humanitatus* by outlawing property rights in every celestial body, absent the establishment of an international regime.²²⁶ The non-space powers helped implement a

of exclusive ownership or of free and unlimited access.” BUCK, *supra* note 21, at 28.

²¹⁹ *Id.*

²²⁰ See REIJNEN, *supra* note 188, at 3.

²²¹ Blaser, *supra* note 192, at 82.

²²² See 1979 Moon Treaty, *supra* note 186, at Art. 11. The Common Heritage of Mankind principle is principally embodied by Article 11 of the 1979 Moon Treaty. See CHENG, *supra* note 194, at 365; REIJNEN, *supra* note 188, at 280; Raclin, *supra* note 225, at 736; Keefe, *supra* note 202, at 355.

²²³ See Eric Husby, *Sovereignty and Property Rights in Outer Space*, 3 J. INT'L L. & PRAC. 359, 368-70 (1994) (comparing the socialist-inspired views of developing nations with the views of developed nations based on the writings of John Locke and Rousseau).

²²⁴ See Twibell, *supra* note 190, at 599. Twibell also elucidates the opinion of Professor Reynolds, who believes that the 1979 Moon Treaty embodied the beliefs of a then-influential faction of developing-state economists who perceived Third World economic difficulties as a result of Western exploitation. *Id.* These economists pushed for a “New International Economic Order” that sought to forbid claims of national sovereignty and private property rights. *Id.* Any for-profit utilization of space resources would be the province of a monopolistic international association that would guarantee that portions of all profits were forwarded to developing states. *Id.* at 599-600.

²²⁵ See *supra* notes 204-211 and accompanying text for a discussion of the 1967 Space Treaty's *res communis* principles.

²²⁶ See Raclin, *supra* note 214, at 736. Raclin notes that the 1979 Moon Treaty

treaty in which all countries would help to manage outer space,²²⁷ and the benefits resulting from exploitation of space resources would be divided equally amongst all nations, *regardless of their level of participation.*²²⁸

Originally, the United States supported the Common Heritage concept, but its support soon eroded in wake of the expectations of Third World nations.²²⁹ When the United States changed its position, it instead supported the view that Common Heritage only meant that access to common territory would be available to all.²³⁰ The United States' primary concern was that the incorporation of Common

requires explicit duties from parties exploring the Moon or exploiting lunar resources, *id.*, which is a foundational element of the Common Heritage of Mankind. See BUCK, *supra* note 21, at 28-29. For example, the 1979 Moon Treaty requires that the exploration and exploitation of the Moon "be carried out for the benefit and in the interest of all countries, irrespective of the degree of economic or scientific development," and that "due regard shall be paid to the interest of present and future generations as well as to the need to promote higher standards of living" Raclin, *supra* note 214, at 736. Raclin also recognizes that the most contentious provisions of the treaty emerged in Article 11, which mandated that "the Moon and its natural resources are the common heritage of mankind" and that "States Parties to this Agreement hereby undertake *to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon* as its exploitation is about to become feasible." *Id.* (emphasis added). Article 11 also emphasizes that

the main purpose of the international regime to be established shall include: . . . (d) An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interest and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

Id.

²²⁷ Raclin, *supra* note 214, at 739.

²²⁸ *Id.*; Weaver, *supra* note 59, at 229.

²²⁹ Raclin, *supra* note 214, at 738-39. Originally, the United States supported the Common Heritage concept with arguments based on efficiency. Blaser, *supra* note 192, at 91. Ambassador Richardson contended that the "most efficient and effective way" to circumvent harmful conflicts in the deep seabed with overlapping mining projects was through the creation of an international regime to administer and supervise exploration and exploitation. *Id.* Proponents of the Common Heritage concept argued that the 1979 Moon Treaty must be ratified because it was a "realist" policy; choosing non-ratification meant supporting chaos. *Id.* Supporters of the Common Heritage principle in the United States, however, soon undermined the Common Heritage concept by insisting that the "peaceful use" provision (1979 Moon Treaty, Art. 3) should be interpreted as non-aggressive uses rather than non-military uses. *Id.* Critics argued that developing Third World nations would actually benefit from free access to ocean and space resources, thus undermining the principle of establishing an international regulatory regime to govern these global commons. *Id.*

²³⁰ Raclin, *supra* note 214, at 738-39; *Hearings on the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Before the Subcomm. on Science, Technology and Space, 96th Cong., 12 (1980) (statement of Roberts B. Owen) [hereinafter "Moon Treaty Hearings"]*.

Heritage principles in the 1979 Moon Treaty, if ratified and accepted by a majority of nations, would discourage development by United States government agencies or private companies, since developers of resources would lose control over those resources to an international regime after that developer spent money harvesting the resources.²³¹ Moreover, the 1979 Moon Treaty's "rational management" and "equitable sharing" provisions²³² furthered the view that the Treaty directed a transmission of wealth, political power, and technology from the space-faring nations to the Third World countries.²³³

Thus, the 1979 Moon Treaty has met with enormous international hostility by the very governments who are needed to ratify the agreement.²³⁴ To date, only ten countries have signed the treaty:²³⁵ Australia, Austria, Chile, Kazakhstan, Mexico, Morocco, the Netherlands, Pakistan, the Philippines, and Uruguay.²³⁶ Specifically included in the group of countries that have refused to ratify the 1979 Moon Treaty are the United States, all but one of the modern nations that belonged to the former Soviet Union, the European Union, and dozens of developing countries.²³⁷ Notably, the 1979 Moon Treaty is only binding on those nations that have ratified it,²³⁸ and no space-faring nation has done so.²³⁹

²³¹ Raclin, *supra* note 214, at 739; Cook, *supra* note 199, at 667.

²³² 1979 Moon Treaty, *supra* note 186, at Art. 11, para. 7.

²³³ Raclin, *supra* note 214, at 739; Cook, *supra* note 199, at 667; Moon Treaty Hearings, *supra* note 230, at 134. Marne A. Dubs, then Chairman of the American Mining Congress' Committee on Undersea Mineral Resources, stated that "common heritage" symbolizes a system in which complete international control over access to, and the disposition of, key natural resources is implemented so as to transfer wealth, technology, and political control from the developed countries to the developing countries. *Id.*

²³⁴ JASENTULIYANA, *supra* note 58, at 225.

²³⁵ Status of International Agreements, *supra* note 212.

²³⁶ *Inventory of International Nonproliferation Organizations and Regimes: Moon Agreement*, Center for Nonproliferation Studies, available at <http://cns.miis.edu/pubs/inven/pdfs/moon.pdf> (last visited Mar. 9, 2004). In addition, five other countries have signed the Treaty, but have yet to get the necessary ratification by their governments: France, Guatemala, India, Peru, and Romania. *Id.*

²³⁷ *Id.*

²³⁸ See CHENG, *supra* note 194, at 174-77. Cheng explains that treaties are consensual agreements designed to produce legally binding effects solely between the contracting parties. *Id.* at 174. Treaties have no legal effect on non-consenting third parties. *Id.*

²³⁹ Husby, *supra* note 223, at 361; Status of International Agreements, *supra* note 212.

C. *Other Space Agreements*

The three remaining space treaties all uphold the ideologies set forth in the 1967 Space Treaty.²⁴⁰ All three agreements rest on the principle that activities in space should be conducted peacefully and cooperatively.²⁴¹ None of the treaties, however, go beyond establishing rudimentary systems of international cooperation for maintaining procedural records of space activities and for resolving crises that result from these activities.²⁴² The three treaties do, however, represent all remaining “formal” space law.²⁴³

The 1968 Rescue Agreement, for example, provides that astronauts must be regarded as Envoys of Mankind and rendered “all possible assistance.”²⁴⁴ The Agreement mandates that nations operating in space must conduct rescue operations and rapidly return the astronauts and hardware to the proper country.²⁴⁵ The specifics of such procedures, however, are not in the agreement, such as which country is financially liable and for how much money if a rescue mission is necessary.²⁴⁶ The United States, along with eighty-eight other countries, has signed this treaty.²⁴⁷

The 1972 Liability Convention, on the other hand, provides that if a State’s launched space object causes damage to anyone, that State is “absolutely liable”;²⁴⁸ States are “jointly and severally liable” for any damage if more than one State launches the space object.²⁴⁹ The only way in which States can be absolved from absolute liability is if the damage results from another State’s acts of “gross negligence” or “an act or omission” intentionally done by another State.²⁵⁰ The only exception to this pardon arises if the launching State conducted illegal activity.²⁵¹ A State or national harmed by another nation’s space object may use diplomatic channels to present a claim, provided that both the harmed State and launching State are

²⁴⁰ JASENTULIYANA, *supra* note 58, at 32-37.

²⁴¹ *Id.*

²⁴² *See generally id.*

²⁴³ Twibell, *supra* note 190, at 592-93.

²⁴⁴ 1968 Rescue Agreement, *supra* note 183, at Preamble.

²⁴⁵ *Id.* at Art. 2-4.

²⁴⁶ *See id.*

²⁴⁷ Status of International Agreements, *supra* note 212. In addition, twenty-five other countries have signed the treaty, but have yet to get the necessary ratification by their government. *Id.*

²⁴⁸ 1972 Liability Convention, *supra* note 184, at Art. II.

²⁴⁹ *Id.* at Art. V.

²⁵⁰ *Id.* at Art. VI.

²⁵¹ *Id.*

members of the United Nations.²⁵² The United States, along with eighty-two other nations, has signed the treaty.²⁵³

Finally, the 1975 Registration Convention provides that all States that are a party to the agreement must register all objects launched into space.²⁵⁴ States must also provide the United Nations Secretary General information about the object and notify him when any objects that were formerly in space are no longer there.²⁵⁵ Nations also have a duty to alert the global community to flight trajectories, orbital parameters, and the intended purposes of all objects launched into space.²⁵⁶ The United States has signed this agreement, along with forty-four other states.²⁵⁷

III. RELIANCE ON THE *RES COMMUNIS* PRINCIPLE HAS CREATED LEGAL UNCERTAINTY DUE TO INCONSISTENT INTERPRETATIONS AND ITS REJECTION OF THE PREVAILING PRINCIPLE OF SOVEREIGNTY

The current body of space law rests in large part on the principle that outer space is *res communis* and not subject to national appropriation.²⁵⁸ Although seemingly straightforward, inconsistent interpretations of this principle have led to ambiguous and vague standards that often contradict one another.²⁵⁹ Reliance on the *res communis* principle is also inconsistent with the prevailing and longstanding principle of sovereignty and is therefore an unrealistic governing principle.²⁶⁰ Finally, international space law suffers from a lack of a governing body that is able to fully enforce the terms of these agreements.²⁶¹ These inconsistencies have created an air of legal uncertainty that have largely contributed to the slow development of outer space resources and the lack of incentives for space exploration and colonization.²⁶²

²⁵² *Id.* at Art. IX.

²⁵³ Status of International Agreements, *supra* note 212. In addition, twenty-five other nations have signed the treaty, but have yet to get the necessary ratification by their government. *Id.*

²⁵⁴ 1975 Registration Convention, *supra* note 185, at Art. II.

²⁵⁵ *Id.* at Art. IV.

²⁵⁶ *Id.*

²⁵⁷ Status of International Agreements, *supra* note 212. In addition, four other countries have signed the treaty, but have yet to get the necessary ratification by their government. *Id.*

²⁵⁸ See 1967 Space Treaty, *supra* note 182, at Art. I-II.

²⁵⁹ Cook, *supra* note 199, at 655.

²⁶⁰ Weaver, *supra* note 59, at 222-24.

²⁶¹ See ZHUKOV & KOLOSOV, *supra* note 189, at 28.

²⁶² See *supra* notes 188-213 and accompanying text for a general discussion of how the 1967 Space Treaty and 1979 Moon Treaty inhibited the development of outer

A. *Reliance on the Res Communis Principle Has Led to Vague Standards and Inconsistent Interpretations*

Outer space law suffers from the legal uncertainty that is inherent in all international, treaty-based law.²⁶³ Legal uncertainty is inherent because of interpretation problems and ambiguities that appear from the use of different languages and societal perspectives.²⁶⁴ Also, since treaties require consensus and compromise to enter into force, provisions contain policies of only the lowest common denominator and are often vague so that nations will acquiesce to their terms.²⁶⁵ Nations that violate a treaty will often argue that their actions are legal due to their interpretation of the contentious provisions.²⁶⁶ These inherent problems of interpretation have contributed to the hotly-contested debate over the scope of the *res communis* principle. This debate has focused on the validity of the 1967 Space Treaty's ban on national appropriation and how to distinguish the phrase "province of all mankind" as embodied in the 1967 Space Treaty from the Common Heritage of Mankind principle articulated in the 1979 Moon Treaty. These two open-ended issues will inform a nation's view as to the extent of property rights that any other nation may acquire in outer space property and resources.

There are two diametrically opposed interpretations of the moratorium on national appropriation in the 1967 Space Treaty, which eliminates and outlaws any claims of "national appropriation by claim of sovereignty [or] by means of use or occupation" in outer space and its celestial bodies.²⁶⁷ The first view presupposes that any nation could avoid violating the Treaty's no-sovereignty provision—yet still implement a system of property rights²⁶⁸ favorable to the

space.

²⁶³ See BUCK, *supra* note 21, at 9.

²⁶⁴ GLENN H. REYNOLDS & ROBERT P. MERGES, *OUTER SPACE: PROBLEMS OF LAW AND POLICY* 27 (1989).

²⁶⁵ BUCK, *supra* note 21, at 9. Jasentuliyana points out that some scholars criticize international space law because any treaty put forth by COPOUS must have the consent of all nations; thus, any nation can veto the final adoption of a draft treaty despite extraordinarily long negotiations, which encourages only the most common grounds entering the draft. JASENTULIYANA, *supra* note 58, at 27-29.

²⁶⁶ REYNOLDS & MERGES, *supra* note 264, at 27.

²⁶⁷ 1967 Space Treaty, *supra* note 182, at Art. II.

²⁶⁸ Property means "an aggregate of rights which are guaranteed and protected by the government." BUCK, *supra* note 21, at 3.

Property rights may be held by individuals or by groups of individuals such as communities, corporations, or nation-states. The property right to a resource is not a single right but rather a bundle of rights, such as rights of access, exclusion, extraction, or sale of the captured resource; the right to transfer one's rights to a second person; and the

State—by simply recognizing extraterrestrial claims by its citizens in international common areas.²⁶⁹ The State could then exercise jurisdiction over its citizens by using its powers to protect its nationals who are performing activities in those global common areas against persons from other States.²⁷⁰ In essence, a State achieves extraterrestrial sovereignty through its citizens' actions.²⁷¹ The opposing view assumes that the Treaty precludes *all* sovereignty and ownership in space and its celestial bodies, whether the claim comes from nation-states, natural persons, or juridic persons (like organizations and corporations).²⁷² Thus, there is a complete moratorium on property rights in outer space.²⁷³

The second half of the debate has focused on distinguishing the “province of all mankind” phrase used in Article I of the 1967 Space Treaty²⁷⁴ from the Common Heritage of Mankind principle employed in the 1979 Moon Treaty.²⁷⁵ The Common Heritage principle is much broader than the phrase “province of all mankind.”²⁷⁶ The Common Heritage principle implies that mankind has an absolute right to partake in the development, use, and distribution of celestial resources, even if a person's nation has not contributed to that resource's exploitation at all.²⁷⁷ The phrase “province of all mankind,” on the other hand, is analogous to the theory that all States have a freedom of usage in outer space, and therefore the right

right of inheritance.

Id.

²⁶⁹ Reynolds, *supra* note 196, at 233.

²⁷⁰ *Id.* Reynolds' view of the no-sovereignty provision is based on the fact that even members of the New International Economic Order (a redistributionist, anti-market international policy group) recognized that exploitation of celestial resources would not violate the 1967 Space Treaty, fueling their desire for adoption of the 1979 Moon Treaty, *id.* at 233 n.26, and interpretations of the Deep Seabed Hard Mineral Resources Act provide that the United States has rights over its nationals in global common areas. *Id.* at 234.

²⁷¹ *See id.* at 233.

²⁷² Carl Q. Christol, *Article 2 of the 1967 Principles Treaty Revisited*, 9 ANNALS OF AIR & SPACE LAW 217, 244 (1984). Christol's view of the no-sovereignty provision stems from the fact that all people are subject to some level of national jurisdiction, and consequently cannot achieve autonomously that which all nations are prevented from accomplishing on their own. Keefe, *supra* note 194, at 359. Thus, the words “by any other means” in Article II impose limitations on States using international or intergovernmental organizations to claim sovereignty over portions of outer space.

Id.

²⁷³ *See* Christol, *supra* note 272, at 244.

²⁷⁴ 1967 Space Treaty, *supra* note 182, at Art. I.

²⁷⁵ *See supra* notes 214-239 and accompanying text for a discussion of nations' various perceptions of the Common Heritage concept.

²⁷⁶ Weaver, *supra* note 59, at 224.

²⁷⁷ *Id.*

to partake in the exploitation of outer space.²⁷⁸ If a nation does not participate in the development of outer space, however, it does not automatically reap the rewards of any program.²⁷⁹

Developed nations support a view that the two phrases are distinct.²⁸⁰ These nations reject the Common Heritage principle because it will effectuate a transfer of political control, wealth, and technology to undeveloped countries.²⁸¹ Instead, developed nations support the narrower “province of all mankind” phrase²⁸² and an interpretation that the 1967 Space Treaty grants equal access to celestial lands.²⁸³ Less developed nations, on the other hand, argue that the 1979 Moon Treaty’s Common Heritage principle informs the international community as to the proper meaning of the “province of all mankind” phrase in the 1967 Space Treaty.²⁸⁴ This theory presupposes that later treaties enlighten nations to the full meaning of earlier ones.²⁸⁵

There is no doubt that this legal uncertainty has inhibited investment and development of outer space for the past three and a half decades.²⁸⁶ States refuse to risk substantial investments in the

²⁷⁸ *Id.*

²⁷⁹ *Id.* This view also follows from statements made during ratification of the 1967 Space Treaty by the United States Senate that it was “the understanding of the Committee on Foreign Relations that nothing in Article I [of the 1967 Space Treaty] diminishes or alters the right of the United States to determine how . . . it shares the benefits and results of its space activities.” Husby, *supra* note 223, at 364. Instead, the Chief United States Negotiator of the 1967 Space Treaty, Arthur Goldberg, called Article I a “statement of general goals” and stated that a more specific treaty was necessary to create any specific obligations. *Id.*; Blaser, *supra* note 192, at 90.

²⁸⁰ See Husby, *supra* note 223, at 363-64, 368-69 (contrasting the United States’ interpretation of Article I of the 1967 Space Treaty with the United States’ furor over the inclusion of the Common Heritage of Mankind principle in the 1979 Moon Treaty).

²⁸¹ See *id.* at 368-70.

²⁸² Weaver, *supra* note 59, at 226.

²⁸³ See *id.* at 225. It is obvious that a distinction based on equal access rather than equal share is beneficial to developed, space-faring nations, as they have no affirmative responsibility to bestow upon undeveloped countries the benefits reaped from space exploration. Cook, *supra* note 199, at 663. Naturally, under such an interpretation, any space-faring nation has the incentive to exploit celestial resources without fearing that its investment will effectuate a transfer of political control, wealth, and technology to undeveloped countries. *Id.* at 667-68. An equal access distinction may also give other nations the motivation necessary to finance a program of celestial development.

²⁸⁴ See Twibell, *supra* note 190, at 598 (noting that Third World nations believed that the 1979 Moon Treaty perfects some of the principles expressed in the 1967 Space Treaty and that it “reflected in crystalline language the degree of states’ interests in the resources of the moon”).

²⁸⁵ See *id.*

²⁸⁶ *Id.* at 613-15.

development of extraterrestrial settlements, mining colonies, and transportation because attitudes towards that State's property rights in resources may change as soon as it begins to reap rewards.²⁸⁷ No State wants the foundation it builds yanked out from underneath it in favor of another set of nations' ideas of how extraterrestrial land should be governed.²⁸⁸

Yet the world is at a critical point in its history of space exploration. Nations that previously had little or no space-faring potential now have the financial and technological capabilities to develop space industries, and these nations are challenging the prominence of the United States and Russia in space activities.²⁸⁹ Consequently, as more and more of these nations develop outer space technologies, States have begun to concede that some measure of property rights should exist in outer space, and therefore are adopting a view that appropriation of resources is permissible.²⁹⁰ Thus, the deceleration of space exploration that has existed due to the concept of *res communis*²⁹¹ may soon give way to some nation challenging the boundaries of this principle by appropriating a significant tract of extraterrestrial territory.²⁹² With all of this legal wrangling and flip-flopping, it is no wonder that States have refused to invest money into the development of outer space. Yet, it also demonstrates how an opportunistic nation could easily exploit this legal uncertainty.

²⁸⁷ *Id.* at 614.

²⁸⁸ *Id.*

²⁸⁹ Twibell, *supra* note 190, at 612.

²⁹⁰ *Id.* at 612-14.

²⁹¹ *Id.* at 618-19; see also *supra* notes 149-175 and accompanying text for a discussion of how the 1967 Space Treaty affected the exploitation of outer space resources.

²⁹² See Zullo, *supra* note 79, at 2432. It should be noted that the present international space law establishment has permitted both the United States and the former Soviet Union to own Moon rocks for the last three decades: unmanned Soviet spacecraft returned to Earth with lunar resources weighing three-quarters of a pound, and the six Apollo missions that landed on the Moon between 1969 and 1972 came back with 842 pounds "of lunar rocks, core samples, pebbles, sand, and dust from the lunar surface." *Id.* Since astronauts returned from the Moon, the lunar rocks have been in the possession of NASA, an executive branch agency. *Id.* NASA explicitly proclaimed that the United States has appropriated the lunar materials: "[t]he purpose of the [Lunar Sample Laboratory] is to maintain in pristine condition the lunar samples that comprise a priceless national and scientific resource." *Id.* For the last thirty years, no State has challenged the right of the United States or the former Soviet Union to appropriate these lunar materials. *Id.* The lack of challenge by the international community is an indication that the right to own celestial resources may already be perceived as customary international law. Zullo, *supra* note 79, at 2432.

B. *By Rejecting Sovereignty and its Hundreds of Years of Custom and Tradition, the Res Communis Principle Creates Legal Uncertainty and an Unrealistic System of Governance*

Astronauts landed on the Moon in July 1969, and the successful Apollo 11 mission was acclaimed as a triumph for scientific exploration.²⁹³ More interesting, however, was the act that did not occur: the American astronauts did not claim territorial sovereignty over the Moon on behalf of the United States.²⁹⁴ Throughout terrestrial civilization's recorded history, every time explorers have set foot on uninhabited shores—and often even when landing on inhabited ones—the land has been claimed for the sponsoring sovereignty or monarchy.²⁹⁵ Why has Moon exploration defied this norm?²⁹⁶ The answer lies in the history of sovereignty and the meaning that sovereignty has acquired over hundreds of years.²⁹⁷

Throughout the Age of Discovery, new land was discovered throughout the Americas and claimed on behalf of Europe's royal sovereigns.²⁹⁸ The Americas were considered *res nullius*, and hence belonged to no one until a European nation claimed the land.²⁹⁹ Soon afterwards, however, issues arose as to whether discovery alone was sufficient to claim sovereignty over the land, or whether occupation of the territory must accompany discovery in order for nations to acquire dominion over their newly-found land.³⁰⁰

As European nations soon realized that discovery alone was insufficient for claims of sovereignty, they initially sought to justify their claims by using other legal means.³⁰¹ Thus, England, Spain, France, Portugal, Holland, and Russia began carrying out formal ceremonies for taking possession over *res nullius*, such as erecting crosses, planting items bearing their nation's coat of arms into the ground, or carrying away turf from their newly discovered land.³⁰² Either way, all nations recognized that effective occupation of newly

²⁹³ BUCK, *supra* note 21, at 141.

²⁹⁴ *Id.*

²⁹⁵ *Id.*

²⁹⁶ *Id.*

²⁹⁷ *Id.* at 141-42.

²⁹⁸ ANDREW G. HALEY, *SPACE LAW AND GOVERNMENT* 119 (1963).

²⁹⁹ *Id.*

³⁰⁰ *Id.* In 1493, the Pope tried to resolve these issues by initially dividing the entire New World between Spain and Portugal, thus recognizing the right to seize all territory. *Id.* The Pope's decision, however, settled little, since neither France nor England agreed to acquiesce to the decree, and the line of demarcation was altered one year later by the Treaty of Tordesillas. *Id.*

³⁰¹ HALEY, *supra* note 298, at 119.

³⁰² *Id.* at 119-20.

discovered land strongly supported a claim of sovereignty, as did any exercise of political power or jurisdiction.³⁰³

Today, the concept of sovereignty is based in property rights: nation-states hold a bundle of rights in international society just as individuals hold rights in their society.³⁰⁴ Since the notion of sovereignty implies that rival States have accepted a competing State's claim as legitimate, sovereignty can be interpreted to mean the exercise of territorial control as well as the right to exclude other States from either laying claim to or possessing that same territory.³⁰⁵ Consequently, a State that has laid claim over territory may lawfully refuse to allow other States access to that territory.³⁰⁶

One reason the global community chose to regard celestial bodies as free from appropriation³⁰⁷ when writing the space treaties is that States failed to create ways to ascertain and maintain the necessary control over appropriated territory.³⁰⁸ Since the practical complexity of extending national borders into outer space is colossal,³⁰⁹ States could not successfully appropriate extraterrestrial

³⁰³ *Id.* at 120-21. The Permanent Court of International Justice at The Hague has recently declared that nations must assert sovereignty over newly discovered territory through exercises of political power or jurisdiction and that settlement alone is insufficient to lay claims of sovereignty. *Id.* at 121.

³⁰⁴ BUCK, *supra* note 21, at 27. States hold many rights in the international arena, including national sovereignty, which Buck defines as:

The supreme, absolute, and uncontrollable power by which any state is governed; . . . the international independence of a state. The power to do everything in a state without accountability . . . to make laws, to execute and to apply them, to impose and collect taxes and levy contributions, to make war or peace, to form treaties of alliance or of commerce with foreign nations, and the like.

Id.

³⁰⁵ Weaver, *supra* note 59, at 231. Accordingly, "the right to exercise exclusive jurisdiction over a resource necessarily entails the right to exclude others from that of the very same resource." *Id.*

³⁰⁶ *Id.* Although a State may exclude other nations from legitimately-claimed territory under principles of sovereignty,

[c]onversely, a state which is operating in an area such as the high seas or on the surface of a celestial body that is *res communis*, cannot lawfully exclude other states from access to that particular area. The state may, however, bar other states from entering its facilities and spacecraft because the state retains jurisdiction over its own vessels and nationals when they operate outside the boundaries of national states.

Id.

³⁰⁷ 1967 Space Treaty, *supra* note 182, at Art. II.

³⁰⁸ Weaver, *supra* note 59, at 232. "Individual states have lent credence to this view due to their demonstrated inability to occupy vast regions of the high seas or celestial bodies. These states have thus failed to assert territorial claims because of the physical characteristics of the areas which they have sought to appropriate." *Id.*

³⁰⁹ BUCK, *supra* note 21, at 141.

lands or portions of outer space because it was impracticable to exclude all other nations from outer space.³¹⁰ In addition, a nation's ability to control claimed resources is essential to complying with the customary requirements of international law that a nation effectively occupy the claimed territory.³¹¹ This deficiency has certainly been of vital importance to the development of principles of non-appropriation for outer space,³¹² and is an obvious reason why no nation (including the United States on the Moon in 1969) has claimed terrain in outer space.

The more important question becomes whether States will respect the no-sovereignty principle of *res communis* as embodied in the 1967 Space Treaty, especially since nations have now developed the technology necessary³¹³ to defend and exercise control over their claims to extraterrestrial territory.³¹⁴ If States can prevent other nations' rights of access to outer space guaranteed by the 1967 Space

³¹⁰ Weaver, *supra* note 59, at 232.

³¹¹ *Id.* at 209.

³¹² *Id.* at 232. "Faced with the impossible task of monitoring and enforcing national sovereignty, [the United Nations] has successfully established open access to the resource domain; customary law as well as treaties reinforce the doctrine." BUCK, *supra* note 21, at 148. "Even though states cannot assert legal claims to the high seas or celestial bodies, the instrumentalities of the states—ships and personnel—are subject to the jurisdiction of the sending state even though these instrumentalities may be traveling through international waters or airspace." *Id.* The major space-faring powers have continued to support the position that "objects they placed on those bodies would be owned and/or controlled by them and would be 'national' in that sense." Weaver, *supra* note 59, at 236. Even so, Article XII moderates the state's right to declare national jurisdiction: all nation-owned "stations, installations, equipment and space vehicles" in outer space can be inspected by other parties to the 1967 Space Treaty. *Id.*

³¹³ See Schultz, *supra* note 61, at 111, 113. For example, Constance Adams designed a prototype of a living module that protects residents from radiation through ingenious placement of water reservoir tanks, creates a spacious home with both personal and communal space, and has a composite skin that is stronger than metal but still protects residents against particle impacts. *Id.* at 113. NASA has also run ninety-day test projects on lunar-Mars life support in a BioHome, which used plants for "generat[ing] oxygen, absorb[ing] carbon dioxide, purify[ing] water, and recycl[ing] solid wastes," which is one of the first steps in creating an extraterrestrial colony. *Id.* at 111.

³¹⁴ See generally Weaver, *supra* note 59, at 207-09. When a State exercises territorial sovereignty it generally means that the State has legal title to the land. *Id.* at 207. Once the more powerful States in the international community recognize the claim, the State exercising sovereignty is entitled to exert absolute dominion over that territory. *Id.* Generally, however, a single act of acquisition never demonstrates proof of sovereignty. *Id.* Since the midpoint of the eighteenth century, international law has demanded that occupation of newly claimed lands be effective in both acquisition and maintenance. *Id.* at 207-08. Hence, in order for title to vest in the discovering State, some continuous manifestation of sovereignty was necessary, like occupation of the newfound land soon after the claim. *Id.* at 208.

Treaty,³¹⁵ the “notion that outer space is a communal resource would be rendered meaningless.”³¹⁶ Instead sovereignty would prevail. The fact that the *res communis* principle has not been tested³¹⁷ is sufficient to create legal uncertainty in the entire body of international space law. There is a clash between the lofty idealistic principles embodied in the 1967 Space Treaty and the cold, hard practicality of centuries of custom and tradition in sovereignty.

Furthermore, those nations that promote and accept the Common Heritage version of the *res communis* principle have a more difficult burden in that they must persuade the international community to accept this concept of property rights.³¹⁸ Since the Common Heritage of Mankind is an alternative system of governance, the burden is on undeveloped nations to prove the principle’s superiority over the historically successful system of sovereignty.³¹⁹ Thus far, however, arguments for the implementation of this socio-economic policy have been met with hostility.³²⁰ Although undeveloped nations have aligned themselves with the Common Heritage of Mankind concept,³²¹ developed nations have failed to acknowledge its legitimacy and legality because the principle does not comply with the three prerequisites that must be fulfilled for it to be accepted as a rule of modern international law.³²²

For any principle to be accepted by the international community, it first must be clear and well-defined so that the international community may integrate the concept into international law.³²³ Next, nations must abide by the principle and widely agree on its authority in international law.³²⁴ Finally, customary recognition of the concept must be manifested by States or, at a

³¹⁵ 1967 Space Treaty, *supra* note 182, at Art. I. The Treaty states that “there shall be free access to all areas of celestial bodies.” *Id.*

³¹⁶ Weaver, *supra* note 59, at 232.

³¹⁷ *See id.* at 224 (noting that any acceptance of a prohibition on sovereignty by States would mean that nations “have agreed to a fundamental change in the political structure of international society”).

³¹⁸ *See* Kurt Anderson Baca, *Property Rights in Outer Space*, 58 J. AIR L. & COM. 1041, 1060-61 (1993).

³¹⁹ *Id.*

³²⁰ Reynolds, *supra* note 196, at 231-32.

³²¹ Husby, *supra* note 223, at 369.

³²² Weaver, *supra* note 59, at 224.

³²³ *Id.* For more information regarding various interpretations of the Common Heritage concept as embodied in the 1979 Moon Treaty, see *supra* notes 222-233 and accompanying text.

³²⁴ Weaver, *supra* note 59, at 224. Most developed states have not adapted their behavior in outer space to measure up to the Common Heritage principle. *Id.*

minimum, be supported worldwide to verify its broad acceptance.³²⁵

Applying this framework, the first problem with international acceptance of the Common Heritage principle has been that States have been unable to develop a homogeneous interpretation of the Common Heritage concept—and thus the principle is not clear and well-defined.³²⁶ It is uncertain, for example, whether the 1979 Moon Treaty requires an equitable distribution of space resources, since the concept of sharing is inapplicable to other commons areas, like the deep seabed.³²⁷ Furthermore, the Common Heritage principle is entirely declaratory and imprecise due to its open interpretations of humanity's rights in outer space.³²⁸ If mankind truly is an heir to outer space³²⁹—and the concept of heritage clearly suggests that common areas should be treated as inheritances transmitted from ancestors to future generations³³⁰—then *mankind should not only have the right to acquire its inheritance* free from resource waste and environmental abuse, but *mankind should have the right to exploit its inheritance* as well, “because an heir is entitled to both.”³³¹ The concept of sharing inherent in the Common Heritage principle, however, seemingly puts a limit on exploitation of space resources because the area must be preserved for future generations.³³² This ambiguity differs vastly from the legal certainty of sovereignty, which States uniformly recognize as allowing a property rights scheme of the sovereign's choice.³³³

The second major problem has been that States have not adopted their behavior so that they abide by the Common Heritage concept.³³⁴ Thus, the concept is regarded more as a socio-political philosophy and moral viewpoint rather than a substantive feature of contemporary international law.³³⁵ Instead, traditional and

³²⁵ *Id.*

³²⁶ *Id.* at 223.

³²⁷ *Id.* at 222. Furthermore, opponents of the Common Heritage concept argue that philosophical property pioneers like John Locke always maintained that property was “common to all men,” but once man labored over his property, a right to that property arose through that manifestation of possession and control. Husby, *supra* note 223, at 369.

³²⁸ Weaver, *supra* note 59, at 223.

³²⁹ 1979 Moon Treaty, *supra* note 186, at Art. 11, para. 1.

³³⁰ Weaver, *supra* note 59, at 223 n.82.

³³¹ *Id.* at 223.

³³² *Id.* at 223 n.82.

³³³ See BUCK, *supra* note 21, at 27 (noting that sovereignty gives a State the absolute power to make laws without accountability to any other State).

³³⁴ Weaver, *supra* note 59, at 224.

³³⁵ *Id.* at 223.

contemporary international law is built on the concepts of sovereignty and exclusivity³³⁶ rather than notions of shared possession.³³⁷ Thus, the 1979 Moon Treaty and the Common Heritage concept both have little practical value, and instead should be viewed as idealistic yet obsolete principles with little legal effectiveness.³³⁸ Even so, the concepts are a part of the history of international space law and continue to affect the legal uncertainty that pervades the field.

C. *The 1967 Space Treaty's Lack of an Enforcement System Adds Uncertainty to Space Law and Invites Countries to Challenge the Res Communis Principle*

Relations in international society are regulated by sovereign and independent states rather than any superior temporal authority, since nations are recognized, by definition, as sovereign and independent.³³⁹ Simply, “[r]ules of law binding upon States . . . emanate from their own free will.”³⁴⁰ Thus, treaty law, which manifests agreed-upon rules of law, is problematic because it lacks a system of enforcement via temporal governance.³⁴¹ For those nations that have signed a treaty, enforcement issues arise because nations that violate treaties can only be penalized by other nations that are prepared to act against them through international actions like war, trade restrictions, condemnation, or isolation.³⁴² Even after negotiations, some countries may defer ratification or not ratify the treaty at all.³⁴³ Sometimes, for example, the government that negotiated the treaty may collapse or the administration may change.³⁴⁴ Finally, the regime

³³⁶ *Id.* Without the guarantee of sovereignty and ownership, nations, organizations, and individuals that may have been interested in celestial exploitation will be reluctant to invest in such a costly and risky proposition. Cook, *supra* note 199, at 669.

³³⁷ Weaver, *supra* note 59, at 223. Weaver also points out that a sovereign’s ability to exclude others negates the legality of a system of communal celestial governance. *Id.* at 224. The mandatory distribution of celestial resources by States engaged in extraterrestrial exploitation amongst those states that do not contribute to the exploitation would signify that developed states would have “surrendered vital sovereign powers . . . and . . . agreed to a fundamental change in the political structure of international society.” *Id.* at 224.

³³⁸ Cook, *supra* note 199, at 668-69.

³³⁹ CHENG, *supra* note 194, at 173.

³⁴⁰ *Id.*

³⁴¹ See Marko, *supra* note 214, at 295.

³⁴² *Id.*

³⁴³ BUCK, *supra* note 21, at 9.

³⁴⁴ *Id.* A perfect example of changes in policy due to administration change occurred when Ronald Reagan assumed the presidency after Jimmy Carter:

negotiating the treaty may not engage in good faith negotiations; agreements may be intentionally deceptive or sole expressions of ally solidarity.³⁴⁵ Although many international law rules, including those of space law, may be able to trace their inspiration to some measure of altruism or humanitarianism, motivations grounded in self-interest and the hope of materialistic gain cannot help but inform (if not infect) the process.³⁴⁶ Thus, it must be recognized that nations have no permanent allies or obligations, only permanent interests,³⁴⁷ and that there are inherent problems with terrestrial nations making policy for the good of all mankind in outer space while serving terrestrial interests.

Given that the 1967 Space Treaty is more of a collection of admirable principles than a codification of detailed regulations,³⁴⁸ State interests in maintaining space as *res communis* may change in the future. No matter how sensible, honorable, or just the *res communis* concept may be in the context of international space law, it cannot be considered law *ipso facto*.³⁴⁹ Finally, the fact that the *res communis* concept is not a binding principle of international law may already be implied within Article XVI of the 1967 Space Treaty, which allows parties to withdraw from the Treaty after they give one year's written notice.³⁵⁰ Consequently, nations can easily withdraw from the 1967 Space Treaty and disregard the *res communis* classification of outer space³⁵¹ once their nation's colonization of space becomes a reality.³⁵²

The United States was one of the 108 General Assembly members who unanimously passed a resolution referring to the deep seabed as the common heritage of mankind in 1980. It also encouraged use of the common heritage vocabulary in discussions of moon law and the Law of the Sea. This stopped with the election of Ronald Reagan, as U.S. policies toward multilateral institutions underwent another radical change.

Blaser, *supra* note 192, at 89.

³⁴⁵ BUCK, *supra* note 21, at 9.

³⁴⁶ CHENG, *supra* note 202, at 173.

³⁴⁷ Charles Krauthammer, *A Farewell to Allies*, TIME, Jan. 12, 2004, at 45.

³⁴⁸ Weaver, *supra* note 59, at 227.

³⁴⁹ See CHENG, *supra* note 202, at 173 (noting that principles can only become general rules of international law once they are accepted by the subjects of international law, either through "consent, recognition, acquiescence, or estoppel").

³⁵⁰ 1967 Space Treaty, *supra* note 182, at Art. XVI.

³⁵¹ See Baca, *supra* note 318, at 1068. Furthermore, even if the global community accepts the principles of the 1967 Space Treaty, based on these nations' acquiescence to the values embodied within the Treaty, those customary principles will still be as vague as a treaty incorporating those principles, *id.*, and thus one of the many open-ended interpretations of those principles could be applied. See *supra* notes 188-213 and accompanying text for an analysis of the varied interpretations for the 1967 Space Treaty.

All that will be necessary for a space-faring nation to claim sovereignty over a portion of a celestial body is the ability to exert control over and defend their extraterrestrial lands, which has been the mark of maintaining and defending a claim for centuries.³⁵³ The ability of a State to so easily challenge the 1967 Space Treaty should be an incentive for a country like the United States, which has a developed space program, to reach Mars first so as to prevent another country from usurping the opportunity and implementing an unfavorable system of property rights and ownership.

D. Conclusion

The 1967 Space Treaty's prohibition on claims of sovereignty breaks hundreds of years of international custom and tradition, and therefore is truly untested as a binding principle of international law.³⁵⁴ Yet, the principle remains in force by virtue of the 1967 Space Treaty.³⁵⁵ Thus, without legal certainty as to the interpretation of the *res communis* and "province of all mankind" principles,³⁵⁶ the United States—and indeed, any space-faring power—plays a very tricky game by not fostering space exploration, as another country may be able to test the viability of these principles by sidestepping them and claiming outer space territory for itself. It must be remembered that a country's interests change over time³⁵⁷ and that the 1967 Space Treaty allows for withdrawal from the Treaty simply by notifying the United Nations in writing one year in advance.³⁵⁸ Thus, any nation that is close to reaping the reward of appropriation of extraterrestrial lands or exploitation of celestial resources can free itself of any obligations to the international community without any serious repercussions. The ability of a State to easily challenge this principle should be an incentive for a developed nation like the United States to land on Mars first and implement a property regime guaranteed to provide quick development and legally certainty—namely, a system of first possession.

³⁵² Since the legitimacy of the 1967 Space Treaty stems from the fact that the two great space powers are parties to the Treaty, (and, accordingly, the 1979 Moon Treaty lacks legitimacy because neither the United States nor Russia has ratified the Treaty), either country could seemingly withdraw from the Treaty and no longer make it a viable instrument of international law. See Blaser, *supra* note 192, at 88.

³⁵³ See *supra* notes 293-312 and accompanying text for a discussion of how sovereignty has been used to exercise control over territory for hundreds of years.

³⁵⁴ See Weaver, *supra* note 59, at 222-24 (noting that a prohibition on sovereignty lacks precedent in international law and rejects classical notions of exclusivity).

³⁵⁵ 1967 Space Treaty, at Art. II.

³⁵⁶ See REIJNEN, *supra* note 188, at 95-99.

³⁵⁷ See CHENG, *supra* note 194, at 172-74; BUCK, *supra* note 21, at 9.

³⁵⁸ 1967 Space Treaty, *supra* note 182, at Art. XVI.

IV. PROPOSAL: THE REEMERGENCE OF NINETEENTH CENTURY FIRST POSSESSION DOCTRINES, CASES, AND STATUTES TO ENCOURAGE THE DEVELOPMENT OF OUTER SPACE IN THE TWENTY-FIRST CENTURY

The 1967 Space Treaty and the concept of space as *res communis* destroyed the United States' incentive for promoting space exploration and development.³⁵⁹ Even if the Treaty were repealed today, the Soviet Union's collapse and the end of the Cold War may have annihilated most of the driving force for encouraging further progress.³⁶⁰ The quest to eliminate colonialism, imperialism, and boundary disputes from the realm of outer space has also eradicated the drive to hunt for its rewards.³⁶¹ Yet, any principle, like the *res communis* concept, that prevents humanity from reaping space's unparalleled rewards must be scrutinized, evaluated, and questioned,³⁶² and alternatives should be proposed. For example, declaring extraterrestrial lands as *res nullius* would signify that the heavens belong to no nation³⁶³ and all territory and resources are ripe for capture.³⁶⁴ Such incentives could give space-faring nations a compelling reason to create new space programs to further develop space. Furthermore, a properly implemented system of property rights would likely foster the speedy development of outer space in addition to reaping political and economic benefits for all of Earth's citizens.³⁶⁵ That system may well find its basis in the well-tested doctrines of first possession.

First possession is the preeminent system for establishing initial property rights in land or a resource, as it accords claimants with legitimate ownership over territory and resources before other prospective claimants can do the same.³⁶⁶ First possession rules are a

³⁵⁹ ZUBRIN, ENTERING SPACE, *supra* note 54, at 14; see *supra* notes 139-156 and accompanying text for a discussion of how the 1967 Space Treaty destroyed the United States' incentive to explore and develop outer space.

³⁶⁰ ZUBRIN, ENTERING SPACE, *supra* note 54, at 14; see *supra* notes 139-156 and accompanying text for a discussion of how the 1967 Space Treaty diminished the drive to quickly develop outer space.

³⁶¹ Twibell, *supra* note 190, at 618-19.

³⁶² *Id.* at 619.

³⁶³ GÁL, *supra* note 3, at 122.

³⁶⁴ *See id.*

³⁶⁵ Reynolds, *supra* note 196, at 232.

³⁶⁶ Dean Lueck, *The Rule of First Possession and the Design of the Law*, 38 J.L. & ECON. 393, 393 (1995). Under common law, first possession rules have been applied to settings as varied as "abandoned property, adverse possession, bona fide purchasing, the electromagnetic spectrum, emissions rights, fisheries and wildlife, groundwater, hardrock minerals, intellectual property, oil and gas, land, nonbankruptcy debt collection, satellite orbits, spoils of war, treasure trove, and water rights." *Id.* at 394.

basic component of and exist extensively in common law statutes and judicial decisions, civil law, traditional Islamic and African legal systems, and informal custom-made law.³⁶⁷ Outside of the legal system, first possession is a principle that is an underpinning of Anglo-American society, which often expresses the doctrine as “finders-keepers” or “first in time, first in right.”³⁶⁸ More importantly, first possession is an effective system for establishing ownership rights.³⁶⁹ Having stood the test of time, first possession principles would bring a measure of certainty to an otherwise legally uncertain field of law.

A. *First Possession and its Applicable Uses in Outer Space*

The *res communis* principle has inhibited the development of outer space because it fails to establish a clear system by which people can protect the fruits of their labor. No government is likely to invest in expansive, long-term projects if it knows that the fruits of its labor can be seized at the whim of another³⁷⁰ or undergo a forced redistribution.³⁷¹ A system of first possession, however, focuses on rewarding hard work and entitles the person who performs that work to its benefits.³⁷² The first possession concepts that would most likely aid the rapid development of outer space and the exploitation of its resources can be found in nineteenth century United States property cases, statutes, and doctrines. The doctrine of discovery, homesteading principles, the rule of capture, prior appropriation principles, and bedrock mining statutes all helped to rapidly develop the United States in the nineteenth century, and could now be used to foster rapid outer space development in the twenty-first century.

1. Discovery of *Res Nullius*

Ever since mankind formed its earliest civilizations, first possession rules have been used to reduce land to ownership, usually in the form of initial occupation.³⁷³ English common law (in the form

³⁶⁷ *Id.* at 393-394.

³⁶⁸ *Id.* at 394.

³⁶⁹ *Id.* at 395.

³⁷⁰ JOSEPH WILLIAM SINGER, PROPERTY LAW: RULES, POLICIES, AND PRACTICES 14 (Aspen Law & Business, 2d ed. 1997).

³⁷¹ Marko, *supra* note 214, at 315. Marko notes that “[f]ree enterprise institutions simply cannot make significant investments in space while they are under the threat of lawsuits over the meaning of treaty terms or ex post facto appropriation of their investments by a nebulous future international regime.” *Id.*

³⁷² SINGER, *supra* note 370, at 14.

³⁷³ Lueck, *supra* note 366, at 414.

of *res nullius*), Islamic law, and long-established sub-Saharan African law have all used first possession to lay claims to lands that were previously not owned.³⁷⁴ Even Chief Justice John Marshall, in the landmark decision of *Johnson v. M'Intosh*,³⁷⁵ used first possession (in the form of discovery of *res nullius*) to justify title, dominion, and sovereignty over all lands claimed by the United States and its European forbearers.³⁷⁶ Chief Justice Marshall reasoned that although Native Americans inhabited the New World, its lands were legally vacant³⁷⁷ because “to leave [Native Americans] in possession of their country was to leave the country a wilderness,”³⁷⁸ as “agriculturists, merchants, and manufacturers, have a right, on abstract principles, to expel hunters from [their] territory.”³⁷⁹ Inherent in Chief Justice Marshall’s statement—and particularly applicable to space law—is the principle that all undeveloped land, even if settled by others, will be subject to the sovereignty of the civilized discoverer who will develop the land.³⁸⁰ Thus, acquisition of *res nullius* by discovery gives an incentive to the discovering nation to explore, exploit, and develop the newly-claimed land, as the discoverer is rewarded for his investment in the celestial property. Advocates of this first possession principle would abhor leaving the land in its native state and would declare such inactivity a misuse of the land.³⁸¹ Thus, an extraterrestrial system of property rights implementing the concept of discovery of *res nullius* would be ideal for stimulating an aggressive space program.

2. Homesteading

Throughout the history of the United States, private rights to vast government holdings can be traced to a combination of first possession principles (including homesteading) and land sales.³⁸² After the Revolutionary War, the original thirteen states surrendered all of their unsettled western lands to the newly formed federal government so that it could be distributed to citizens.³⁸³ Although the

³⁷⁴ *Id.*

³⁷⁵ *Johnson v. M'Intosh*, 21 U.S. 543 (1823).

³⁷⁶ Lueck, *supra* note 366, at 414. Even today “new” lands are sporadically discovered and then claimed: within the last two decades, a man claimed a small land mass in the Thimble Islands off the shores of Connecticut. *Id.*

³⁷⁷ Steven Paul Mcsloy, “*Because the Bible Tells Me So*”: *Manifest Destiny and American Indians*, 9 ST. THOMAS L. REV. 37, 38 (1996).

³⁷⁸ *M'Intosh*, 21 U.S. at 590.

³⁷⁹ *Id.* at 588.

³⁸⁰ See Mcsloy, *supra* note 377, at 38.

³⁸¹ SINGER, *supra* note 370, at 13.

³⁸² Lueck, *supra* note 366, at 414.

³⁸³ *Id.*

original policies of disposition entailed land sales, first possession principles (in the form of preemption, squatting, and homesteading) eventually dominated.³⁸⁴ For roughly the first fifty years of the eighteenth century, when the government policy for disposition was land sales, squatters claimed huge tracts of land under preemption policies.³⁸⁵ Land sales, however, stalled on the Great Plains, inhibiting American expansion.³⁸⁶ With the formation of homesteading, however, the doctrine of first possession formally replaced land sales as the primary means of disposition.³⁸⁷

Under the 1862 Homestead Act, individuals who first claimed unsurveyed public land were granted a private property right in that land by the United States government.³⁸⁸ In exchange for five years of continuous settlement and improvements to a tract of land and a nominal fee, settlers received title in fee simple to 160 acres of land.³⁸⁹ This plot of land could not be sold or transferred to private individuals during the five-year period.³⁹⁰ These land grants were instrumental in the successful development of the American frontier because investors and pioneers had a stake in the successful development of their plots of land.³⁹¹

Similar land grants could serve as a valuable incentive to the development of outer space by corporations, organizations, and individuals.³⁹² Once the discovering nation claims a celestial body via discovery of *res nullius*, that State could then distribute these lands to individual claimants. The first country to appropriate outer space territory could offer its nationals the opportunity to settle this newly acquired terrain through land grants similar to homesteading. If the

³⁸⁴ *Id.*

³⁸⁵ *Id.* The expansion of squatting, especially after its recognition in the preemption acts, suggests that enforcement of land rights were increasing in cost as the frontier quickly stretched beyond older settlements. *Id.*

³⁸⁶ Lueck, *supra* note 366, at 414-15. Protecting and selling land proved much more difficult on the vacant Great Plains than it had been next to well-established towns and villages, so, by 1862 the United States abandoned the majority of its land sales policies in favor of first possession principles. *Id.* The ensuing land rush reduced enforcement costs, since dense settlements sprang up in areas where regulation costs were excessive for the State. *Id.* at 415. Homesteading also increased dissipation of the least valuable public lands. *Id.*

³⁸⁷ *Id.* at 414.

³⁸⁸ Lueck, *supra* note 366, at 414.

³⁸⁹ Tom I. Romero, II, *Uncertain Waters and Contested Lands: Excavating the Layers of Colorado's Legal Past*, 73 U. COLO. L. REV. 521, 565 n.243 (2002).

³⁹⁰ Susan Rose-Ackerman, *Inalienability and the Theory of Property Rights*, 85 COLUM. L. REV. 931, 958 (1985).

³⁹¹ Reynolds, *supra* note 196, at 232.

³⁹² *Id.*

country were to act in the spirit of the space treaties, it could offer land grants—and thus equal access to the lands—to all mankind (rather than just its nationals). Either way, a system of homesteading ensures that those who risk developing celestial land will be rewarded for their work with valuable property rights, rather than potentially lose the value of their work to the global community, which is the more likely outcome under a *res communis* system of celestial government.

3. Rule of Capture

Whenever some fugitive resource is reduced to possession for the first time (like oil, gas, or the spectrum of radio frequencies), the first possession rule of capture has been used to resolve the issue of property rights in that resource.³⁹³ A person can only establish ownership of a fugitive resource by “reducing to possession” a flow from the source of the asset, since enforcing possession of the asset itself is cost prohibitive.³⁹⁴ Cases like *Pierson v. Post*,³⁹⁵ the classic example of the rule of capture, helped open the American wilderness by allowing free takings of wildlife on undeveloped private lands.³⁹⁶ Similarly, the rule of capture can be applied in outer space to the discovery of any new fugitive resources (for example, capturing the sun’s rays for use as solar energy) to efficiently develop exploitation of that resource. Rather than have disputes as to whether an individual has illegally appropriated a resource to the detriment of society under a *res communis* system, the person who successfully confines possession of a fugitive resource can exploit it with legal certainty under a system of first possession. This legal certainty would aid the rapid development and exploitation of all celestial resources.

4. Prior Appropriation

Although scientists have discovered deposits of frozen water on and beneath the lunar³⁹⁷ and Martian surfaces,³⁹⁸ water will still be available only on a limited basis on both of these extraterrestrial

³⁹³ Dhammika Dharmapala & Rohan Pitchford, *An Economic Analysis of “Riding to Hounds”*: *Pierson v. Post Revisited*, 18 J.L. ECON. & ORG. 39, 40 (2002).

³⁹⁴ Lueck, *supra* note 366, at 403-04.

³⁹⁵ *Pierson v. Post*, 3 Cai. R. 175, 2 Am. Dec. 264 (N.Y. 1805).

³⁹⁶ Thomas A. Lund, *Early American Wildlife Law*, 51 N.Y.U. L. REV. 703, 712-13 (1976).

³⁹⁷ Kerr, *supra* note 18, at 1628; Cowen, *supra* note 18, at 166.

³⁹⁸ See *supra* notes 18 and 91 and accompanying text for a discussion of water on Mars.

bodies.³⁹⁹ Since water will be a commodity, it is only fitting that a system of prior appropriation,⁴⁰⁰ which allocates rights to sources of water by using the rules of first possession,⁴⁰¹ be implemented on these celestial bodies. Possession via prior appropriation necessitates diverting water from its source so that it is put to beneficial use (like consumption, mining, or irrigation),⁴⁰² and this diversion creates a priority right to use the water over subsequent users.⁴⁰³ The primary message of prior appropriation doctrine is that “water is a commodity, an object that exists for humans to move and manipulate, a thing that exists primarily to serve human needs.”⁴⁰⁴ Prior appropriation helped to rapidly develop the American frontier because it allowed industrious individuals to divert water from its natural flow so that otherwise arid land could be developed.⁴⁰⁵ People were rewarded for their pioneering spirit with extraordinarily valuable water rights that were protected from later claimants.⁴⁰⁶

Prior appropriation would provide an incentive to extraterrestrial explorers to leave Earth and go to the Moon or Mars for much the same reasons, as the earliest space pioneers would have the incentive to lay claim to any water rights that may exist. These explorers could receive money from colonists who need the water to irrigate their greenhouses, extract minerals from the surface, or survive in general. Using prior appropriation to govern water rights in space would be a huge advantage over a *res communis* system in that unabated communal use of water could harm the interests of the pioneer who invested their time and money to extrapolate the frozen water from beneath the surface. Although the use of water for survival of other pioneers would remain a priority, the remaining water could be used to effectively irrigate the new land or mine other resources that could be used for survival.

³⁹⁹ See ZUBRIN, *THE CASE FOR MARS*, *supra* note 46, at 185-93; LEWIS, *supra* note 17, at 60.

⁴⁰⁰ Chris Bromley, *A Political and Legal Analysis of the Rise and Fall of Western Dams and Reclamation Projects*, 5 U. DENV. WATER L. REV. 204, 212 (2001).

⁴⁰¹ Lueck, *supra* note 366, at 427.

⁴⁰² *Id.* at 427-28.

⁴⁰³ Lynda L. Butler, *The Pathology of Property Norms: Living Within Nature's Boundaries*, 73 S. CAL. L. REV. 927, 940 (2000).

⁴⁰⁴ *Id.* at 941.

⁴⁰⁵ Bromley, *supra* note 400, at 212.

⁴⁰⁶ *See id.*

5. General Mining Statute of 1872

Under common law, private landowners own all non-fugitive minerals attached to their property and may exploit them at will.⁴⁰⁷ Mineral rights on public lands, however, are established under the General Mining Law of 1872.⁴⁰⁸ This first possession statute allows individuals to assert claims to public lands for the exploitation of minerals.⁴⁰⁹ All a miner must do to obtain a patent on mineral-rich land is to locate a mineral load, assess the property, and then submit an application for a patent on the land.⁴¹⁰ During the late nineteenth century, the General Mining Law helped dispose of public lands rapidly by providing incentives for settlers to journey west and complete the vision of Manifest Destiny.⁴¹¹ The General Mining Law can once again serve as a federal mandate for the rapid disposition of public lands,⁴¹² albeit public extraterrestrial lands, if implemented in outer space because both the lunar and Martian surfaces are littered with minerals.⁴¹³ Also, like the rule of capture, implementation of the General Mining Statute of 1872 would be an advantage over a *res communis* system of property rights because a miner could assess a claim on extraterrestrial public land with the legal certainty that he will be rewarded for his efforts.

B. My Proposed Model for Implementing Traditional First Possession

The traditional principles of first possession could easily be implemented by any nation to win the race to a celestial body. Under my model for implementing traditional first possession, for example, upon landing on another planet or moon, space explorers would claim the newly discovered *res nullius* on behalf of their sponsoring nation and reject the *res communis* principle. Under the principle of sovereignty, the laws of the discovering nation would extend to the

⁴⁰⁷ Lueck, *supra* note 366, at 416.

⁴⁰⁸ *Id.* at 416-17. The Act states that “[a]ll valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, [shall be] free and open to exploration and purchase . . . by citizens of the United States . . .” The General Mining Law of 1872, 30 U.S.C. §§ 21-41 (2004).

⁴⁰⁹ Lueck, *supra* note 366, at 417.

⁴¹⁰ *Id.* Miners are protected while prospecting (and before discovering minerals) by the doctrine of *pedis possessio, id.*, which states “that a prospector working on land in the public domain is entitled to freedom from fraudulent or forcible intrusions while actually working on the site.” BLACK’S LAW DICTIONARY 1152 (7th ed. 1999).

⁴¹¹ Christine Knight, *A Regulatory Minefield: Can the Department of Interior Say “No” to a Hardrock Mine?*, 73 U. COLO. L. REV. 619, 619-21 (2002).

⁴¹² *See id.*

⁴¹³ *See supra* notes 73 and 108 and accompanying text for a list of the natural resources available on the Moon and Mars.

reasonable boundaries of that claim, as that is all that the first pioneers would likely be able to protect.⁴¹⁴ The discovering nation could then implement laws similar to homesteading, the rule of capture, prior appropriation, and the General Mining Statute of 1872, if similar laws have not already been enacted by that nation. Consequently, as individuals move to the planet due to the incentives of homesteading, the discovering nation could extend its extraterrestrial borders and thus the protection it gives its extraterrestrial citizens. Throughout exploration and expansion, the allocation of fugitive resources could be governed by the rule of capture, and water allocation could be governed by the doctrine of prior appropriation. Likewise, mineral rights could be governed by the General Mining Statute of 1872. Very quickly, venturesome humans could populate a new celestial body and begin creating humanity's first extraterrestrial civilization.

Such a series of acts could easily be performed by the United States on Mars. Due to the problems inherent in the 1967 Space Treaty,⁴¹⁵ the United States could easily withdraw from it without any legal repercussions. Furthermore, the United States already has experience in successfully implementing all of the aforementioned first possession principles,⁴¹⁶ as well as the technology to complete such a mission.⁴¹⁷

Yet, unilateral withdrawal from the 1967 Space Treaty by the United States is not the only way to implement a model of first possession; rather, any State might incorporate principles of first possession into an interpretation of the 1967 Space Treaty that retains the Treaty's broader philosophical ideals. Otherwise, the problem that arises in implementing a traditional model of first possession is that it turns its back on the potential chance for the world to act in unison on a virgin frontier that is not yet plagued by Earth's many problems.⁴¹⁸ Although very practical, this model

⁴¹⁴ See *supra* notes 293-312 and accompanying text for a discussion of the necessity of exercising control over territorial claims.

⁴¹⁵ See *supra* notes 258-358 and accompanying text for a discussion of the 1967 Space Treaty and the problems caused by ambiguous interpretations of the *res communis* principle, the rejection of sovereignty, and the lack of a governing body to enforce these principles.

⁴¹⁶ See *supra* notes 375-412 and accompanying text for a discussion of the United States' successful implementation of first possession principles in the settlement of the American West.

⁴¹⁷ See *supra* notes 43-51 and accompanying text for a discussion of the Mars Direct plan that would allow the United States to travel to Mars with its current technology.

⁴¹⁸ Marko, *supra* note 214, at 323. Marko notes that poorer countries viewed the

abandons Utopian principles and aspirations that humanity tends to associate with the settlement of a vast new world.⁴¹⁹ Therefore, such a model could incur the ire of the international community and cause rifts that the space treaties originally intended to avoid.⁴²⁰ A revised first possession system, however, could be successfully implemented with modifications that would likely garner the respect and praise of the international community.

C. My Proposed Model for Applying First Possession in the Spirit of the 1967 Space Treaty and 1979 Moon Treaty

The 1967 Space Treaty and 1979 Moon Treaty have been impediments to the development of outer space, generally due to their lofty principles, forced “cooperation” amongst all nations, and use of vague language.⁴²¹ Although philosophically sound, the Treaties seek the implementation of communal ideals that are not in man’s nature—at least if recorded history is any evidence of human behavior.⁴²² It is also highly likely that applying the rules of first possession to outer space would stimulate rapid exploration, colonization, and development, as there would be a race for the economic wealth offered by space in light of dwindling Earth resources.⁴²³ There may be a way, however, to reconcile some of the moral principles encouraged by the space treaties with the development principles advanced by a system of first possession, while still maintaining the advantages that both concepts offer. Under my model for applying first possession in the spirit of the 1967 Space Treaty and 1979 Moon Treaty, this reconciliation should be

1979 Moon Treaty as a chance “to prevent the type of destructive and conflict-marred colonialism that has plagued our planet for over four hundred years.” *Id.* See also *supra* notes 202-203 and accompanying text for a discussion of how the 1967 Space Treaty attempted to preclude neo-neocolonialism and a Cold War-style arms race in outer space.

⁴¹⁹ Indeed, the 1967 Space Treaty and 1979 Moon Treaty can be viewed as multinational attempts for humanity to right previous wrongs and begin anew with a clean slate.

⁴²⁰ See *supra* notes 204-211 and accompanying text for a discussion of the underlying principles of the 1967 Space Treaty and the problems these provisions sought to redress.

⁴²¹ See *supra* notes 263-292 and accompanying text for a discussion of the idealistic principles, mandates of cooperation amongst all nations, and use of vague language within the space treaties and how these issues have impeded development of outer space.

⁴²² See *supra* notes 293-338 and accompanying text for a discussion of the history of sovereignty and the rejection of communal principles.

⁴²³ See *supra* notes 363-413 and accompanying text for a discussion of first possession principles and how they helped to develop the American frontier.

embodied in a detailed vision of uses of outer space, together with an assessment of the rights that should be guaranteed to members of an outer space civilization.

To accomplish this task, the discovering nation of a new celestial body would not reject the 1967 Space Treaty *in toto* upon landing on the new terrain. Instead, it would interpret the Treaty's "province of all mankind" phrase broadly and implement its interpretation in the territory it can control. These interpretations should be accepted readily by the international community as consistent with sovereignty, given that the discovering nation can implement whatever laws it desires for territory it can control.⁴²⁴ The discovering nation would then invite nations to recognize its interpretation of the phrase "province of all mankind" as a guiding force in the further settlement of outer space.

First, rather than broadly classifying all of outer space as *res communis*, the discovering nation should adopt a categorical distinction based on likely uses of space. The vacuum that exists between celestial bodies, for example, should be defined as *res communis*. Just as the oceans and seas of Earth are the common property of mankind,⁴²⁵ this vacuum will likely be the transportation passageway used to commute between Earth and the rest of the celestial bodies in our Solar System. As such, no nation should be denied access to the celestial freeway. Planets, moons, comets, and asteroids, however, should be redefined as *res nullius* so as to give incentives for exploration and exploitation. In that manner, nations can exercise sovereignty over celestial territory that they can rightfully claim, occupy, and protect. Next, it will be necessary for the first nation to reach a celestial body to apply the first possession doctrine and claim that body. Rather than claim it on behalf of the nation that sent the explorers, however, it should claim the planet on behalf of all mankind, thus keeping with the spirit of the "province of all mankind" principle championed by the 1967 Space Treaty.

Subsequently, in keeping with the spirit of a global international community and international law, the discovering nation must recognize the gravity of its accomplishment and establish the governing regime called for by Article 11, Paragraph 5 of the 1979 Moon Treaty. Creating a regime with the power to institute and enforce a legal system will relieve outer space of its current legal

⁴²⁴ See *supra* notes 293-312 and accompanying text for a discussion of the necessity of exercising control over territorial claims and the benefits such control allows nations.

⁴²⁵ GÁL, *supra* note 3, at 122.

ambiguity and will allow investors to measure the safety of their investment. Next, the governing regime should implement a first possession system of property based on United States property law. Such a system should be well-accepted by the international community, given the ubiquitous history of first possession principles throughout global legal history,⁴²⁶ and should also promote the rapid development of outer space to hedge against overpopulation, dwindling resources, or even an extinction level event like nuclear war or an asteroid collision.

Perhaps a new concept of property can be realized by the first nation to reach a new planet, moon, or asteroid, if the discovering nation declares that celestial body *res nullius humanitatus*,⁴²⁷ meaning that it is a place where people can still have individual property rights and be rewarded for their labor based on first possession, but where settlers will act on behalf of the interests of humanity rather than a single terrestrial nation. In this manner, *res nullius humanitatus* would guarantee all humans *equal access* to the rewards offered by outer space, rather than a *de facto* equal share in the rewards reaped from such exploration and exploitation simply because they are human. Thus, outer space will be claimed by all of humanity and become part of mankind's extraterrestrial Manifest Destiny. Naturally, under such a system, the principle that space is the "province of all mankind" should be adhered to and all nations would be guaranteed equal access to outer space. Yet, the term "province of all mankind" should be expanded to encompass more than just equal access to outer space for members of all nations; instead the phrase should come to mean a new beginning for humanity.

The international regime may someday come to recognize that space expeditions likely can create new civilizations, with different concerns and priorities than any terrestrial culture. Within the realm of possibilities, people from various nations may one day choose to emigrate to the Moon and to Mars, despite risks and hardships, *if the rewards are great*.⁴²⁸ In such settings, governing regimes should tend towards granting more extensive human rights than any current terrestrial nation.⁴²⁹ An excellent starting point would be the Bill of

⁴²⁶ See *supra* notes 366-376 and accompanying text for a discussion of the application of first possession in the common law and a list of other legal systems that recognize first possession principles.

⁴²⁷ See *supra* notes 191-193 and accompanying text for a discussion of *res nullius*; see *supra* notes 218-228 and accompanying text for a discussion of *res communis humanitatus*.

⁴²⁸ See ZUBRIN, ENTERING SPACE, *supra* note 54, at 124.

⁴²⁹ *Id.*

Rights and the United States Constitution and its bedrock principle that all people have inalienable rights in “life, liberty, and the pursuit of happiness.”⁴³⁰ It would be helpful, however, to move beyond principles only recognized by these documents through *implied* fundamental rights and instead guarantee *express* equal opportunity rights regardless of race, gender, class, and age.⁴³¹ Finally, rights to privacy, education, scientific knowledge, information, and voting in a *direct* democracy (rather than oligarchies with democratic tendencies like the United States), all of which are denied by many present governments, should be offered to all persons.⁴³² Such a paradigm would afford the opportunity to avoid at least some of the problems that have plagued known models, and fulfill the vision of those who drafted the 1967 Space Treaty as a chance for a clean slate.

Thus, my system for the allocation of property rights in outer space, with its governing regime and clear directive for settling outer space, should also resolve the two major problems inherent in treaty law—enforcement and interpretation⁴³³—because the newly-established regime would uniformly govern this new territory with these guiding principles. The only detractions and counterarguments to the *res nullius humanitatus* concept is that it is a new, untested principle of property rights, much like the *res communis* principle and its more liberal Common Heritage derivation. As opposed to these principles, however, *res nullius humanitatus* does not reject the concept of individual property rights that rewards governments and persons for their efforts. Furthermore, the entire international community would also likely accept such a concept, as all humanity would have equal access to space’s rewards—a goal consistent with the new beginning desired by the authors of the space treaties. In this manner, my system of international space governance, under the guiding principle of *res nullius humanitatus*, would hopefully resolve the competing concerns of all nations that have participated in this debate for the last half century.

V. CONCLUSION

There may be some criticism that this Comment promotes unilateral action by space-faring nations, and given the leadership of the United States in space, likely unilateral action by the United States. Although cooperation is optimal in principle, it is not the

⁴³⁰ *Id.*

⁴³¹ *See id.* at 125.

⁴³² *See id.* at 125-26.

⁴³³ Marko, *supra* note 214, at 295.

ideal way to rapidly develop outer space, especially as the law of outer space has developed through the United Nations. Space treaties take too long to negotiate and require too many consenting opinions to be truly effective, causing the simplest, lowest common denominator policies to emerge,⁴³⁴ rather than detailed regulations that can be used to promote outer space exploration and development. By placing a moratorium on property rights in outer space, the space treaties do nothing more than stagnate the development of outer space and serve the interests of Third World countries.⁴³⁵ It seems, however, that developing countries speak with forked-tongues: they claim to be acting on behalf of mankind by supporting the status quo, but simultaneously serve their terrestrial interests.⁴³⁶ Developing countries do not want to be excluded from outer space—and are keeping mankind from reaping its rewards.

Thus, the only way to quickly develop outer space so as to avoid overpopulation, resource depletion, or extinction is to implement a system of first possession, which is well-recognized throughout the world as a fundamental legal principle. It is also a system that is proven to quickly conquer a vast frontier. Therefore, asking the United Nations to implement United States-based property law is not self-serving or hubristic. A system of first possession based on rules of discovery and capture, policies of homesteading and prior appropriation, and statutes of bedrock mining worked in the nineteenth century to swiftly develop the American West.⁴³⁷

Perhaps ironically, it is nineteenth century precedent that holds the greatest promise for allocating property rights in space, “the final frontier.” Although a system of “first in time, first in right” is exclusionary by its very nature, appropriating outer space territory in the spirit of the 1967 Space Treaty (i.e., adhering to the principle that space is the “province of all mankind”) could nonetheless render equal access to outer space for all of humanity. A system by which an

⁴³⁴ See *supra* note 265 and accompanying text for a discussion of how the consensus methodology and rule of unanimous consent cause lowest common denominator policies to emerge in space treaties.

⁴³⁵ See *supra* notes 267-288 and accompanying text for a discussion of how differing interpretations of the moratorium on property rights has inhibited the development of outer space.

⁴³⁶ See *supra* notes 223-233 and accompanying text for a discussion of how developing countries sought to implement the *res communis humanitatus* concept for the benefit of mankind while simultaneously directing the transmission of wealth, political power, and technology from developed countries to undeveloped countries.

⁴³⁷ See *supra* notes 363-413 and accompanying text for a discussion of these first possession principles and how each of them individually helped to develop the American frontier.

appropriating nation allows individual property rights to be claimed by *any* human being—even those from other nations—on a “first come, first serve” basis would allow all persons equal access to space to reap its rewards. This first possession system would likely turn out to be more egalitarian than the current system promoted by developing nations (i.e., one of equal share for all nations, even for those nations that have not contributed to the exploitation of resources) because the last three decades have demonstrated that a system of *res communis* gives no incentive to develop any outer space resources. Consequently, the current structure of *res communis* allows no person or nation to reap any rewards because no development is stimulated and there are no rewards to reap.⁴³⁸ An equal share in nothing still leaves all persons with nothing!

Implementing a development-friendly system of first possession while simultaneously adhering to the “province of all mankind” principle, however, ensures all of humanity that it will eventually have equal access to the seemingly *infinite* resources of outer space. Access to infinite resources will combat the idea that the world’s resources are fixed and finite, which necessarily leads to a competition where every nation is the enemy of the other because of the necessity to acquire those limited resources. Instead, this struggle will be resolved in favor of a society where there is a universe of unlimited resources just waiting to be accessed by all of mankind. Seemingly, the authors of the space treaties foresaw such a society;⁴³⁹ yet, the system of *res communis* stagnated the exploration and exploitation of space.⁴⁴⁰ A first possession system would set the course straight and give every individual the opportunity to share in the vast treasures of outer space.

⁴³⁸ See *supra* notes 258-352 and accompanying text for a discussion of the deficiencies, ambiguities, and uncertainties created by the space treaties and their effect on the development of outer space.

⁴³⁹ See *supra* notes 195-203 and accompanying text for a discussion of the rewards that developed and developing nations believed would be reaped from the *res communis* approach to property in outer space.

⁴⁴⁰ See *supra* notes 258-352 and accompanying text for a discussion of how the *res communis* principle has slowed the development of outer space.