

FORUM ON SPACE LAW

EDITORS' INTRODUCTION

It seems that rarely a day goes by without the newspapers reporting on some new development or activity relating to outer space. After many delays and setbacks, such as the Challenger tragedy, the pace of space exploration and commercialization has begun to accelerate. The U.S. space station, the Galileo probe to Jupiter, the launching of the Hubble Space telescope, and the private launching of communication satellites have all been in the news lately. The Commerce Department projects that commercial revenues from ventures in space will increase twenty-seven percent this year to over three billion dollars.¹

As space exploration and commercialization continue to advance, lawyers and the law will come to play an increasingly important role. The field of space law is rapidly growing and evolving to meet the challenges of appropriating the benefits and allocating the liabilities from activities in space. Already several hundred lawyers are practicing in this relatively new field, and many private law firms have established or are considering the establishment of space law practice groups.²

All three branches of the federal government will also have critical roles in adapting the legal system to foster space exploration and innovation. This Forum presents three short articles that discuss the contributions of the three branches of government in promoting space activities. The first article is the text of a recent speech by Vice President and Chairman of the National Space Council Dan Quayle that sets out the goals of the Executive for the U.S. space program in the 1990s and beyond. The second article is by Supreme Court Justice William Brennan, who has long had an active interest in space activities and the role of law in promoting and regulating such activities. Justice Brennan speculates on the role of the courts and lawyers in creating legal doctrines that will apply to future space colonies. The third article is derived from the testimony of Professor Glenn Reynolds in favor of a Congressional bill that will explicitly extend patent protection to innovation in space. Such protection is critical to the advancement of commercial ventures in space. Together, these three short articles present an introduction to and overview of the roles of the three branches of the U.S. government in promoting space exploration and commercialization.

1. See Feder, *Searching for Profits in Space*, N.Y. Times, Feb. 11, 1990, at F10, col. 1.

2. See Wiehl, *Space Law: Anticipating Conflict in New Frontier*, N.Y. Times, Mar. 24, 1989, at B6, col. 3.

AMERICA'S FUTURE IN SPACE

*Dan Quayle**

America has been a leader in the scientific understanding of space. We also pioneered the space age. In the 1960s, we made a national commitment to both space science and space exploration.

Unfortunately, over the past two decades, we have not maintained the momentum of the 1960s. In space launch capability, our competitive advantage in technology has disappeared. We have not sufficiently developed space as an arena for private enterprise; and, after developing the world's first space station in the early 1970s, we will be waiting until the late 1990s for a replacement. We have continued to have good ideas—but our programs seem to be taking too long and costing too much to build. As a result, the rest of the world is catching up and may pass us by. And despite our continued scientific and technological preeminence, our government has not done as well as it could have in marshalling the resources and the leadership necessary to keep us ahead in space.

When President Bush established the National Space Council on April 20, 1989, he asked me, as its Chairman, to take a fresh look at our space program. He asked me to work with others in the Administration and outside to reassert our world leadership in space. He asked that we shape a space program that is aggressive and innovative, and that we challenge accepted ways of doing business.

As soon as I became Chairman of the Space Council, I began meeting with various groups of experts on our space program. And whatever their particular differences, I heard much the same thing from almost all of them; they told me that we can no longer accept the status quo.

As Chairman of the National Space Council, I intend to bring the kind of innovative approaches to the space program of the 1990s that were characteristic of Polaris, Atlas, Apollo, Voyager, and some programs in the Defense Advanced Research Projects Agency. To do this, the Council is looking across the traditional divisions among civil, commercial, and national security activities. We are building a program that is more than the sum of these parts.

Our strategy has several elements. First, we intend to develop our space launch capability and its related infrastructure as a national

* Vice President of the United States; Chairman of the National Space Council. This article is the text of a speech delivered by Vice President Quayle to the American Astronomical Society in Arlington, Virginia on January 10, 1990.

resource. These large, complex, and expensive infrastructure elements are like the great railroad, highway, and dam programs of the past. They are as vital to space travel as the interstate highway system is to motor travel.

Moreover, they cannot be considered only within the context of a single government agency. They cannot be built to meet the needs only of a specific space program. They must be structured to accommodate both our current needs and our future programs. We need to ensure reliable and affordable access to space. The Space Council is consulting widely on ways to accomplish this. I believe we can lower the cost of space launch.

Our second goal is to open the frontiers of space. This includes manned and unmanned programs. Last July the President announced the goals of completing Space Station Freedom, going back to the Moon to stay, and going on to Mars. Those goals have given focus to our manned space efforts, and are crucial to our space program as a whole. But our manned space program will move ahead in conjunction with our unmanned program. Our unmanned space exploration provides excitement and fascinating results.

During Voyager's encounter with Neptune last August, I was at the Jet Propulsion Laboratory on August 29th, congratulating the scientists there for a job well done. That mission taught all of us how central unmanned exploration is to space science and discovery. As Magellan now makes its way toward Venus and Galileo toward Jupiter, let me reaffirm our commitment to the unmanned, as well as the manned, exploration of space. Let me also emphasize today the role of science in our future programs.

We are committed to a balanced scientific program. The large exploration programs we are planning will not emphasize human activities at the expense of scientific excellence. When we return to the Moon, we will devote much of our effort to scientific research. At some point we hope to establish lunar astronomical observatories, to build on the foundations laid by the Hubble Space Telescope and other Great Observatory satellites.

Similarly, our exploration of Mars will begin with an expanded series of unmanned scientific probes, perhaps including a return of Mars surface samples. There are ways in which we will use space to reassert America's leadership in basic sciences.

The benefits of space travel and exploration go far beyond the mere scientific. Our timed goal is to capitalize on the by-products of space sciences and technologies for more earthly application. The National Space Council is committed to intensifying our use of space to deal with:

problems on Earth. Environmental concerns are a top priority of people everywhere. Space can give us the means to understand such problems and devise solutions.

In this regard, the most hopeful new initiative is the Mission to Planet Earth. At our Space Council meeting in November 1989, we began a review of current plans for Mission to Planet Earth to make sure it is structured to give us the knowledge we need as efficiently and as soon as possible. We intend to move forward on this. In addition, we believe the exploration of space will enhance our economic well-being and our overall national competitiveness.

In addition to the Space Council, I also chair the President's Council on Competitiveness. I believe these two are closely related and that space science and space exploration are crucial to our nation's technological and scientific development and economic competitiveness.

The final element of our strategy, of course, is ensuring that our space program contributes to our nation's security. To achieve these goals, the Space Council is taking a fresh look at our current programs and options. We have already made some real contributions. We have restructured and improved the National Aerospace Plane Program which is a leading technology for the future. And, we have preserved a national capability for civil earth remote sensing with LANDSAT.

We have also addressed the issues associated with international participation in our new space exploration program. Shortly after the President's announcement, I met with Japanese Prime Minister Kaifu. He and I agreed to start a dialogue about joint U.S.-Japanese ventures in space. This dialogue is likely to grow in importance in the years ahead, but now is the time to think through the whole issue of international cooperation.

In this as in other parts of our space program, we will be seeking new ways to accomplish our goals in space. In general, we will look for ways to streamline the design and production phases of program development, while maintaining high standards of safety and performance.

There are well founded concerns over the time it takes to translate promising ideas into real space capability. A few months ago the U.S. launched the Galileo probe to Jupiter—it will arrive there in the mid-1990s. A few months from now we will launch the Hubble Space Telescope—a major milestone in the history of astronomy. But these projects began in the 1970s. I think you will agree this just isn't good enough. Our performance hasn't kept up with our science. We've got to figure out how to reduce the time from idea to realization from decades to a few years. I believe that this can be done.

That's why I asked NASA Administrator Dick Truly to ensure that

our space exploration program is benefitting from a broad range of ideas about different architectures, new systems concepts, promising new technologies, and the innovative use of existing technologies for space exploration. In performing this task, I asked him to query the best and most innovative minds in the country—at universities, federal research centers, within our aerospace industry, and elsewhere.

I have also asked the National Academy of Sciences and the Aerospace Industries Association to look at current approaches to space exploration and tell us about new, better approaches. The federal government will do its part. An ambitious space program will not be cheap, but the necessary resources are well within our means as a nation. President Bush is committed to providing the resources, now and in the future. Despite the well-known budget constraints, and despite cuts by Congress in our proposal, our 1990 civil space budget is nearly twelve percent larger than 1989's.

But money alone will not be enough. We need fresh thinking. And we need a new sense of commitment—a revival of the can-do spirit that has made our nation great. The Apollo Moon landing was one of the highlights of the 1960s, but there were other, more ominous events as well: the Berlin Wall, the invasion of Czechoslovakia, the Soviet promise to “bury” us. Today, of course, the Berlin Wall is open. Czechoslovakia has embarked on the road to freedom. And far from burying the West, communism finds itself in decline and disrepute.

These events didn't just happen by accident. As many people have noted, they happened in part because even the Iron Curtain was not impervious to the Information Revolution sweeping the globe. And as you all know, space-based communications have played a key role in this revolution. In other words, contrary to the fears of many, the progress of science, on the whole, seems to have benefitted the cause of freedom. I believe that scientific progress goes hand in hand with political and social progress—that science and freedom are allies, not enemies. Progress in space can and should mean progress for all the peoples of the Earth.

SPACE COLONIZATION AND THE LAW

*William J. Brennan, Jr.**

This Bicentennial Conference of Judges of United States Courts of Appeals has been discussing what the future holds for the role of the federal appellate judiciary. I'm going to continue on the same line but, after you've heard me, you may think that what I say is pure fantasy and that I've taken leave of my senses. Because I'm going to say something about the law and Outer Space—and specifically what prospect there is for involvement of the law and courts and lawyers in the still mysterious but surely burgeoning evolution of humankind's effort to conquer the far reaches of the Universe.

Can it be that human beings shall indeed colonize the moon and Mars and even farther reaches of the heavens? Does the nation's reentry into the fray, signalled by the successful flight of *Discovery*, answer with an emphatic yes? Recently, the administration funded NASA with about 900 million dollars to begin work on a space station, a project estimated to cost upwards of thirty billion dollars by the time it is finally assembled in orbit in the late 1990s.¹ Apparently about twenty shuttle flights would be required over a three-year period to haul the station components into orbit for assembly there. Several shuttle flights would then be needed to ferry people and research equipment to and from the station. A "visions" committee of NASA is pondering a permanent base on the moon and human exploration of Mars.²

And not long ago, *The Washington Post* reported that then President Reagan, with the five astronauts of the shuttle *Discovery* beside him at Houston, proclaimed that "America must lead the effort to colonize space, because in the next century leadership on Earth will come to the nation that shows the greatest leadership in space."³ President Reagan talked of establishing a permanent moon base and of a manned flight to Mars. "Let every child dream that he or she may one day plant the Stars

* Associate Justice, Supreme Court of the United States. This text is a slightly modified version of the remarks of Justice Brennan to the Bicentennial Conference of Judges of United States Courts of Appeals on October 26, 1988.

1. See Lindley & Swinbanks, *United States Back in Space Again*, 335 NATURE 480 (1988); Hattis, *The U.S. Space Station: A Quarter-Century of Evolution*, TECH. REV., July 1988, at 29.

2. See Boffey, *Panel Urges Lunar Station as Step to Mars*, N.Y. Times, Aug. 18, 1987, at C3, col. 1.

3. Quoted in Cannon, *President Salutes Discovery*, Bush, Wash. Post, Oct. 15, 1988, at A4, col. 1.

and Stripes on a distant planet," he said.⁴ "Mankind's journey into space," he went on, "like every great voyage of discovery, will become part of our unending journey of liberation. In the limitless reaches of space, we will find liberation from tyranny, from scarcity, from ignorance and from war. We will find the means to protect this Earth and to nurture every human life, and to explore the universe."⁵ "This," he concluded, "is our mission, this is our destiny."⁶

My interest in this fascinating issue was triggered by an invitation from the National Air and Space Museum of the Smithsonian Institute and the Center for Democracy of Boston University to join their cooperative program to commemorate the Bicentennial of the Constitution by examining the possible applicability of the values and principles underlying our constitutional heritage to future space settlements. This program included the staging of conferences of a large number of leading legislators, jurists, lawyers, educators, businessmen, and other distinguished citizens to discuss and propose a "Declaration of First Principles for the Governance of Outer Space Societies."⁷ Drafts of such a *Declaration* were completed and circulated for comment. As might be expected, some found flaws in it, of which more will be said later.

Now, why the sudden interest in the law of space communities? No such community exists yet but there is a feeling abroad that, more quickly than we realize, there will be space communities on the moon or on Mars or simply anchored somewhere in space. Princeton physicist Gerard K. O'Neill anticipates orbital colonies of 10,000 or more people in many places in outer space.⁸ Moreover, a Presidential Commission—the National Commission on Space—has recently published a report that envisions human settlements in space in the relatively near future at Earth orbital, lunar, and eventually Martian bases.⁹

In the face of the unbelievable accomplishments of space programs of the United States and Soviet Union, I don't see how we can possibly reject all this as pure fantasy. But I do think that with so much to be done to create space colonies, it may certainly be a long time before large, independent societies will be in existence.

Yet, if we accept, as I am persuaded we must, that space colonization

4. *Id.*

5. *Id.*

6. *Id.*

7. Reprinted in G. REYNOLDS & R. MERGES, *OUTER SPACE: PROBLEMS OF LAW AND POLICY* 310-11 (1989).

8. G. O'NEILL, *THE HIGH FRONTIER* (rev. ed. 1982).

9. NATIONAL COMMISSION ON SPACE, *PIONEERING THE SPACE FRONTIER* 71-73 (1986).

is inevitable and that we should therefore prepare for it, what are some of the legal problems that we should be thinking about? The conferees at last year's Smithsonian meetings identified a large number. Some of these issues are presented below.

Since Earth is part of space and space is part of the Cosmos, space societies can't sever their ties with Earth. Is Earth then to determine the shape or nature of governance in space? If so, isn't space then just a new continent, as was our own when the Mayflower landed, to be explored as was our own by several nations—the Spanish, the French, the Portuguese, and the English? Should any law then be made for a space society in advance of actual settlement? Does not that law have to await knowledge of what people will make up a colony in space? What is the best historical model—the Mayflower Compact, the Articles of Incorporation of the British East India Company, or whatever? Or should it be a wholly original creation? Will the norms of Western society determine the lives and dreams of humanity in space? If the United States creates a society populated by U.S. citizens, what federal law should govern that society? Admiralty law, perhaps? Does the Constitution follow the flag so that its protections are available to every resident of the space settlement? Who regulates the United States settlements: the space-dwellers themselves, or the Congress? Can we really say in advance or is that a question that should be left to the space settlers? In any event, is it not folly to think of a homogenous society in space—won't we have separate, different groups? How do we acquire a portion of the moon, or of Mars, or of space itself, for a settlement? From whom do we acquire this territory? What right is there to own real property in space? What mechanism should be created for determining which domestic laws are appropriate to the space environment? Should it be something akin to a space equity jurisdiction? What of international approaches looking to a body of international law to regulate governance of all settlements in space?

These are by no means all of the questions posed by the relationships of Earth and the United States to future space communities. The list does, however, signal something of the monumental tasks that must inevitably entangle lawyers in their solution. It is not that we do not already have some laws in the field. The United States became a signatory in 1967 to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies.¹⁰ Under that treaty the signatories agree that each "shall bear international responsibility for national activities in

10. Oct. 10, 1967, 18 U.S.T. 2410, T.I.A.S. 6347.

outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities."¹¹ There is also the Moon Treaty¹² and perhaps up to 100 additional treaties or agreements relevant to outer space.

Moreover, Congress has extended federal criminal law to punish criminal conduct on the moon or other celestial bodies, and in space craft outside the Earth's atmosphere.¹³ Indeed, a few district court and state court decisions have extended American domestic law to the solution of outer space problems.¹⁴ And doubtless, too, there are many lawyers who have already had occasion to counsel clients on space law. But I suggest that the actual establishment of space settlements will confront the profession with enormous new responsibilities that we ought to prepare for as thoroughly as we can. For it is accepted by all of us, I am sure, that the United States must be, and must become, unequivocally committed to space exploration and exploitation and the settlement of space by Americans. Our very survival requires no less. We have to keep in mind that the Soviets, Japanese, Europeans, and South Americans also have asserted interests in outer space.

Let me return now to the *Declaration of First Principles* that the Smithsonian Conferences produced last year.¹⁵ The *Declaration* was not the only effort in its field. Another, entitled a proposed *Treaty Governing Social Order of Long-Duration or Permanent Inhabitants of Near and Deep Space* (which I shall refer to as the *Convention* to distinguish it from the *Declaration*) was advanced in a recent book entitled *Envoys of Mankind*.¹⁶ Both the *Convention* and the *Declaration* have come under sharp criticism in a review by John A. Ragosta and Glenn H. Reynolds, lawyers who have practiced space law in Washington, D.C.¹⁷

The criticism of the *Declaration* may be more serious. While concluding that the *Declaration* has much to recommend it because it focuses directly on affirmative statements of fundamental and political rights, the review comments:

11. *Id.* art. VI.

12. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 34 U.N. GAOR (Agenda Items 48, 49) at 1, U.N. Doc. A/Res/34/68 (1979), reprinted in 18 INT'L LEGAL MATERIALS 1434-41 (1979).

13. 18 U.S.C. § 7(6) (1988).

14. See generally OFFICE OF TECHNOLOGY ASSESSMENT, SPACE STATIONS AND THE LAW: SELECTED LEGAL ISSUES (1986).

15. See *supra* note 7 and accompanying text.

16. G. ROBINSON & H. WHITE, ENVOYS OF MANKIND: A DECLARATION OF FIRST PRINCIPLES FOR THE GOVERNANCE OF SPACE SOCIETIES 266-70 (1986).

17. Ragosta & Reynolds, *In Search of Governing Principles* (Book Review), 28 JURIMETRICS J. 473 (1988).

The *Declaration* appropriately guarantees civil and political freedoms that should govern all actions in space of earth and space inhabitants. Such principles can guide analysis of legal issues that arise in whatever context and provide guidance for a discussion of rules for governance of space societies. Unfortunately, the *Declaration* has a fatal flaw. The *Declaration* is written solely from the perspective of the United States, failing . . . to understand the critical role that the political relations of all Earth nations will have on space inhabitants. . . . We do not believe that the Soviet Union, France, China, or any other spacefaring nation will look with favor on principles formulated in such a manner. It is simply not productive to seek to establish principles for laws and government in space that will certainly be perceived by the world's leader in space habitation (the Soviet Union, alas, not the United States) as either irrelevant or insulting.¹⁸

Having decided that both the *Convention* and the *Declaration* are flawed, Ragosta and Reynolds offered their own version of a *Declaration of Rights and Principles for the Governance of Space Societies*.¹⁹ Their guidelines were for and about the space inhabitants, and was not an attempt to defuse or resolve all the possible conflicts of Earth nations in space. Accordingly, their focus was on man's exploration and ultimate inhabitation of space, not simply one nation's space activities, and in that respect avoided unnecessary historical, political, and cultural ties to one nation. They believe that their *Declaration* could not itself be a system of laws and governance, but should help to foster such a system. Finally, they too would have their *Declaration* recognize that there are fundamental principles that should apply to governance of any human society.

It's very obvious that neither the *Convention* nor the two *Declarations* come even close to being the last word on the subject. As the reviewers observed: "[A]ll of the work done to date constitutes little more than a preface to the task of working out a scheme of governance for space societies."²⁰ But whether permanent human presence in outer space is likely in the near term, or likely only in the distant future, apparently they are going to be a reality with which we must deal.

And the study of space societies may have a big dividend for Earth.

18. *Id.* at 485.

19. *Id.* at 487-89.

20. *Id.* at 489.

Walter McDougall has noted that our modern system of international law began with the great age of exploration of the high seas.²¹ A similar burst of development of international law and understanding may result from the new era of space colonization. Again quoting Ragosta and Reynolds:

In the same way, inquiry into the rules that should govern societies in space is likely to provide fresh insights into the governance of societies here on earth, a field in which, to judge by current events, there is certainly room for progress. This is particularly true because many of the salient characteristics of space societies, such as strong dependence on sophisticated technology, problems with maintaining environmental quality, the need for people to work together smoothly under stress in close quarters, and the dependence of inhabitants on their society for basic necessities such as food, water, air, and communications, are in many ways simply exaggerations of characteristics already present (and growing) in earth societies. By studying the problems of space societies we gain a window into not just their future, but our own.²²

I won't see the day when a code of laws for space communities will become an urgent necessity. Perhaps few of you may see that day. But we can be glad that responsible quarters are beginning to give thought to the law and space communities. For, to repeat former President Reagan's admonition, "America must lead the effort to colonize space, because in the next century leadership on Earth will come to the nation that shows the greatest leadership in Space."²³

21. W. MCDUGALL, *THE HEAVENS AND THE EARTH* 185 (1985).

22. Ragosta & Reynolds, *supra* note 17, at 489-90 (footnote omitted).

23. See *supra* note 3.

LEGISLATIVE COMMENT: THE PATENTS IN SPACE ACT

*Glenn H. Reynolds**

The following Legislative Comment is adapted from the testimony of Professor Glenn H. Reynolds in support of H.R. 2946, the "Patents in Space Act," before the Subcommittee on Courts, Intellectual Property, and the Administration of Justice of the House Judiciary Committee on October 4, 1989. H.R. 2946 was introduced by Representative Robert Kastenmeier (D-WI) on July 29, 1989; its companion bill, S. 459, was introduced in the Senate by Senator Albert Gore, Jr. (D-TN). The proposed bill would explicitly extend the protection of U.S. patent laws to inventions made, used, or sold in outer space on U.S. spacecraft or other space objects under the control of the United States.

*Professor Reynolds is actively engaged in research and writing regarding legal problems involving advanced technologies, including those relating to outer space. He is the author, with Robert P. Merges, of *Outer Space: Problems of Law and Policy* (1989) and of numerous articles concerning space-related legal problems.*

I appreciate the opportunity to testify concerning U.S. patent treatment of spacecraft and other space objects, and the impact of H.R. 2946 on that treatment.¹ At the outset, I would like to congratulate the Subcommittee for paying attention to this important topic at this early date. All too often, our system requires a crisis to precipitate action; in this case, I believe that significant problems will be headed off by this bill. My testimony will discuss two main topics: the impact of H.R. 2946, and the reasons why I believe that the bill is necessary. I will also address briefly some other, related topics of concern including—most significantly—the desirability of a special grant of jurisdiction, analogous to the admiralty jurisdiction, for federal courts in space-related cases.

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1. The Patents in Space Act, H.R. 2946, 101st Cong., 1st Sess. (1989).

I. IMPACT OF THE BILL ON UNITED STATES PATENT LAW

Previous testimony on an earlier version² of the current bill has addressed the impact of this legislation on U.S. patent law.³ Therefore, my treatment of this first issue will be brief.⁴ H.R. 2946 serves three purposes. First, it will ensure that research in space will in fact receive patent protection, which is of obvious importance if such research is to be encouraged. Second, it will ensure that space-based inventions are not subjected to the subtle—but often significant—burdens that U.S. patent law places on applicants whose inventive work took place outside the United States. And third, it will make infringement that takes place in space subject to liability under U.S. patent law.

U.S. patent law currently does not provide protection for inventions made, used, or sold in outer space because the existing law is territorial in application. The relevant U.S. Code section provides that for the purposes of the patent laws:

The terms "United States" and "this country" mean the United States of America, its territories and possessions.⁵

The Supreme Court recently held that our patent system has no extraterritorial effect and was not intended to apply to activities taking place beyond the territorial limits of the United States.⁶ Prior to this decision, there had been some case authority that seemed to suggest otherwise.⁷ Based on this earlier authority, one can make an argument that U.S. patent law continues to apply to U.S. flag ships and, by analogy, to U.S.

2. H.R. 2725, 99th Cong., 1st Sess. (1985).

3. See, e.g. *Patents in Space: Hearings Before the Subcomm. on Courts, Civil Liberties, and the Administration of Justice of the House Comm. on the Judiciary*, 99th Cong., 2d Sess. 96-118 (1985) (testimony of Professor Donald Chisum).

4. For further background and analysis, see G. REYNOLDS & R. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY 282-90 (1989); *Patents in Space: Hearings Before the Subcomm. on Courts, Intellectual Property, and the Administration of Justice of the House Comm. on the Judiciary*, 101st Cong., 1st Sess. 36-81 (1989) (testimony of Professor Glenn H. Reynolds) [hereinafter *Hearings*].

5. 35 U.S.C. § 100(c) (1988). This section was added in 1952 by Pub. Law 82-593, 66 Stat. 792, 797 (1952). Unfortunately, the legislative history provides little guidance, stating only that "[p]aragraphs (c) and (d) are added to avoid the use of long expressions in various parts of the revised title." 1952 U.S. CODE CONG. & ADMIN. NEWS 2394, 2409.

6. *Deepsouth Packing Co., Inc. v. Laitram Corp.*, 406 U.S. 518, 531 (1972).

7. See, e.g., *Gardiner v. Howe*, 9 F. Cas. 1157 (C.C.D. Mass. 1865) (No. 5219) (applying U.S. patent laws to U.S. flag ships on the high seas).

flag spacecraft.⁸ However, such an argument would be undercut by the intervening changes in the law, which I will discuss further in the next section.⁹

For the moment, I will assume that in the absence of this bill U.S. patent law will not apply to space inventions, so that the bill is required to ensure "U.S. treatment" of inventions made, used, or sold in space. To understand why this is important, one must understand three key points about how U.S. patent law currently works.

The first key point is that under U.S. law, foreign inventive activity is treated differently than U.S. activity. Unlike the patent laws of most other countries, U.S. patent law generally provides that a patent will issue to the first person to invent the product or process she claims in her patent.¹⁰ As a result, in the United States the first inventor is said to have "priority" over others claiming the invention. The existence of priority is determined by looking at certain key events: conception, reduction to practice, and diligence. Crucial to the issue of space patents is that a person may not establish *any* of these events by reference to activity outside the United States.¹¹

An inventor will suffer a substantial disadvantage if, because of the territorial nature of U.S. patent law, an invention reduced to practice on board a satellite or space station is viewed as being reduced to practice outside the United States.¹² This problem is exacerbated by the nature of much space research. Many of the most promising devices and processes being investigated can *only* be reduced to practice in outer space, since they rely on microgravity or other unique characteristics of the space environment. Thus, a lack of patent protection would likely forestall research in these fields.¹³

A second key point has to do with "prior art." An invention, in order to qualify for a patent, must be a true *invention* worthy of some sort of encouragement. Under patent law, this translates into a requirement that

8. For an example of such an argument, see Saragovitz, *The Law of Intellectual Property in Outer Space* 17 IDEA 86 (Spring 1975).

9. See *infra* notes 36-48 and accompanying text.

10. In most other countries, the general rule is that the patent goes to whoever is "first to file," regardless of who was in fact first to invent.

11. 35 U.S.C. § 104 (1988); see also 3 D. CHISUM, PATENTS § 10.03 (1978 & rev. 1989).

12. For an illustration of how this might work, see G. REYNOLDS & R. MERGES, *supra* note 4, at 287.

13. See *Hearings, supra* note 4, at 27-35 (testimony of Dr. Charles E. Bugg, Director, Center for Macromolecular Crystallography).

an invention be both "novel"¹⁴ and "nonobvious."¹⁵ For reasons now somewhat dubious, U.S. patent law draws a sharp distinction between domestic and foreign activities in calculating what is to be counted as prior art. Patents and printed publications, no matter where they originate, are considered prior art; but non-written items that are previously known, used, or invented by another are counted within the relevant prior art only if they occur within the United States.¹⁶ This means that if space is considered "outside the United States" for patent purposes, a U.S. company's work in space would, for example, not be "prior art" barring a patent by another foreign or domestic company unless it were either published or the subject of a patent.

The third issue is protection from infringement. In many cases, this would not be a practical problem. Since U.S. patent law forbids anyone from making, using, or selling a patented device within the United States without a license from the patent owner,¹⁷ the mere fact that a satellite manufactured in the United States is to be launched into space would not protect its manufacturer from a suit for infringement. It would still be "made" and presumably "sold"¹⁸ in the United States, and thus subject to U.S. patent law. However, there are other circumstances where only the "use" aspect is called into play, and where that "use" is likely to take place only in space.¹⁹

Given these three important restrictions of existing U.S. patent law, the denial of patent protection for space inventions would have undesirable effects. First, there is no sound policy reason for denial of such

14. "Novel" means that no identical invention is found in the already existing "prior art" as recognized by the law. 35 U.S.C. § 102 (1988).

15. "Nonobvious" means that an invention must be more than a simple extension of the prior art. *Id.* § 103.

16. *Id.* § 102(a), (b).

17. *Id.* § 271.

18. I note that H.R. 2946, unlike its predecessor, provides patent protection for inventions "made, used, or sold in outer space." H.R. 2946, 101st Cong., 1st Sess. § 2(a) (1989). The prior bill only applied to inventions "made" or "used" in outer space. H.R. 2725, 99th Cong., 1st Sess. § 1(a) (1985). While it is hard for me to imagine that many inventions will be "sold" in outer space in the near future, the expansion of the language is a good idea. In the absence of some disastrous failure of economy, management, or national will the day is certain to come when this concern *will* arise, and we might as well have the law in shape now, particularly as the cost of adding an extra word or two to the bill is effectively zero.

19. For example, if a spacecraft—say, a communications satellite—were manufactured and sold outside the United States, but registered under the United States flag, it would be "used" in outer space subject to the bill, but not "made" or "sold" there. Similarly, patented inventions having to do with objects only put together in space—large space structures, or multisatellite systems, for example—would raise difficult questions of where the invention was "made" (as shown by the *Deepsouth Packing* case, *supra* note 6 and accompanying text, which held that exporting components that would be assembled abroad into the patented device did not violate U.S. patents), but none regarding its use.

protection; it is simply a gap in the law. Second, while denial of protection would not discourage innovation in the affected areas entirely, it *would* tend to skew the character of research. Large, integrated firms that could make use of knowledge gained internally would still have an incentive to do research (though a smaller one than if the results of their research were to be protected), but smaller firms and universities that could realistically be expected to recoup their costs only through patent licensing fees would not. Unlike many of our economic competitors such as Japan, these small entities account for a disproportionate share of our cutting-edge research. By failing to extend patent protection to space innovations made by smaller firms and research centers, we would systematically be depriving ourselves of our most valuable research resources.²⁰

Finally, the bill will have an impact with regard to protection of national security secrets. U.S. patent law provides that an invention originating in the United States may not be patented abroad unless the inventor has either filed an application in the United States and waited six months, or obtained permission to file abroad from the Commissioner of Patents and Trademarks.²¹ The purpose of these provisions is to permit national security review of U.S. inventions. H.R. 2946 will ensure that these national security provisions apply to inventions made on board U.S. registry space objects.

II. THE NEED FOR LEGISLATIVE ACTION

For the reasons described above, U.S. patent protection should be extended to cover space activity. However, there has been disagreement over the question of whether a bill is necessary to effect that extension. There are three possible approaches to extending patent protection to activity aboard U.S. spacecraft and space stations. First, one could simply maintain that U.S. patent law, by plausible extension, should already be read to extend to space, and that new legislation is therefore not necessary. Second, one could agree that there is room for doubt about whether current patent law extends to innovations in outer space, but

20. For discussions of these issues, and why the patent system is important in promoting research, especially among smaller firms, see Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265 (1977); Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL'Y 285, 301 (1986). See generally *Intellectual Property and Trade 1987: Hearings Before the Subcomm. on Courts, Civil Liberties, and the Administration of Justice of the House Comm. on the Judiciary*, 100th Cong., 1st Sess. (1987).

21. 35 U.S.C. §§ 181-188 (1988).

argue that this matter should be resolved in the courts before resorting to legislation. Third, one can argue that it is appropriate to resolve the question through legislation, avoiding the uncertainties involved in litigation.

I hold to the last view—that new legislation is needed—for a number of reasons. Most importantly, I consider it a matter of some doubt as to whether existing U.S. patent law should be read as applying to U.S. spacecraft. That is because the jurisdictional theory behind the patent laws, and the jurisdictional theory under which a launching state exercises “jurisdiction and control” over a space object on its registry, are based on different and incompatible principles.

There are, in essence, five general principles of jurisdiction, as follows:

1. *Territorial Jurisdiction*, based on the geographic territory of a state;
2. *Nationality Jurisdiction*, based on the nationality of persons or entities subjected to state control;
3. *Protective Jurisdiction*, based on the nature of acts committed and their impact on vital state interests such as national security;
4. *Universal Jurisdiction*, based on the principle that some crimes (the classic example is piracy, though in modern times torture, genocide, and related “human rights” offenses have been included) are universally condemned and that no connection with any particular state is required; and
5. *The Passive Personality Principle*, based on the ability (some would say the duty) of a state to act with regard to any action by a foreigner outside its territory where that action would substantially affect the person or property of a citizen—a foreign contract to assassinate an American, for example.²²

For the purposes of this analysis, it is only necessary to look at two of these theories: territorial jurisdiction and nationality jurisdiction. In the context of nationally-flagged entities such as ships, aircraft, embassies, or spacecraft, these two theories of jurisdiction are often confused but they are in fact distinct. Territorial jurisdiction is based on just that, territory. Though we may speak of aircraft, ships, or embassies as being “U.S. soil”²³ in a legal sense, this characterization was aptly described

22. See G. REYNOLDS & R. MERGES, *supra* note 4, at 248–58.

23. When applied to ships, this characterization is known as the “floating island” theory of jurisdiction.

by the U.S. Supreme Court as "a figure of speech—a metaphor" and not an accurate statement of their legal status.²⁴

Spacecraft, like ships and aircraft, have legal personality growing from both specific provisions and established customs and usages of international law. As the Supreme Court went on to say in *Cunard*:

The jurisdiction which [the "floating island" theory] is intended to describe arises out of the nationality of the ship, as established by her domicile, registry and use of the flag, and partakes more of the characteristics of personal than of territorial sovereignty.²⁵

Thus, though in many ways we may treat a ship *as if* it were a part of the nation whose flag it flies, that treatment is based on analogy. The treatment actually grows out of the ship's nationality and the rights associated with that character under international law, not from the obviously false idea that the ship really is a piece of the nation's territory.

The same principle logically applies to spacecraft. Under the 1967 Outer Space Treaty²⁶ and the 1976 Registration Convention,²⁷ national jurisdiction extends to spacecraft carried on a particular nation's registry. Specifically, Article VIII of the Outer Space Treaty provides that:

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.²⁸

This scheme is highly reminiscent of that providing for registry of ships under the international law of the sea.²⁹

Of course, the argument might be made that the phrase "retain jurisdiction and control" in Article VIII of the Outer Space Treaty means that more than nationality jurisdiction is involved. After all, a spacecraft sitting in American territory prior to launch is within the territorial jurisdiction of the United States, and the Treaty provides that, after launch,

24. *Cunard S.S. Co. v. Mellon*, 262 U.S. 100, 123 (1923).

25. *Id.*

26. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Oct. 10, 1967, 18 U.S.T. 2410, T.I.A.S. 6347 [hereinafter Outer Space Treaty].

27. Convention on Registration of Objects Launched into Outer Space, Sept. 15, 1976, 28 U.S.T. 695, T.I.A.S. 8480.

28. Outer Space Treaty, *supra* note 26, art. VIII.

29. See G. REYNOLDS & R. MERGES, *supra* note 4, at 255-56.

the United States shall "retain" jurisdiction. Thus, it might be argued, this means that U.S. territorial jurisdiction applies to spacecraft even after launch.

This argument would be inconsistent with the rest of the Outer Space Treaty, however. Article VIII provides that jurisdiction and control are retained while the space object is "in outer space or on a celestial body," with the obvious corollary that national jurisdiction and control will not extend to a spacecraft that has returned to earth in another country.³⁰ If, after all, a space object was considered actually to be a part of the launching state, jurisdiction and control would always be present by virtue of the territorial principle. Indeed, it makes little sense to talk about a part of the United States being "in another country"—it is always part of the United States and, though it may be surrounded by another country, is not "in" that other country. Thus, regarding spacecraft as actual parts of the launching states, instead of objects to be treated as within the jurisdiction of the launching state by virtue of nationality, leads to obvious absurdities. Furthermore, such a construction would run afoul of Article II of the Outer Space Treaty, which proscribes application of national sovereignty in outer space.³¹

When these factors are kept in mind it is plain that case law purporting to support the application of U.S. patent law to U.S. space objects is of doubtful value. For example, the case of *Gardiner v. Howe* is often cited for its language that "[t]he patent laws of the United States afford no protection to inventions beyond or outside of the jurisdiction of the United States; but this jurisdiction extends to the decks of American vessels on the high seas, as much as it does to all the territory of the country, and for many purposes is even more exclusive."³² However, the chief reason for citing *Gardiner* probably lies in the paucity of authority on the subject rather than in the reasoning contained in the opinion. The *Gardiner* opinion, exclusive of facts and procedural history, is only twenty-two lines in length, and contains no reasoning beyond the somewhat dubious statement that "[w]ere it to be held that in cases like the present the plaintiff is not entitled to recover, patents for improvements in the tackle and machinery of vessels, or in their con-

30. This is further indicated by the next sentence in Article VIII, which provides that "Ownership [but not jurisdiction or control] of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth." Outer Space Treaty, *supra* note 26, art. VIII.

31. *Id.*, art. II.

32. 9 F. Cas. 1157 (C.C.D. Mass. 1865) (No. 52:9).

struction, would be valueless."³³

This is not to say that *Gardiner* was wrongly decided; I believe that the outcome, at least, was correct on policy if not on legal grounds. But *Gardiner* is poor precedent for space patent cases because it lays down no real principle, and has the added disadvantage of having been decided long before the patent laws were amended to provide that their jurisdiction extended only to "the United States of America, its territories and possessions."³⁴ One might, in fact, imagine a court deciding that one possible purpose of Congress in adding this language to the patent law was specifically to overrule *Gardiner*.³⁵

It is likely that a court would note that the jurisdictional basis of the patent law, being territorial in nature, is not compatible with the nationality basis of jurisdiction expressed in the Outer Space Treaty. This distinction between territorial and nationality bases of jurisdiction has been recognized in a number of other cases. *Cunard v. S.S. Mellon*, mentioned earlier, is one such example.³⁶ Among the issues in this 1923 case was whether Prohibition under the 18th Amendment's ban on liquor sales in "the United States and all territory subject to the jurisdiction thereof"³⁷ applied to U.S. flag vessels beyond U.S. territorial waters. The Supreme Court held that it did not, stating that:

The defendants contend that the [18th] amendment also covers domestic merchant ships outside the waters of the United States, whether on the high seas or in foreign waters. But [the amendment] does not say so, and what it does say shows . . . that it is confined to the physical territory of the United States. In support of their contention the defendants refer to the statement sometimes made that a merchant ship is a part of the territory of the country whose flag she flies. But this, as has been aptly observed, is a figure of speech—a metaphor. . . . The jurisdiction which it is intended to describe arises out of the

33. *Id.*

34. 35 U.S.C. § 100(c) (1988).

35. This was not the position taken by the Patent and Trademark Office Board of Appeals in *Ex Parte McKay*, 200 U.S.P.Q. 324 (1975), regarding a process that could only be used on the Moon. The Appeals Board said that because U.S. *in personam* jurisdiction would apply to U.S. personnel and spacecraft on the Moon, U.S. patent law would apply as well. While I freely admit that this decision is inconsistent with my analysis, *infra*, I believe that the decision of the Appeals Board is also inconsistent with the case law, see *infra* notes 36–48 and accompanying text, and that it would not have been reached by a court that reviewed that law in making its decision.

36. 262 U.S. 100 (1923).

37. U.S. CONST. amend. XVIII, § 1 (1919, repealed 1933).

nationality of the ship, as established by her domicile, registry and use of the flag, and partakes more of the characteristics of personal than of territorial sovereignty.³⁸

Thus *Cunard* can be said to stand for the proposition that laws based on a territorial principle of jurisdiction will not be applied in circumstances where United States jurisdiction attaches on the nationality principle.

Subsequent cases appear to follow this holding of *Cunard*. For example, in the case of *Lam Mow v. Nagle* the Ninth Circuit held that a baby born to Chinese parents on board a U.S. vessel was not a U.S. citizen, notwithstanding that the child would have been entitled to United States citizenship if he had been born on U.S. soil.³⁹ The Court observed that "if the petitioner here had been born within an area of land over which the United States exercises dominion as a sovereign power, he would be a citizen though of alien parentage. The real point in issue is therefore limited to the inquiry whether such a birth upon an American merchant vessel at sea is birth 'in the United States' within the meaning of the Constitution."⁴⁰ Concluding that birth on board a U.S. vessel did not constitute birth "in the United States," the Court considered and rejected the notion that the ship's registry under the U.S. flag placed it within the United States, quoting the language of *Cunard* referred to above⁴¹ regarding the nationality principle and its incompatibility with the territoriality principle.

Similarly, the case of *United States v. 12536 Gross Tons of Whale Oil ex the Charles Racine* held that an American flag ship was not a "point" located "in the United States" under an applicable statute forbidding the transportation of merchandise "between points in the United States" except by American flag vessels.⁴² Thus, a Norwegian vessel that took on whale oil from an American factory ship and delivered it to a U.S. port was not in violation of the statute, notwithstanding the United States' argument that the extension of U.S. maritime jurisdiction to U.S. flag ships made them part of the United States.

The same sort of reasoning has been applied to aircraft as well. In *Air Line Stewards and Stewardesses Association v. Northwest Airlines, Inc.*, the Eighth Circuit held that U.S. labor laws do not apply to U.S. flag

38. 262 U.S. at 123 (citations omitted).

39. 24 F.2d 316 (9th Cir. 1928).

40. *Id.* at 317.

41. See *supra* text accompanying note 38.

42. 29 F. Supp. 262 (E.D. Va. 1939). This case involved an interpretation of the Merchant Marine Act of 1920, 41 Stat. 988, 999 (1920) (current version at 46 U.S.C. § 883 (1988)).

aircraft operating outside of the United States.⁴³ The Court began by saying:

First, we agree that Congress does have the power to make the Railway Labor Act applicable to employees employed on American flag airplanes and who work wholly outside the United States. The point is that the Congress specifically has not done so.⁴⁴

Noting that the Act did not specifically provide for application outside the territory of the United States, the Court construed it not to apply extraterritorially, stating that "we have in mind the rule that unless there is an explicit and unequivocal showing of a contrary intent, Acts of Congress are to be given an interpretation which is domestic in nature."⁴⁵

The patent law also seems to be moving in the same direction of emphasizing its territorial rather than nationality basis of jurisdiction, notwithstanding *Gardiner*.⁴⁶ In *Decca Ltd. v. United States*, the U.S. Court of Claims noted that the law had changed since *Gardiner* and then proceeded to state:

In view of the foregoing, we think a decision founded on the fiction that for purposes of the Patent Laws, United States ships and planes wherever found, are United States territory, would be founded on water.⁴⁷

The Court found it unnecessary to base its decision on this "fiction" however, as it concluded that enough elements of the invention were within the United States to justify application based on the territorial principle.

In a later case, the Court of Claims again disapproved of *Gardiner* in dicta, saying:

43. 267 F.2d 170 (8th Cir.), *cert. denied*, 361 U.S. 901 (1959).

44. *Id.* at 176 (citation omitted).

45. *Id.* at 178. *See also* United States ex rel. Claussen v. Day, 279 U.S. 398 (1929) (holding U.S. Naturalization Act not applicable to American vessel outside U.S. territorial waters).

46. *See supra* notes 32-33 and accompanying text.

47. 544 F.2d 1070, 1074 (Ct. Cl. 1976), *cert. denied*, 454 U.S. 819 (1981).

Of course, the constitutional power of Congress to make our patent laws applicable to processes carried out on U.S. flag ships and planes at sea is not challenged; the question is whether Congress has done so in view of the Supreme Court's doctrine of strict construction.

Perhaps the patent bar will note the possible loophole in the coverage of the U.S. patent laws and will invite the attention of Congress to it. Meanwhile, it is well to adjudicate cases on other grounds when possible, as we do in this case.⁴⁸

Given these precedents in the case law, reliance on the courts' willingness to interpret the reach of the patent law expansively with regard to spacecraft is probably misplaced.

III. CONCLUSION

The rather small legal tail being wagged by the rather large analytical dog above is this: While Congress has the power to extend U.S. law to U.S. registry spacecraft, courts are unlikely to hold that it has done so where the statute describes its jurisdiction in territorial terms. On the other hand, where a statute explicitly applies to U.S. citizens, or U.S. spacecraft, there will be no problem finding jurisdiction.⁴⁹ Thus, since the current patent law expresses its jurisdiction in territorial terms, and since it contains no express provision for application to U.S. spacecraft, anyone anxious to see patent protection extend to space objects on the U.S. registry would be well advised to support legislation making such provision.

This is not to say that a court could not, with some effort and craftsmanship, manage to hold otherwise.⁵⁰ Certainly I would hope that a court confronted with this question in the absence of legislation would

48. *Ocean Science & Engineering, Inc. v. United States*, 595 F.2d 572, 574 (Ct. Cl. 1979).

49. See, e.g., *United States v. Flores*, 289 U.S. 137 (1933) (U.S. maritime jurisdiction allows conviction for murder committed on ship of U.S. registry that was docked at a river port in Belgian Congo 200 miles from ocean).

50. For an example of such an opinion, see *Moragne v. States Marine Lines, Inc.*, 398 U.S. 375 (1970) (creating an action for wrongful death under the general maritime law). This opinion has received considerable praise: "More than any other case, perhaps because the opinion is so hard-headed, perhaps because it is written by so traditional a judge as Harlan, *Moragne* stands as a monument to what courts, aware of the fullness of techniques available to them, can do to update laws." G. CALABRESI, *A COMMON LAW FOR THE AGE OF STATUTES* 152 (1982). Such opinions are notable in part because they are rare, though, and we should not count on the courts to save us from ourselves when a legislative remedy is so readily available.

go ahead and extend patent protection to innovations aboard U.S. spacecraft, since there are no conceivable policy grounds for *not* placing U.S. spacecraft within U.S. patent law, and since a judgment in favor of extending patent protection to outer space activities would in fact be more in accord with the intent of Congress in passing the patent laws. But those who feel that legislation is unnecessary because the "floating island" theory or something similar will support such jurisdiction are urging a long walk on what will probably turn out to be a very short legal pier.⁵¹

Furthermore, based on my own conversations and experiences, uncertainty over these issues is already having some impact on the willingness of investors to become involved in space manufacturing and related ventures. Even if H.R. 2946 did nothing more than soothe the fears of the business community and help to encourage investment in such ventures, it would be well worth the time and effort. However, the bill does much more than this, as set out above, and for these reasons I believe that H.R. 2946 represents a necessary improvement to the existing law, and favor its passage.

A. *The Need for More General Reform*

Finally, I would like to note that this bill, though valuable, addresses only one of the many potential problems created by earthbound laws that do not take sufficient account of the possibility of commercial activity in outer space. Some of these problems were identified in a recent report by the Office of Technology Assessment.⁵² That report, though excellent, addresses only some of the potential legal problems that are likely to arise from increased commercial activities in space. Indeed, one significant difficulty at present is that there are probably many potential problems of which we are today unaware. It may be worth the time of this or some other Subcommittee to schedule hearings in the future as to what can be done generally to remove other legal impediments to space commercialization, particularly in light of the fact that promotion of

51. Since this Legislative Comment was written, the Supreme Court has bolstered my assertion by holding that the Fourth amendment search-and-seizure provisions (which, unlike the patent laws, contain no limiting language) do not apply extra-territorially. *United States v. Verdugo-Urquidez*, 58 U.S.L.W. 4263 (1990). Although I believe that this case is wrongly decided for reasons set out in Ragosta, *Aliens Abroad: Principles for the Application of Constitutional Limitations to Federal Action*, 17 N.Y.U.J. INT'L L. & POL'Y 287 (1985), the outcome certainly supports the position I take here.

52. OFFICE OF TECHNOLOGY ASSESSMENT, *SPACE STATIONS AND THE LAW: SELECTED LEGAL ISSUES* (1986). For a review of this report, with some suggestions and criticisms, see Reynolds, 27 JURIMETRICS J. 431 (1987).

commercial activity in space has been identified as a key priority by both the Congress⁵³ and the Executive.⁵⁴

Such hearings might focus on the currently felt needs of those in the industry—problems with procurement, antitrust, or tax laws, for example—but in addition should look somewhat farther afield. In particular, I believe that it is worth looking at mechanisms for resolving problems as yet unforeseen, in ways that will promote the development of outer space rather than retard it. Some thoughts on one such mechanism follow.

B. Jurisdiction, Evolution, and Conflicts with State Law

A good place to start, as the problems leading to the space patents bill suggest, is with jurisdiction. It would be possible, I suppose, to handle matters piecemeal by combing the statute books to determine which laws should be amended to ensure coverage of space activity, which should be left alone, and which should be complemented by new statutes aimed directly at space-related problems. But such a process would be cumbersome to say the least, and the several years required to bring the Patents in Space bill to its current state suggest that it would also be exceedingly slow. Thus, I am of the opinion that a statute-by-statute approach is worthwhile only in the case of particularly important issues—of which the question of patents is certainly one.

But for other issues that are very important in the aggregate but not worth this rather great effort individually, some other approach will be necessary. Often, where Congress wishes to state general rules of policy without stating specific methods of implementation, it does so by creating an administrative agency, or by vesting new authority in an existing one. Such an approach would not be appropriate in the space context, though, because at this early date there simply would not be enough for such an agency to do. Nor would a new agency, presumably driven by its own political needs to experiment and (perhaps) over-regulate, necessarily serve the overriding purpose of promoting investment in and development of outer space.

53. See Commercial Space Launch Act of 1984, Pub. L. 98-575, § 2, 98 Stat. 3055, 49 U.S.C. App. § 2601 (1988); Commercial Space Launch Act Amendments of 1988, Pub. L. 100-657, § 2, 102 Stat. 3900 (1988) (both stating importance of commercial activity in space for the U.S. economy and future). See also Gore, *Outer Space, the Global Environment, and International Law: Into the Next Century*, 57 TENN L. REV. 329 (1996).

54. See White House Fact Sheet, *The President's Space Policy and Commercial Space Initiative to Begin the Next Century*, Feb. 11, 1988.

In the Office of Technology Assessment study referred to above,⁵⁵ two key concerns were voiced: (1) the need to set up an evolutionary system to develop space law as it is needed without strangling it with an excessively rigid *a priori* code; and (2) the need for space activity to be free from conflicting and inconsistent state law in order to avoid legal uncertainty and reduce litigation. It seems to me that these needs would be served admirably by an institution that has been resorted to in similar circumstances in the past, namely the grant of special jurisdiction, along with general Congressional guidance, to the federal judiciary.

C. *Maritime Jurisdiction as a Model*

The institution to which I refer is the Constitutional grant of jurisdiction to the federal courts over "all Cases of admiralty and maritime Jurisdiction,"⁵⁶ and I believe that it is something that offers some very helpful guidance in the space context. While it would hardly be sensible to cut-and-paste the current maritime law, with all of its inevitable historical absurdities⁵⁷ into the space setting, a good deal can be learned from looking at why the special grant of admiralty jurisdiction was created in the first place—in other words, why did the Constitution create a separate grant of jurisdiction for a special industry, and why the shipping industry?

To be brief, I believe that the answer turns on precisely the factors set out above with respect to activities in outer space. The shipping industry, and maritime commerce in general, were seen at the time as being of special importance to the nation, and success in the maritime sphere was seen in part as depending on the existence of stable, flexible, law that would be unified at a national level, free from inconsistent—and possibly self-serving—state laws. A special jurisdictional role for the federal courts was intended to provide a forum in which these concerns would be addressed, and in which practical law, attuned to the needs and realities of the industry, could develop as required, without either the fractionating effect of multiple state court proceedings or the necessity for each legal development to wend its way through the legislative process. Furthermore, it was thought that by ensuring that maritime cases would be heard by federal courts, this jurisdictional grant would also promote smoother international relations in the important field of maritime

55. See *supra* note 52.

56. U.S. CONST. art. III, § 2.

57. See, e.g., *Madole v. Johnson*, 241 F. Supp. 379 (W.D. La. 1965) (lake no longer navigable in interstate commerce within admiralty jurisdiction because it was so navigable in past).

affairs, since the decisions of American federal courts were likely to be treated with greater respect by foreign governments than those of state courts.⁵⁸

All of these concerns, it seems to me, exist in the space context as well, and would support the grant of special and exclusive federal jurisdiction over space activities. Although a precise definition of such jurisdiction is a project for another time and place, a few thoughts are appropriate here. The first is that, unlike maritime jurisdiction, there is no need to vest this special space jurisdiction in *every* District Court. Instead, since for the foreseeable future any party engaged in space activity will need to have a considerable presence in Washington, D.C. for other reasons, it might make sense to require that such suits be brought in the District Court for the District of Columbia, something that would also help promote the more-rapid growth of a body of unified law.⁵⁹ Appeal from such decisions could be directed to the Court of Appeals for the Federal Circuit, which might be expected to have special expertise in technical matters because of its jurisdiction over patent appeals; or to the District of Columbia Circuit, whose considerable expertise in "high technology" administrative and environmental cases would also recommend it.

Such a jurisdictional grant need not be accomplished through Article III of the Constitution as was the grant of admiralty and maritime jurisdiction. Congressional action, under the express Article III power to vest jurisdiction in "inferior courts,"⁶⁰ will be quite sufficient. Such action might be taken on its own, or (more constructively, I believe) as part of a more general package of legislation designed to address several important specific issues and to provide general guidance for the federal courts in the future.

As I mentioned earlier, this is not the place for a more detailed treatment of these issues, but I hope that what I have suggested here will at least be enough to spur further thought on the question. For absent some

58. The leading discussion of these concerns is Black, *Admiralty Jurisdiction: Critique and Suggestions*, 50 COLUM. L. REV. 259 (1950). See also *Peralta Shipping Corp. v. Smith & Johnson Corp.*, 739 F.2d 798 (2d Cir. 1984), *cert. denied*, 470 U.S. 1031 (1985) (discussing and applying Black's analysis); Putnam, *How the Federal Courts Were Given Admiralty Jurisdiction*, 10 CORNELL L. Q. 460 (1925); Frank, *Historical Basis of the Federal Judicial System*, 13 LAW & CONTEMP. PROBS. 3 (1948) (suggesting special connection between maritime industry and international relations as a key justification for admiralty jurisdiction—a concern that certainly applies in the space context as well).

59. Indeed, the District of Columbia seems to be the locale of choice for such suits already. See, e.g., *Florida Coalition for Peace and Justice v. Bush*, Civ. Act. 89-2682-OG, 1989 U.S. Dist. LEXIS 12003 (D.D.C. Oct. 10, 1989) (rejecting challenge to launch of space probe *Galileo* because of onboard radiothermal generators).

60. U.S. CONST. art. III, § 1.

disastrous failure of competence or vision, the time will come—perhaps sooner than we think — when questions such as space jurisdiction will be less exotic, and the relationship between the quality of our law and the success of our aspirations for space development will be more obvious. When that day comes, we may even hope to see parties registering their spacecraft under the United States flag in order to take advantage of that law, if it is good enough—a practice with obvious advantages for this country. Many lawyers, judges, scholars, and legislators will have a role to play in bringing such a happy situation about, but as the Patents in Space bill itself demonstrates, it is time for them to start playing that role in earnest, for the day of practical space lawyering is at hand.

