

Space Tourism: Regulating Passage to the Happiest Place Off Earth

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“Interplanetary travel is now the only form of ‘conquest and empire’ compatible with civilization. Without it, the human mind, compelled to circle forever in its planetary goldfish bowl, must eventually stagnate.”¹

I. INTRODUCTION

Since SpaceShipOne succeeded in winning the X PRIZE in October 2004, space tourism businesses have been booming with several companies in the race to become the first to send paying customers into suborbital space.² As a result, states are already fighting over which will be the home to the first space resort and launch locations.³

Space tourism is an excellent starting point for other private space endeavors. As a means of entertainment, it has the potential to bring in investors and enthusiasts, create immediate profit, and lay the groundwork for greater research and funding in other space applications.⁴ Like the aeronautics industry, private enthusiasts have challenged boundaries of man’s capabilities, and competitions have opened the door to a myriad of possibilities for private astronautics. Unlike the aeronautics industry, which was pushed to its limits by the necessities of war, private

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¹ ARTHUR C. CLARKE, VOICES FROM THE SKY 12 (Pyramid Books 1967) (1965).

² Scaled Composites, Tier One Private Manned Space Program, <http://www.scaled.com/projects/tierone/index.htm> (last visited Mar. 19, 2006); *The Race to Blast Tourists Into Space*, CNN.COM, Mar. 21, 2006, <http://www.cnn.com/2006/TECH/space/03/20/space.tourism.ap/index.html> (“more than a dozen companies are developing rocket planes to ferry ordinary rich people out of the atmosphere”).

³ Alan Boyle, *New Mexico Lays Out Its Spaceport Plan*, MSNBC.COM, Dec. 14, 2005, <http://www.msnbc.msn.com/id/10467451/>. Virgin Galactic has already announced that it will be tenants of the New Mexico spaceport after its estimated completion date of late 2009 or early 2010. Virgin Galactic chose New Mexico over other potential sites, including Mojave Spaceport in California. *Id.*

⁴ For example, asteroid mining, low gravity research, and even colonization of other celestial bodies.

astronautics and space tourism have the opportunity to develop at their own pace. Total safety, not a struggle for survival, will be the industry's first priority.

Russia was the first to offer space-hungry multi-millionaires a ride in the Soyuz spacecraft, coupled with a brief stay on the International Space Station (ISS).⁵ Organizations like the X PRIZE Foundation wanted more affordable commercial space travel; therefore, like the early aeronautics prize challenges, the Foundation spurred competition through a contest for glory, and a \$10 million prize.⁶ As with the early aeronautics industry, private businesses are emerging and are eager to capitalize on the newly uncovered space tourism market by offering space rides exponentially cheaper than Russia.

Congress has responded to the promising industry by attempting to solidify domestic law in a manner that will secure public safety while still supporting the industry's developing financial needs.⁷ Congress has also considered incentive plans in an attempt to stimulate investment.⁸ Whether Congress's actions will benefit the industry remain to be seen, and there is still more the United States government can do to help the space tourism industry prosper.

This comment will explore the United States' role in developing the law regulating space tourism. Part II discusses why space tourism, as a means of entertainment, is an excellent place to begin development of space travel technologies. Part III will provide an overview of the history of space tourism and the recent events leading up to the proliferation of this business. Part IV looks at the United States government's response to this entirely new industry and the government's impact on it.

⁵ See Associated Press, *Want To Go To Space? First Read This*, MSNBC.com, Dec. 29, 2005, <http://msnbc.msn.com/id/10642660> [hereinafter AP, *Want To Go To Space*].

⁶ See *infra* Part III.C.

⁷ Representative Lampson explained that "the basic purpose of [The Space Launch Act] is to establish a framework for regulating the emerging commercial human space flight industry. The Committee on Science has heard ample testimony that such a framework is needed if the companies are to make their plans and attract needed investment capital. At the same time, Congress needs to ensure that safety is protected as this new industry emerges." 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. Lampson). See also Henry R. Hertzfeld & Frans G. von der Dunk, *Bringing Space Law into the Commercial World: Property Rights Without Sovereignty*, 6 CHI. J. INT'L L. 81, 97-98 (2005) (Solidifying space law is key to the success of space commercialization. "Unless and until a way of assuring private enterprises that their investments in research and development, equipment, and operations in space can be recovered, the insecurity and risks of not having an operating mechanism for establishing these rights will impede the fast growth of commercial space.").

⁸ See *infra* Part IV.A.

II. WHY SPACE TOURISM IS THE BEST PLACE TO BEGIN

Space tourism is a very young industry and unique in many respects. As with any emerging industry, there are many questions surrounding its very existence. In these early years, all that space tourism can be is entertainment—a luxury good for the slightly space-obsessive and wealthy. A preliminary question must be addressed: why should space tourism be encouraged? The simple answer is: why not?⁹ The overarching answer is that history has demonstrated that there are three main ways to spur innovations in technology—war, necessity, and entertainment.¹⁰ Through entertainment, space tourism will at a minimum provide an opportunity for regular people to explore the unknown; the industry also has great potential to be a source of incredible technological innovations.

Immediately after the United States won the space race by placing a man on the moon, space exploration technology was no longer a priority in the United States' Cold War agenda and was put on the political back-burner.¹¹ As moon landings became routine, public interest and political support for National Aeronautics and Space Administration (NASA) declined.¹² Government development of manned space technology did not cease entirely, but it came close.¹³ The same space shuttles that went into service in 1981 are still NASA's only means of transporting a human into space.¹⁴ NASA has continued its existence and made remarkable scientific findings despite its slim support, but after two space shuttle disasters have essentially grounded the fleet since 2003, NASA's future is tenuous at best.¹⁵ Even President Bush's recent proposal to include a return to the moon in NASA's budget seems to have fallen on deaf ears, as congressional and public support concentrates on domestic issues.¹⁶ The public

⁹ See generally ARTHUR C. CLARKE, *THE PROMISE OF SPACE* (1968) (explaining different methods of space exploration and emphasizing the importance of human participation).

¹⁰ See *infra* text accompanying notes 11–21.

¹¹ See RICHARD HIRSCH & JOSEPH JOHN TRENTO, *THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION 206–07* (1973). President Nixon dramatically cut the NASA budget “with the skill of a politician. NASA was no longer popular with the public. . . . The old popular political punch that had been NASA's chief congressional weapon was just not strong enough any more, and the President seized this opportunity to let the program wind down.” *Id.*

¹² *Id.*

¹³ OXFORD DICTIONARY OF SPACE EXPLORATION 224 (2005).

¹⁴ *Id.*

¹⁵ *NASA Scrubs May Shuttle Lunch*, CNN.COM, Mar. 14, 2006, <http://www.cnn.com/2006/TECH/space/03/14/space.shuttle/index.html>; OXFORD DICTIONARY OF SPACE EXPLORATION 224 (2005).

¹⁶ *Bush Space Plan Faces Opposition*, CNN.COM, Jan. 14, 2004, <http://www.cnn.com/2004/TECH/space/01/14/bush.opposition/index.html>. The proposed budget increase will

commitment to the space race that existed in the 1960's is simply not there anymore; today, people only support tax expenditures in the interest of national defense or in response to necessity.¹⁷

Waiting to investigate the vast possibilities of space exploration until emergencies arise will result in an inordinately small window of time to accomplish the difficult feats necessary to evade disaster. Emergencies triggering necessity include limited resources,¹⁸ the dying sun problem,¹⁹ asteroid strikes,²⁰ and other planetary or stellar catastrophes—all of which are not theoretically pressing matters, at least to current knowledge.²¹ The necessity for escaping the planet is not immediate enough to motivate investment now—the initial monetary commitment for speculative and far-off profits is too great.

Entertainment, however, has proven to be the great motivator of the modern era. People in their spare time turn to a myriad of activities for entertainment, from video games and movies to skydiving and rock climbing. In the age of globalization and a consumer society, the latest gadgets and toys have put technology front and center in the casual entertainment arena. Most importantly, by its nature, entertainment has stressed safety within the expansion of its development.

War and necessity regularly foster demand before technology is fully developed, resulting in greater risks to safety than are normally permitted.²² However, in today's consumer marketplace, particularly in the entertainment sector where luxury good lawsuits are a part of everyday business,²³ such safety risks are

likely not be enough for President Bush's stated goals anyway.

¹⁷ For excellent articles on space war technologies designed for national security, particularly to combat terrorism, see Dawn Stover, *The New War in Space*, POPULAR SCIENCE, Sept. 2002, at 40; see also Dawn Stover, *Battlefield Space*, POPULAR SCIENCE, Nov. 2005, at 50.

¹⁸ JOEL LEVY, *THE DOOMSDAY BOOK: SCENARIOS FOR THE END OF THE WORLD* 106–07 (2005).

¹⁹ *Id.* at 186–87.

²⁰ *Id.* at 215–16.

²¹ The majority of the science fiction genre is predicated on these various theories.

²² See, e.g., ROBERT JACKSON, *SUBMARINES OF THE WORLD* 18 (2000) (noting the Russian submarine *Alfa*, launched in 1970, had a seriously flawed and unreliable reactor); TERRENCE POULOS, *EXTREME WAR* 345–50 (2004) (detailing the German tank *Ferdinand*, which was “extremely slow, easily disabled, and inadequately armed,” was originally designed to combat the Soviet Union's KV-1 and was still used on the front lines during the 1943 assault on Kursk despite its underdeveloped design); DIANA PRESTON, *BEFORE THE FALLOUT* 244, 244 n.*, 245 (2005) (describing the research and development which resulted in the atomic bomb, and the desperate measures taken during World War II under war pressure, such as human radiation experiments where “patient subjects . . . were never told that the injections were part of a medical experiment for which there was no expectation that they [would] benefit, and [to which] they never consented”) (internal citations omitted).

²³ Robert J. Bliwise, *Litigation: Too Much of a Good Thing?*, DUKE MAGAZINE, Jan-Feb, 1996, at 8, 11 (discussing the litigious nature of the United States particularly in the

not tolerated.²⁴ Currently, the only market for space tourism is affluent space enthusiasts, and the main motivation for such an individual to purchase a ticket is simple enjoyment and entertainment.²⁵ If this experience is not presented and maintained as safe as possible, then demand will disappear.²⁶

A prime example of the entertainment business driving technology is the video game industry's effect on computer hardware. Sony's most recent game console, the PlayStation 3, is still in development.²⁷ This next generation in video game entertainment will feature the revolutionary Cell processor, a piece of hardware about the size of a thumbtack with processing power comparable to that of a supercomputer, ten times the power of the Pentium 4 processor.²⁸

With individuals and industries increasingly relying on computers and other technological advancements, companies like Sony can utilize entertainment as a means to recover development costs and generate initial profits. This consequently drives companies to create what consumers ultimately want: something smaller, better, and faster. Gamers willing to spend hundreds of dollars on video game systems and games provide funding for further computer technology research and development.²⁹ This

products liability arena, pointing out that “[f]ederal products-liability lawsuits involving personal injury increased sixfold from 1975 to 1989,” and that “[r]ising liability costs have influenced product innovation and product introduction decisions, particularly in markets in which the liability exposure is substantial. And the products-liability price tag, which is passed on to the consumer, sometimes reaches staggering levels”).

²⁴ See *id.* (internal citations omitted) (“The fact that [the lawnmower company] had met the safety commission’s safety standards did not get them off the hook. The typical argument is, ‘Well, the regulations are a floor, they’re not a ceiling on your responsibility’—that would be the plaintiff’s argument.”).

²⁵ See FUTRON CORPORATION, SPACE TOURISM MARKET STUDY: ORBITAL SPACE TRAVEL & DESTINATIONS WITH SUBORBITAL SPACE TRAVEL, <http://www.futron.com/pdf/SpaceTourismMarketStudy.pdf> 9 (Oct. 2002) [hereinafter FUTRON CORPORATION] (study surveying over 450 affluent Americans in market research for suborbital and orbital space tourism). Interest beyond the extremely affluent, however, is definitely out there. “More than ten million people each year visit space museums, space camps, rocket launch-recovery sites, and government space research and development centers, generating approximately \$1 billion in revenue per year.” Charity Trelease Ryabinkin, *Let There Be Flight: It’s Time to Reform the Regulation of Commercial Space Travel*, 69 J. AIR L. & COM. 101, 108 (2004).

²⁶ Spaceflight is inherently risky, “even after exhaustive, detailed, and careful investigation, extensive re-engineering, and changes in communication,” and thus all the more reason for it to be developed through the industry demanding the highest levels of safety with the most demanding of customers. Molly K. Macauley, *Flying in the Face of Uncertainty: Human Risk in Space Activities*, 6 CHI. J. INT’L L. 131, 133 (2005).

²⁷ Chris Roper, *PS3 Power: Details on Cell*, IGN.COM, Feb. 7, 2005, <http://gear.ign.com/articles/585/585862p1.html>.

²⁸ See *id.* The PlayStation3 will actually contain three cell processors. Most home computers currently for sale contain a single processor comparable to the Pentium 4. *Id.*

²⁹ Gamestop, Sony PlayStation 2 Redesign with Gran Turismo 4!, <http://www.gamestop.com/product.asp?product%5Fid=B020245V> (last visited Mar. 19, 2006) (advertising a new PlayStation 2 game console which was originally released over five years ago;

fuels creative ventures that, although less profitable in the short term, ultimately aid companies in discovering the technology of the future, both safely and efficiently.³⁰

In anticipation of this result, the impact of the Cell chip is already growing: IBM intends to use Sony's Cell chip to run its new line of blade servers.³¹ Sony, Toshiba and IBM recently renewed their partnership for another five years.³² Originally developed for the entertainment industry in Sony's PlayStation 3, the partnership is now fully "pitching to the defense, medical and entertainment industries."³³ This is an excellent example of not only how war, necessity and entertainment can drive the creation of technology, but also how entertainment can fund technology that will later assist in the defense and medical industries. Likewise, space exploration will develop from space entertainment, and with it will come prime capital and safe technology development, later creating the tools and systems necessary to enhance and sustain other industries, such as mineral gathering and deep space exploration.³⁴

III. A BRIEF HISTORY OF SPACE TOURISM AND THE REACH FOR GREATER HEIGHTS

While the interest in space exploration is long standing, the exploration itself has only been attempted recently.³⁵ Born from Cold War competition, the space race was a battle between governments, not private parties, and the governing laws were designed accordingly.³⁶ Though government support has steadily decreased, private interest has continued to grow. With a little help from space hunting innovators, like the X PRIZE Founda-

bundled with one game, the console still sells for around \$200).

³⁰ Welcome to the Sony Electronics CES 2006 Virtual Press Kit, <http://news.sel.sony.com/ces06/> (last visited Mar. 19, 2006) (demonstrating that Sony is involved in a myriad of entertainment enterprises that recursively fund each other).

³¹ Associated Press, *IBM's Newest Processor Targets PlayStations and Battle Stations*, LONDON FREE PRESS, Feb. 9, 2006, at D1. Blade servers "are relatively thin chunks of circuitry designed to perform specialized computing tasks."

³² *Id.*

³³ *Id.*

³⁴ Sir Richard Branson of Virgin Galactic has stated: "[o]ur principal aim behind this is not to make money. The principal aim is to reinvest any money we make into space exploration." Leonard David, *Richard Branson and Burt Rutan Form Spacecraft Building Company*, SPACE.COM, July 27, 2005, http://www.space.com/news/050727_branson_rutan.html [hereinafter David, *Spacecraft Building Company*]. "Eventually these trips will also serve as an important tool for investigation into commercial remote sensing and microgravity and atmospheric research." 150 CONG. REC. H786 (daily ed. Mar. 3, 2004) (statement of Rep. Reynolds).

³⁵ DAVID SCOTT & ALEXEI LEONOV, *TWO SIDES OF THE MOON* 61 (2004). Yuri Gagarin was the first man in space in 1961—less than fifty years ago.

³⁶ Joanne Irene Gabrynowicz, *Space Law: Its Cold War Origins and Challenges in the Era of Globalization*, 37 SUFFOLK U. L. REV. 1041, 1042–43 (2004).

tion, the private sector is capitalizing on an opportunity that was never before legitimately considered by anyone other than science fiction writers. Reminiscent of early aviation competitions, the X PRIZE demonstrated that travel beyond what were the assumed upper boundaries for private parties was not only possible, but could also be extremely profitable.³⁷ Even before the X PRIZE came to fruition, Russia made clear that there was a market for space tourism and sold the first space tourist tickets.³⁸

A. Russia's New Enterprise

In 2001, Russia offered the first opportunity for private individuals to buy a ticket into space.³⁹ After the collapse of the Soviet Union, seeking funds for its struggling space program and grossly indebted country, the Russian government began selling roundtrip tickets on a Soyuz spacecraft for a brief stay in the ISS.⁴⁰ For \$20 million, plus paperwork, and rigorous testing and training, one could take a trip off this world to the ISS.⁴¹ To date, Russia's program has been relatively successful.

Initially, the United States government vehemently opposed Russia's space tourism endeavor, fearing that inexperienced passengers without the requisite multilingual skills would jeopardize the missions.⁴² After repeated reassurances by the Russians, the United States government finally relented, but demanded that tourists sign tortuous waivers and liability agreements.⁴³

The first successful space tourist was Dennis Tito.⁴⁴ Tito, a 60-year old California millionaire, was an investment fund manager and former NASA rocket scientist.⁴⁵ In April 2001, Tito spent ten days in space after intense training with cosmonauts near Moscow.⁴⁶ As the first space tourist, NASA required Tito to sign legal documents pledging that he and his heirs would not sue NASA if something went wrong.⁴⁷ Furthermore, NASA re-

³⁷ "Space tourism could revolutionize the human experience and could potentially become billion-dollar industry, creating numerous jobs in high-tech manufacturing and design." 150 CONG. REC. H837 (daily ed. Mar. 4, 2004) (statement of Rep. Jackson-Lee); *see also* FUTRON CORPORATION, *supra* note 25, at 9 (the study predicts the overall space tourism market will be generating revenues over \$1 billion per year by 2021).

³⁸ *See* AP, *Want To Go To Space*, *supra* note 5.

³⁹ *Id.*

⁴⁰ Space Today Online, *Tourists Visit the International Space Station*, <http://www.spacetoday.org/Astronauts/SpaceTourists.html> (last visited Mar. 20, 2006).

⁴¹ *Id.*

⁴² *Id.*

⁴³ *See id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*

quired Tito to pay for anything he broke.⁴⁸

One year later, in April 2002, South African Mark Shuttleworth became the second civilian space tourist.⁴⁹ The twenty-eight year old internet tycoon also became the first African to reach space.⁵⁰ Traveling into space for more than entertainment, Shuttleworth purchased a seat to conduct AIDS and stem cell experiments.⁵¹ He called his trip “a working vacation.”⁵²

The third and most recent space tourist, though he preferred the more somber title of “space flight participant,” was Dr. Gregory Olsen.⁵³ While training at Russia’s Yuri Gagarin Cosmonaut Training Center in 2004, the sixty-year old Olsen learned to speak elementary Russian and was educated about the basic Soyuz and ISS equipment.⁵⁴ Though his original flight was postponed due to health concerns,⁵⁵ in October 2005, he traveled on the Soyuz to the ISS.⁵⁶ A New Jersey businessman and scientist, Olsen, like Shuttleworth, opted for a working vacation.⁵⁷ Olsen used his time at the ISS to grow crystals for experimental use in infrared cameras, his company’s chief manufactured product.⁵⁸ Once again, a tourist’s trip into space was about business, not just entertainment.

Wealthy celebrities have also been drawn to the idea of space travel. N’Sync pop star Lance Bass began training in June 2002 and had a guaranteed seat aboard the Soyuz for a trip in October 2002, but failed to accumulate the required funds in time.⁵⁹ Even so, the publicity around his attempt to become, at the age of twenty-three, the youngest person to ever enter space, brought more widespread attention to space tourism.⁶⁰ In June 2002, Supermodel Cindy Crawford also suggested she wanted the coveted Soyuz seat, but never actually signed up.⁶¹

⁴⁸ *Id.*

⁴⁹ *Id.* Shuttleworth was the first space tourist subject to a new agreement between NASA and all other International Space Station partners, which was created “[a]fter NASA lost the battle to prevent the Russians from launching Dennis Tito . . . at least NASA wanted to prevent problems and embarrassments as much as possible.” See MICHEL VAN PELT, SPACE TOURISM: ADVENTURES IN EARTH ORBIT AND BEYOND 27 (2005).

⁵⁰ Space Today Online, *supra* note 40.

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ See *id.* “The singer’s space flight was to have been supported by Los Angeles television company Destiny Productions, which would have filmed his training and voyage for a TV special.” *Id.*

⁶¹ *Id.*

In May 2002, flight doctors at Russia's Institute of Biomedical Problems in Moscow tested former NASA Associate Administrator for Policy Planning, Lori B. Garver, to see if she was physically able to make the trip.⁶² She is neither rich nor famous, but hoped to become a space tourist through gifts and sponsorship funding.⁶³ Her goal was "to demonstrate that ordinary people could go to space."⁶⁴ Though she did not make the trip, her goal was already in other people's minds.

As early as 1998, companies like Space Adventures, based in Arlington, Virginia, recognized the private interest in space travel.⁶⁵ Russia used Space Adventures to locate customers financially capable of taking a ride to the ISS.⁶⁶ Space Adventures has also provided space flight training,⁶⁷ high altitude rides in Russian MiGs,⁶⁸ and simulated zero gravity rides.⁶⁹

Early companies like Space Adventures helped foster the public's hopes to travel in space, but were only able to provide an expensive avenue through a governmental body. In recent years, there has been a shift in reliance from government to the private market in commercial space travel. The private space race has largely mirrored aviation development of the beginning of the twentieth century.

B. The Early Days: First Aviation Competitions

Competition has furthered man's attempts to leave the Earth's surface for over a century. In the early 1900s, when aviation was in its infancy, hundreds of races, challenges, and prizes were offered, stimulating the advancement of aircraft technology.⁷⁰ The Orteig prize of 1927 is one of the most famous, which offered a \$25,000 prize to the first person to fly nonstop from New York to Paris.⁷¹ No government was yet willing to develop the technology, and no private sector had yet seen the

⁶² *Id.* Garver was a part of the corporate Space Program Development team at DFI International when the tests were conducted.

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ Space Adventures, Overview- Who We Are, <http://www.spaceadventures.com/company/overview> (last visited Mar. 20, 2006).

⁶⁶ Space Today Online, *supra* note 40.

⁶⁷ Space Adventures offers an "Orbital Qualifications Program that includes all medical examinations and tests required to be flight certified by the Russian space agency, Rosaviakosmos." VAN PELT, *supra* note 49, at 27.

⁶⁸ Space Adventures, Space Adventures' Programs, <http://www.spaceadventures.com/company/programs> (last visited Mar. 20, 2006).

⁶⁹ *Id.*

⁷⁰ X PRIZE Foundation, History of Prizes, <http://www.xprizefoundation.com/prizes/default.asp> (last visited Mar. 20, 2006).

⁷¹ *Id.*

profit-making potential of a flight across the ocean. The Orteig prize filled the gap, providing entertainment to the competition's spectators, and money and glory to its winner. Nine teams attempted to cross the Atlantic and win the prize; Charles Lindbergh won the competition in the legendary Spirit of St. Louis.⁷²

Lindbergh's small team of professionals proved that, with innovation and effort, long distance air travel was possible, and that such innovation did not require government-conglomerate sponsorship.⁷³ At that time, Lindbergh's simple, yet solid design was dramatically different from the direction conventional aviation was going; had it not been for the massive publicity generated by the competition, Lindbergh's plane's design would probably have never received the attention that it did.⁷⁴ Within one year of the 1927 flight, Lindbergh's aircraft was personally viewed by a quarter of all Americans.⁷⁵ In only a few years, there was a substantial increase in the public's interest and awareness of the aviation industry: a 400 percent increase in airplanes, a 300 percent increase in pilot's license applications, and thirty times the number of commercial airline passengers.⁷⁶ Lindbergh's single flight has been rightfully credited for "starting a chain of events which directly triggered the multi-billion dollar commercial aviation industry of today."⁷⁷ Lindbergh's flight created an increase in demand for air travel, which encouraged competition, decreased prices and improved performance. The everyday person could fly.

C. Recent Times: X PRIZE Brings a New Era

Following in Orteig's footsteps, a small group of entrepreneurs decided that the world needed a Spirit of St. Louis experience to break the commercial space barrier.⁷⁸ Hoping to gather the needed support to launch another major competition in innovation, Peter H. Diamandis, Byron K. Lichtenberg, Colette M. Bevis and Gregg E. Maryniak established the X PRIZE Foundation in 1995.⁷⁹ The St. Louis community, the same roots of the Spirit of St. Louis Organization which backed Lindbergh almost

⁷² *Id.*

⁷³ *See id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ *See generally* X PRIZE Foundation, History of the X PRIZE, http://www.xprizefoundation.com/prizes/xprize_history.asp (last visited Mar. 20, 2006) (explaining that X PRIZE Founder Peter H. "Diamandis had the idea of creating a cash prize for space travel as a mechanism to implement his life-long dream of traveling into space.").

⁷⁹ *Id.*

seventy years earlier, answered their call.⁸⁰ The X PRIZE Foundation began with ten members, each contributing \$25,000;⁸¹ today, there are over sixty-five members.⁸²

The Foundation did not have a simple task in front of them. Before the X PRIZE Foundation could even announce its proposed competition, the Foundation had to make agreements with NASA, the Federal Aviation Administration (FAA), and other space and aviation organizations in order to ensure that they would cooperate.⁸³ After securing approval from these entities, the X PRIZE Foundation announced the X PRIZE competition on May 18, 1996.⁸⁴ By September 1997, over a dozen teams had registered to participate.⁸⁵ In May 2004, the X PRIZE was renamed the ANSARI X PRIZE after Iranian entrepreneurs Anousheh and Amir Ansari, whose multi-million donation made the competition even more enticing.⁸⁶

The competition's rules were simple: design and successfully launch a craft that could safely carry three adults above sixty-two miles, the traditionally recognized boundary between Earth and Space, and return them safely.⁸⁷ Then, complete the flight again within two weeks, reusing at least ninety percent of the original craft.⁸⁸ The competition's requirements meant that the design had to be safe, largely reusable and cost-effective.⁸⁹ If a team completed the challenge, the Foundation promised a \$10 million prize—and the honor of being the Lindbergh of space.⁹⁰ The competition was a major success. Twenty-six teams from seven countries entered the race.⁹¹ Most importantly, several

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *Id.* On that very day, aviation designer Burt Rutan committed his small company to the endeavor. *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ ANSARI X PRIZE, Rules and Guidelines, http://www.xprize.org/teams/rules_and_guidelines.php (last visited Mar. 20, 2006) [hereinafter Rules and Guidelines]. See ERIC ANDERSON & JOSHUA PIVEN, THE SPACE TOURIST'S HANDBOOK 51 (2005) (defining 62 miles as the working boundary between atmosphere and space).

⁸⁸ *Id.*

⁸⁹ It was hoped that these competition requirements would help get the space industry as a whole past the "chicken-and-egg problem of economics. To drastically lower the costs of spaceflight, a vehicle needs to fly frequently. But to find enough customers to fly frequently, one needs to have low prices, and that requires low costs. The solution seemed to lie in new markets, and the one many believed could jump-start the private sector was 'space tourism.'" Editorial, *Commercial Space at a Tipping Point*, AVIATION WEEK & SPACE TECH., Sept. 27, 2004, at 66 [hereinafter *Commercial Space at a Tipping Point*].

⁹⁰ *Id.*

⁹¹ X PRIZE Foundation, The Ansari Legacy, http://www.xprizefoundation.com/about_us/ansari_legacy.asp (last visited Mar. 20, 2006).

unique concepts and designs, created under the ideas of simplicity, safety, efficiency, and cost-effectiveness were born.

Armadillo Aerospace designed a “brutally simple” hydrogen peroxide fueled rocket.⁹² John Carmack, a video game software design engineer, founded this small, unpaid team.⁹³ Their re-entry design used a new compressible nose cone that crumples upon impact to absorb the shock.⁹⁴ One of Canada’s teams, Canadian Arrow, brought back the German V2 rocket design.⁹⁵ The team used research developed sixty years ago to create a modern, safe vertical rocket.⁹⁶ The Da Vinci Project created perhaps the most innovative and unique concept of the ANSARI X-PRIZE competitors. Led by Brian Feeney, an expert in 3-D computer-aided design, the team created a balloon-launched spacecraft named Wild Fire.⁹⁷ “Carried to 80,000 ft. by a reusable helium balloon, Wild Fire releases on ignition, takes an angular trajectory to clear the balloon, then fires straight up.”⁹⁸ Also Canadian based, Da Vinci Project was staffed completely by volunteer labor.⁹⁹ 500 workers generously gave over 100,000 man hours, making it the largest volunteer project in Canadian history.¹⁰⁰

Other teams designed a multitude of variations on rockets and launch mechanisms—ranging from vertical launch rockets to dual-system lifters and launchers.¹⁰¹ These were no longer science-fiction plans captured only on paper, they were being simulated and tested; concepts were becoming a reality.

D. The Sky is No Longer the Limit: SpaceShipOne Wins the X PRIZE, Honor and Glory

Burt Rutan of Scaled Composites’ TierOne Project won the ANSARI X PRIZE on October 4, 2004.¹⁰² This innovative aero-

⁹² Preston Lerner, *A Few Dreamers Building Rockets in Workshops*, POPULAR SCIENCE, May 2003, at 56, 63.

⁹³ *Id.* at 58. Carmack created the famous computer games Doom and Quake. *Id.*

⁹⁴ *Id.* at 64.

⁹⁵ *Id.*

⁹⁶ ANSARI X PRIZE, Canadian Arrow, <http://www.xprize.org/teams/arrow.php> (last visited Mar. 21, 2006).

⁹⁷ Lerner, *supra* note 92, at 64.

⁹⁸ *Id.*

⁹⁹ ANSARI X PRIZE, Da Vinci Project, <http://www.xprize.org/teams/davinci.php> (last visited Mar. 21, 2006).

¹⁰⁰ *Id.*

¹⁰¹ ANSARI X PRIZE, ARCA, <http://www.xprize.org/teams/arca.php> (last visited Apr. 11, 2006) (describing a vertical launch rocket); ANSARI X PRIZE, Suborbital Corporation Team, <http://www.xprize.org/teams/suborbital.php> (last visited Apr. 11, 2006) (describing a dual-system lifter and launcher).

¹⁰² Alan Boyle, *SpaceShipOne Wins \$10 Million X Prize*, MSNBC.COM, Oct. 5, 2004, <http://www.msnbc.msn.com/id/6167761/> [hereinafter Boyle, *SpaceShipOne Wins*]; Scaled Composites, *supra* note 2.

nautics designer has created some of the most unique and intrinsically beautiful aircraft of modern times,¹⁰³ and is particularly well-known for his kit planes that people can build themselves.¹⁰⁴

After Rutan announced his participation in the competition, he set his small team to work on a two-stage system.¹⁰⁵ SpaceShipOne and White Knight worked almost flawlessly for all three launches.¹⁰⁶ White Knight, a slow-rising, high-altitude aircraft, flew to an altitude of approximately 50,000 feet, then released SpaceShipOne from underneath it.¹⁰⁷ Once clear of White Knight, SpaceShipOne ascended to over sixty-two vertical miles, powered by a rocket using essentially old tires and laughing gas for propulsion.¹⁰⁸ Then, SpaceShipOne changed its wing format to a feathered position to gently float down into the atmosphere, and repositioned the wings to their original setting to glide to a landing.¹⁰⁹ The ship did not even need a heat shield, a major design issue with NASA's fleet.¹¹⁰ Rutan's team received what little financial support it needed from Microsoft billionaire Paul Allen.¹¹¹ From concept to launch, the TierOne Project cost only \$25 million; the Rutan team created a reusable space ship for approximately the same price as one space ride with the Rus-

¹⁰³ *Boneyard: Where Machines End Their Lives* (History Channel television broadcast Feb. 2, 2006).

¹⁰⁴ That is actually how he met one of his pilots who was part of the TierOne project—Mike Melvill built one of Rutan's Long-EZ kit planes in 1978, and flew across the country to Mojave just to show Rutan. Rutan hired Melvill to be his test pilot and business partner. Eric Adams, *The New Right Stuff*, POPULAR SCIENCE, Nov. 2004, at 60, 68.

¹⁰⁵ See Bill Sweetman, *Burt Builds Your Ride to Space*, POPULAR SCIENCE, July 2003, at 48.

¹⁰⁶ Almost perfectly—during the first test flight that reached space, SpaceShipOne had some roll problems which took it off-course, and the trim control locked during the stage where SpaceShipOne was feathered, but the problem resolved itself and Mike Melvill returned safely. *Black Sky: The Race for Space* (Discovery Channel television Oct. 3, 2004) [hereinafter *The Race for Space*]. During the first flight for the X PRIZE, Mike Melvill dealt with a dangerous barrel roll while traveling at Mach 2.5 at the edge of space; Melvill utilized the reaction control system, a safety feature the TierOne team predicted may be needed. *Black Sky: Winning the X Prize* (Discovery Channel television October 10, 2004) [hereinafter *Winning the X Prize*]. Besides passing very close to the White Knight, Brian Binnie had a perfect flight for the second X PRIZE launch. *Id.* These issues were not great enough to stop the pilots from finding time to take pictures and play with candy and toys in the zero gravity. *Id.*

¹⁰⁷ Sweetman, *supra* note 105, at 48–49; *The Race for Space*, *supra* note 106.

¹⁰⁸ Sweetman, *supra* note 105, at 48–49; *The Race for Space*, *supra* note 106.

¹⁰⁹ Sweetman, *supra* note 105, at 48–51; *The Race for Space*, *supra* note 106.

¹¹⁰ Editorial, *SpaceShipOne Propels Space Travel Future*, THE CITY PAPER ONLINE, Oct. 8, 2004, http://www.nashvillecitypaper.com/index.cfm?section_id=38&screen=news&news_id=36324 (noting that SpaceShipOne did not require heat shield tiles); Kathy Sawyer, *Heat Shielding Was Area of Concern Before Columbia*, WASH. POST, Apr. 15, 2003, at A2 (noting the difficulties NASA has experienced with space shuttle heat shields from the 1986 Challenger flight to the 2003 Columbia flight, both of which ended in tragedy).

¹¹¹ See Adams, *supra* note 104, at 62.

sians.¹¹²

Rutan's revolutionary idea eventually broke several records. On June 21, 2004, Mike Melvill became the first civilian pilot to cross the outer space barrier in Rutan's SpaceShipOne, by just 408 feet.¹¹³ The test flight showed once again that a small group of innovators could perform more efficiently and cost effectively in an area believed to be only within the purview of governments. The public appeared to agree. Approximately 11,000 people went to the middle of the Mojave Desert to see the test launch; some even went the day before to sleep on the tarmac in order to get good seats.¹¹⁴ The event was broadcast live worldwide, demonstrating the popularity of the event.¹¹⁵ Seemingly, the private space bubble had been popped; Burt Rutan and his team had turned the hope that within this generation, everyday people would touch space, a little more plausible.¹¹⁶

On September 29, 2004, Rutan's SpaceShipOne flew for a second time, in its first flight for the ANSARI X PRIZE.¹¹⁷ The team also had a new sponsor—multi-millionaire Sir Richard Branson, of the Virgin conglomerate, saw the business opportunity of a lifetime and brought in Rutan and Allen to form Virgin Galactic, a subsidiary of the Virgin Corporation.¹¹⁸ Virgin Galactic is committed to using scaled-up versions of White Knight and SpaceShipOne (to be named White Knight Two and SpaceShipTwo) to take tourists into suborbital space,¹¹⁹ and is accepting reservations for rides launching as early as 2008.¹²⁰ The cur-

¹¹² *Id.*; Space Today Online, *supra* note 40 (listing the price of a Russian flight to the International Space Station at \$20 million).

¹¹³ Alan Boyle, *Private Rocket Ship Breaks Space Barrier*, MSNBC.COM, June 21, 2004, <http://www.msnbc.msn.com/id/5261571/> [hereinafter Boyle, *Private Rocket Ship*]. See also Boyle, *SpaceShipOne Wins*, *supra* note 102 ("In addition to winning the X Prize, Binnie's flight smashed the altitude record for an airplane, set by X-15 pilot Joseph Walker in 1963. That altitude was 354,200 feet (67 miles or 107.9 kilometers).").

¹¹⁴ See *id.* See also Windows Media Video: SpaceShipOne Flight 15P (America By Air) (available at http://www.scaled.com/projects/tierone/video/americanbyair-SS1_v02.wmv).

¹¹⁵ CollectSPACE, Private Spacecraft to Launch June 21, <http://www.collectspace.com/news/news-060204a.html#062104b> (last visited Apr. 6, 2006).

¹¹⁶ The "giggle factor—the idea that only astronauts and cosmonauts have any business in space," was finally conquered. There had been a tendency to dismiss space tourism as a science fiction fantasy, and was even concluded as "infeasible" by some in the U.S. aerospace industry. Ryabinkin, *supra* note 25, at 116–17. SpaceShipOne definitely gave the dismissive roll of the eyes a reason to look up.

¹¹⁷ Alan Boyle, *SpaceShipOne Whirls Into Space for a Prize*, MSNBC.COM, Sept. 29, 2004, <http://www.msnbc.msn.com/id/6126386/>.

¹¹⁸ Virgin Galactic, A Starship Built on Enterprise, <http://www.virgingalactic.com/who.asp> (last visited Apr. 6, 2006).

¹¹⁹ Press Release, Virgin Galactic, Branson and Rutan Form "The Spaceship Company" (July 29, 2005), available at <http://www.virgingalactic.com/en/press/OshkoshPressRelease.doc> [hereinafter The Spaceship Company].

¹²⁰ Virgin Galactic, When Can I Go?, <http://www.virgingalactic.com/en/when.asp> (last

rent price tag is \$200,000.00,¹²¹ one percent of the price of a Soyuz ride.¹²² Branson and Rutan also later created The SpaceShip Company, which will build the new fleet of commercial ships.¹²³

On October 4, 2004, only a week later, SpaceShipOne, piloted by Brian Binnie, made its third successful trip to space and back, well within the two-week and ninety percent reuse requirements to win the \$10 million X PRIZE.¹²⁴ At 69.6 miles, Binnie also broke the X-15's previous altitude record for a horizontal launch craft.¹²⁵ More importantly, Rutan's team knew what they accomplished would now make private space travel a reality.¹²⁶

E. Since the X PRIZE: The Cup and a Budding Industry

Following the success of the X PRIZE, the X PRIZE Foundation went a step further and created the X PRIZE Cup to motivate continuous invention and innovation.¹²⁷ On October 9, 2005, the first X PRIZE Cup event was held, complete with a show depicting the history of aircraft and spacecraft and demonstrations by previous X PRIZE contenders.¹²⁸ There was also the Eggs Prize, where middle school students competed against each other by building water rockets which had to safely launch a raw egg thirty meters into the air twice within two hours.¹²⁹ Most importantly, the X PRIZE Foundation announced that, starting in 2006, it would have an annual X PRIZE Cup: "the Cup hopes to initiate multimillion-dollar prizes to incentivize continued breakthroughs in suborbital operations—prizes such as maximum alti-

visited Mar. 21, 2006).

¹²¹ *Id.*

¹²² Space Today Online, *supra* note 40 (listing the price of a Russian flight to the International Space Station at \$20 million).

¹²³ David, *Spacecraft Building Company*, *supra* note 34; The Spaceship Company, *supra* note 119.

¹²⁴ Boyle, *SpaceShipOne Wins*, *supra* note 102; Rules and Guidelines, *supra* note 87.

¹²⁵ *See id.* ("In addition to winning the X Prize, Binnie's flight smashed the altitude record for an airplane, set by X-15 pilot Joseph Walker in 1963. That altitude was 354,200 feet (67 miles or 107.9 kilometers).").

¹²⁶ Associated Press, *SpaceShipOne Takes Its Place at Smithsonian*, MSNBC.COM, Oct. 5, 2005, <http://www.msnbc.msn.com/id/9601983/>. SpaceShipOne now hangs in the Milestones of Flight Gallery of the Smithsonian Institute's National Air and Space Museum next to Charles Lindbergh's Spirit of St. Louis. *Id.*

¹²⁷ X PRIZE Cup, About the X PRIZE Cup, http://www.xpcup.com/index.cfm?goto=2005_activities.default (last visited Mar. 21, 2006) [hereinafter About the X PRIZE Cup].

¹²⁸ X PRIZE Cup, Schedule of Events, http://www.xpcup.com/index.cfm?goto=2005_activities.schedule (last visited Mar. 21, 2006).

¹²⁹ X PRIZE Cup, The Eggs Prize, http://www.xpcup.com/index.cfm?goto=education_eggsprize (last visited Mar. 21, 2006). Educational programs such as this will help maintain interest and awareness in students of science, space, and confidence in their own creativity.

tude, farthest cross range, and fastest turn around time.”¹³⁰ The X PRIZE Foundation wants to assure that interest and competitive ideas stay alive, though it has little to be worried about. Since the X PRIZE, space tourism companies have been springing up. The race is no longer just about glory; it is also about making money.

Jeff Bezos, founder and CEO of Amazon.com, created Blue Origin to develop low-cost space passenger vehicles of his own.¹³¹ On his ranch in Van Horn, Texas, Bezos is building a suborbital space launch facility that will test components to create a vertical take off and landing vehicle within the next seven years.¹³² In January 2005, Bezos’s company was still in the licensing stage, and working with the FAA to certify its launch site.¹³³

Armadillo Aerospace, though it did not win the X PRIZE,¹³⁴ is still determined to be a contender in commercial space travel.¹³⁵ Featured at the latest X PRIZE Cup event,¹³⁶ Armadillo is researching and developing computer-controlled ethanol rocket vehicles for suborbital tourism flights.¹³⁷

Even more ambitious, Bigelow Aerospace, owned by Las Vegas businessman Robert Bigelow, is developing an orbiting space hotel.¹³⁸ Nearing its testing phase, Bigelow has created a hotel in compact pieces that can be inflated and reassembled in space.¹³⁹ The only challenge seems to be getting it into orbit. Taking from the X PRIZE model, Bigelow is offering a \$50 million award in his America’s Space Prize competition.¹⁴⁰ The prize will be awarded to the first independent United States group that develops a five or more crew spacecraft that can make at least two orbits, dock and orbit with the space hotel, and is at least eighty percent reusable.¹⁴¹

With public interest in space travel soaring, more companies

¹³⁰ About the X PRIZE Cup, *supra* note 127.

¹³¹ Leonard David, *Blue Origin: Rocket Plans Spotlighted*, SPACE.COM, June 13, 2005, http://www.space.com/news/050613_blue_origin.html.

¹³² Alan Boyle, *Amazon Founder Unveils Space Center Plans*, MSNBC.COM, Jan. 13, 2005, <http://msnbc.msn.com/id/6822763/>.

¹³³ *See id.*

¹³⁴ *Cf.* Boyle, *SpaceShipOne Wins*, *supra* note 102 (explaining that SpaceShipOne won the X PRIZE).

¹³⁵ Armadillo Aerospace Home Page, <http://www.armadilloaerospace.com/n.x/Armadillo/Home> (last visited Mar. 22, 2006).

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *See* Michael Belfiore, *The Five-Billion-Star Hotel*, POPULAR SCIENCE, Mar. 2005, at 50, 52, 56.

¹³⁹ *Id.* at 54, 56.

¹⁴⁰ *See* Bigelow Aerospace, Inc., America’s Space Prize, <http://www.bigelowaerospace.com/prize.html> (last visited Mar. 22, 2006).

¹⁴¹ *See id.*

are joining the new space race.¹⁴² Several of the original X PRIZE contenders are still working on their concepts. Like the different airline companies, there are still a variety of niches to fill, and plenty of money to be made.¹⁴³ But even with the increasing public interest and a myriad of space technology developments, there is concern that the legal hurdles may be insurmountable.

IV. UNITED STATES RESPONSE TO SPACE TOURISM

After SpaceShipOne's triumph at the ANSARI X PRIZE, many individuals and corporations hope to create a competitive private space industry. However, investors are concerned about how the United States government may respond to the growing industry. Stuart Witt, manager of the Mojave Spaceport, stated: "[t]he single biggest factor facing the private sector in reaching orbit or interplanetary or even reaching the surface of the moon is the United States Congress Frankly, I think that is the only issue."¹⁴⁴ Witt is not alone in his concern. Congress has responded to the call, but whether its actions will benefit the industry or bring about its downfall remain to be seen.

A. Congress Gets Involved

Over the past few years, Congress has considered involvement in the private space industry. Several House bills have been proposed trying to create investment incentives; however, none have survived.¹⁴⁵ In 2003, Representative Ken Calvert proposed the Invest in Space Now Act of 2003.¹⁴⁶ The Invest in Space Now Act recognized the United States' potential to be the leader in space technology.¹⁴⁷ The Act would have granted a tax credit for owners of stock in C-corporations that were qualified space transportation vehicle providers at the time the stock was

¹⁴² See FEDERAL AVIATION ADMINISTRATION, ASSOCIATE ADMIN. FOR COMM. SPACE TRANSP., 2004 U.S. COMMERCIAL SPACE TRANSPORTATION DEVELOPMENTS AND CONCEPTS: VEHICLES, TECHNOLOGIES, AND SPACEPORTS (Jan. 2004), available at <http://ast.faa.gov/files/pdf/Book1screen.pdf>.

¹⁴³ See, e.g., Sandi Doughton, *Bezos Brings Space Race to Kent as he Plans a Passenger Rocket*, SEATTLE TIMES, Dec. 25, 2005, at A1, A20 ("Each of the enterprises is focusing on a different approach to the same challenge—developing a reliable, affordable and safe method to get people into space. Competition among the groups will raise the odds of success").

¹⁴⁴ Alan Boyle, *Spaceports Compete in Race for Business*, MSNBC.COM, Oct. 7, 2004, <http://msnbc.msn.com/id/6191567/> [hereinafter Boyle, *Spaceports Compete*].

¹⁴⁵ *Recent Developments- Commercialization of Space: The Commercial Space Launch Amendments Act of 2004*, 17 HARV. J.L. & TECH. 619, 630 (2004) [hereinafter *Recent Developments*].

¹⁴⁶ Invest in Space Now Act of 2003, H.R. 2358, 108th Cong. (1st Sess. 2003).

¹⁴⁷ See H.R. 2358.

issued.¹⁴⁸

In the same year, Representative Dana Rohrabacher proposed the Zero Gravity, Zero Tax Act of 2003.¹⁴⁹ This Act would have excluded from gross income any “gain on the sale or exchange of any stock of a qualified space corporation.”¹⁵⁰ Neither the Invest in Space Now Act nor the Zero Gravity, Zero Tax Act was signed into law.

In March 2005, Rohrabacher reintroduced the Zero Gravity, Zero Tax Act.¹⁵¹ Rohrabacher also introduced the Space and Aeronautics Prize Act which aimed to create a government prize system reminiscent of the X PRIZE.¹⁵² The Space and Aeronautics Prize Act would grant a cash award in recognition of achievements in research, development, and prototype demonstrations that have potential application to both public and private space endeavors.¹⁵³

While none of this legislation has been voted past the House floor, it demonstrates that congressional interest is growing, as members begin to understand the importance of the space tourism industry.¹⁵⁴ Tax benefits and prize systems will encourage investment. During these formative years, it is equally important that Congress tread lightly when it comes to regulating space tourism to avoid stifling development.

B. Regulating Commercial Space Travel

Before the 1980s, there was no private space transportation industry; thus, there was no domestic regulation on the matter.¹⁵⁵ There was, however, an international body of law governing space, consisting of treaties set during the Cold War era.¹⁵⁶ All of the existing treaties have outdated ideas of how space would eventually be utilized, particularly requiring that all space

¹⁴⁸ H.R. 2358.

¹⁴⁹ Zero Gravity, Zero Tax Act of 2003, H.R. 914, 108th Cong. (1st Sess. 2003).

¹⁵⁰ H.R. 914.

¹⁵¹ See Zero Gravity, Zero Tax Act of 2005, H.R. 1024, 109th Cong. (1st Sess. 2005).

¹⁵² See Space and Aeronautics Prize Act, H.R. 1021, 109th Cong. (1st Sess. 2005).

¹⁵³ See H.R. 1021.

¹⁵⁴ See also 150 CONG. REC. H10045-H10048 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher) (expressing legitimate concerns that if regulatory barriers hinder the growth of the space industry, it will “force this industry to go overseas, rather than provide the jobs here and the development of technology here”).

¹⁵⁵ Press Release, U.S. House Comm. on Transp. and Infrastructure, Future of Commercial Space Transportation to be Focus of Congressional Hearing, (Feb. 7, 2005), available at <http://www.house.gov/transportation/press/press2005/release8.html>.

¹⁵⁶ See Gabrynowicz, *supra* note 36, at 1041–42. For challenges that the current outer space laws place on further commercialization and development of outer space, see Ty S. Twibell, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, UMKC L. REV. 589, 610–12(1997).

developments be for the “common heritage of mankind.”¹⁵⁷ It is uncertain whether the space treaties, which make no reference to space “tourists,” even apply to the private space tourism industry;¹⁵⁸ thus, the treaties should be revisited, or even entirely replaced.

During the early 1980’s, “recognition of the value of commercial space transportation by U.S. government officials, and the ban of commercial payloads from flying aboard the Space Shuttle after the Challenger disaster, promoted the development of [the commercial space transportation industry] in the United States,”¹⁵⁹ and in 1984, Congress passed the Commercial Space Launch Act to regulate future launches.¹⁶⁰ Congress also created the Office of Commercial Space Transportation (OCST) within the Department of Transportation.¹⁶¹ The OCST was renamed the Office of the Associate Administrator for Commercial Space Transportation (AST) and was transferred to the FAA in 1995.¹⁶² Until recently, however, it was uncertain whether the FAA and AST’s jurisdiction also covered space tourism.

Until December 2004, several agencies were competing for the jurisdiction over suborbital craft.¹⁶³ These ships are designed to enter space using rocket power, and thus appeared to be under the purview of AST.¹⁶⁴ However, several of these suborbital craft had two stages, behaving like airplanes for take-off and landing,

¹⁵⁷ See Lynn M. Fountain, Note, *Creating Momentum in Space: Ending the Paralysis Produced by the “Common Heritage of Mankind” Doctrine*, 35 CONN. L. REV. 1753, 1753 (2003); see also Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty), intro., Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205.

¹⁵⁸ See Julie C. Easter, *Spring Break 2023—Sea of Tranquility: The Effect of Space Tourism on Outer Space Law and World Policy in the New Millennium*, 26 SUFFOLK TRANSNAT’L L. REV. 349, 366–67 (2003) (pointing out the treaties “fail, however, to provide a solution to the problems anticipated by frequent commercial travel into outer space by citizens worldwide”); Steven Freeland, *Issues in Space Law: Up, Up and . . . Back: The Emergence of Space Tourism and Its Impact on the International Law of Outer Space*, 6 CHI. J. INT’L L. 1, 10 (2005); see generally R. Thomas Rankin, Note, *Space Tourism: Fanny Packs, Ugly T-Shirts, and the Law in Outer Space*, 36 SUFFOLK U. L. REV. 695 (2003) (examining the history of space travel and resulting international treaties, and how they might apply to commercial space flight in tort and criminal cases).

¹⁵⁹ Ryabinkin, *supra* note 25, at 114.

¹⁶⁰ See Press Release, U.S. House Comm. on Transp. and Infrastructure, *supra* note 155.

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ See, e.g., 150 CONG. REC. S10054 (daily ed. Sept. 30, 2004) (Exhibit 2, a letter to the Committee on Commerce, Science, & Transportation, written by several members of the developing space tourism industry) (“[C]onfusion has developed as to whether some of these suborbital RLVs [Reusable Launch Vehicles] might be regulated as a rocket or an airplane, or worse still, as both . . . this regulatory uncertainty was a real and unnecessary barrier to private investment in, and therefore the success of, this new suborbital RLV industry, and that Congress needed to fill in the ‘legislative gap’ . . .”).

¹⁶⁴ *Recent Developments*, *supra* note 145, at 626.

and, therefore, appeared to be subject to the FAA's Regulation and Certification Group, which regulates experimental aircraft.¹⁶⁵ Regulation under either branch of the FAA could have meant death to the industry. AST's licenses were set up for non-reusable rockets, which cost millions of dollars, but were "a sufficiently small fraction of the total" cost of launching commercial rockets.¹⁶⁶ FAA experimental aircraft and passenger licenses, however, are equally expensive and their cost is a major hurdle for small and start-up businesses.¹⁶⁷ Space tourism crafts desperately needed their own regime—existing regulatory systems did not properly fit these new vehicles, and the high cost of these systems threatened to destroy the industry.¹⁶⁸

1. The Commercial Space Launch Amendments Act of 2004

In October 2004, federal legislation was in a state of flux as House and Senate negotiations were underway.¹⁶⁹ The industry was strongly pushing for "fly at your own risk" provisions and full independence with their safety standards.¹⁷⁰ The industry argued that these open provisions and standards were essential for extra protection from lawsuits "because of the inherent risk involved with flying experimental spacecraft."¹⁷¹ The responsive argument claimed that passengers would be "forced to give up their access to due process."¹⁷²

After serious negotiations and compromises, President Bush signed the Commercial Space Launch Amendments Act of 2004¹⁷³ (Space Launch Act) into law on December 23, 2004.¹⁷⁴ The Space Launch Act replaces the original legislation from 1984,¹⁷⁵ now

¹⁶⁵ *Id.*

¹⁶⁶ Rand Simberg, *Permission to Fly*, FOXNEWS.COM, Oct. 15, 2003, <http://www.foxnews.com/story/0,2933,100181,00.html>. The cost of launching a non-reusable commercial rocket is so incredibly expensive that a mere multi-million dollar license is not considered a barrier, but rather just another small cost factor of production. *Id.*

¹⁶⁷ See Rand Simberg, *Certifiable*, FOXNEWS.COM, July 24, 2003, <http://www.foxnews.com/story/0,2933,92840,00.html>.

¹⁶⁸ Easter, *supra* note 158, at 378. "To have a successful program, investors must know that their financial endeavors are secure and that the restrictions imposed by outer space law are predictable. The feeling of security will make participants more likely to carry out their plans in space because they will not suffer losses from engaging in activity that is later deemed to be impermissible." *Id.* at 379.

¹⁶⁹ Boyle, *Spaceports Compete*, *supra* note 144.

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ Commercial Space Launch Amendments Act of 2004, 49 U.S.C.A. §§ 70101–70305 (West 2004).

¹⁷⁴ Alan Boyle, *Private-Spaceflight Bill Signed Into Law*, MSNBC.COM, Dec. 23, 2004, <http://msnbc.msn.com/id/6682611/> [hereinafter Boyle, *Private-Spaceflight Bill*].

¹⁷⁵ Glenn Harlan Reynolds, *International Space Law in Transformation: Some Observations*, 6 CHI. J. INT'L L. 69, 70 (2005) (noting "[t]he pre-2004 version of the Commercial Space Launch Act of 1984 did not address space tourism directly").

under the purview of the AST,¹⁷⁶ but the Act also distinguishes commercial human space flight as its own industry in many regards.¹⁷⁷ According to Senator Inhofe, sections were modified in order to remove governmental barriers to the space tourism business and to protect the budding industry.¹⁷⁸

The Space Launch Act enacted some major protections for space tourism businesses. Most importantly, the industry won its “fly at your own risk” clause in 49 U.S.C.A. § 70105(b)(5) which allows a licensed party to carry space flight participants only if they “inform[] the space flight participant in writing about the risks of the launch and reentry, including the safety record of the launch or reentry vehicle type,” and that the United States government has not certified the vehicle as safe.¹⁷⁹ After being fully informed, the participant must also give written consent.¹⁸⁰ This appears to give space tourism businesses a great deal of freedom.

The Space Launch Act also includes the commercial human space flight industry in its temporary indemnification and insurance scheme which requires participants to purchase insurance, but also indemnifies participants up to \$1.5 billion beyond the insurance cap.¹⁸¹ This is a major economic protection to the industry, shielding them “from high insurance costs due to the risk of even a single catastrophic event.”¹⁸²

¹⁷⁶ See 49 U.S.C.A. § 70103 (West 2004) (granting authority to the Secretary of Transportation to carry out the Space Launch Act); see also 49 U.S.C.A. § 70119 (West 2004) (authorizing appropriation of funds to the AST under the Space Launch Act). Because the AST is a subset of the FAA, both under the wing of the Department of Transportation, the administrative agency’s names will be used throughout this Comment interchangeably. Leonard David, *FAA Sets Up Plan for Spaceflight Permits*, MSNBC.COM, May 25, 2005, <http://msnbc.msn.com/id/7983128/> (“[T]he Office of the Associate Administrator for Commercial Space Transportation, or AST, [is] the only space-related line of business within the FAA and under the wing of the U.S. Department of Transportation.”).

¹⁷⁷ See *infra* text accompanying notes 179–91.

¹⁷⁸ 150 CONG. REC. S10051-52 (daily ed. Sept. 30, 2004) (statement of Sen. Inhofe) (“To incentivize and safely get government out of the way is the philosophy of the Commercial Space Launch Amendments Act of 2004 . . .”).

¹⁷⁹ 49 U.S.C.A. § 70105(b)(5)(A) (West 2004). However, space vehicles will not be considered fully approved by the United States government or its administrative agencies until 2012 because the AST and FAA will not be given full regulatory control until that time. 49 U.S.C.A. § 70105(c)(3) (West 2004).

¹⁸⁰ Laura Montgomery, *Space Tourism and Informed Consent: To Knowingly Go*, 51 FED. LAW. 26, 28–29 (2004) (What “informed consent” really would entail varied in the early debates from recommending the passenger make out a will before boarding to telling the passenger “you have a 1 in 14 chance of dying on this flight” and showing several “videos of catastrophic rocket accidents”).

¹⁸¹ 49 U.S.C.A. §§ 70112–13 (West 2004). 150 Cong. Rec. H836 (daily ed. Mar. 04, 2004) (statement of Rep. Boehlert) (explaining that the indemnification is currently set to last for three years, and studies are currently commencing to determine how to end it without harming the industry).

¹⁸² *Recent Developments*, *supra* note 145, at 629. See also Hertzfeld & von der Dunk, *supra* note 7, at 93 (The insurance agreement protects the United States government, as

49 U.S.C.A. § 70105a created an entirely new, experimental permit for reusable suborbital rockets, allowing research and development to test new design concepts, equipment, or techniques, and to facilitate crew training.¹⁸³ The permit also grants an unlimited number of launches and reentries for the covered design, eliminating the burden and cost of securing a new license for each test.¹⁸⁴ In 49 U.S.C.A. § 70104, which provides restrictions on launches, operations, and reentries, subsection (d) specifically notes that regulations may only require one license or permit “to conduct activities involving crew or space flight participants, including launch and reentry”¹⁸⁵

49 U.S.C.A. § 70105(c) was the major compromise. Favorable to the industry, 49 U.S.C.A. § 70105(c)(2) allows only minimal regulations on space tourism vehicles. This section allows only regulations that prohibit design features that have resulted in a serious or fatal injury, or that may contribute to events that pose a high risk of causing a serious or fatal injury.¹⁸⁶ In 2012, however, pursuant to 49 U.S.C.A. § 70105(c)(3), full regulatory control will pass to the FAA.¹⁸⁷ Assuming the first commercial space flights launch on schedule, the FAA will have the power to regulate all aspects of the space tourism industry after only five years of operation with actual space tourists.

49 U.S.C.A. § 70105(a)(2) grants the FAA power, when granting licenses and permits, to regulate safety standards for launch vehicles, reentry vehicles and crews, so long as it does not interfere with 49 U.S.C.A. §§ 70105 (b) and (c).¹⁸⁸ This narrows the interpretation of 49 U.S.C.A. §§ 70105 (b) and (c) dramatically; demonstrating that these sections were not intended to be full blanket exceptions, particularly with respect to crew members.

Aside from the Space Launch Act’s eight-year termination of self-regulation, there are other provisions that give immediate regulatory power to the FAA over persons involved, both as customers and crew.¹⁸⁹ 49 U.S.C.A. § 70105(b)(4) mandates that crews must receive training and pass medical standards as de-

well. “[B]y treaty, every space-faring nation has agreed that each government will ultimately be liable for the actions of its citizens. This potential large liability has necessitated a licensing and regulatory system to be established in many nations to protect government funds.”)

¹⁸³ 49 U.S.C.A. § 70105a (West 2004).

¹⁸⁴ 49 U.S.C.A. § 70105a(e)(1) (West 2004).

¹⁸⁵ 49 U.S.C.A. § 70104(d) (West 2004).

¹⁸⁶ 49 U.S.C.A. § 70105(c)(2) (West 2004).

¹⁸⁷ 49 U.S.C.A. § 70105(c)(3) (West 2004).

¹⁸⁸ 49 U.S.C.A. § 70105(a)(2) (West 2004).

¹⁸⁹ 49 U.S.C.A. § 70105 (West 2004).

terminated by the FAA, and that all crews must be fully informed in writing that the United States government has not certified the launch vehicle as safe.¹⁹⁰ Furthermore, 49 U.S.C.A. § 70105(b)(6)(A) also gives the FAA power to create regulations that will require physical examinations, medical and training requirements for space flight participants, but this clause terminates in December 2007.¹⁹¹ Thus, even though the Space Launch Act seems to represent the industry's freedom to regulate itself, the FAA still retains some control.

2. Space Wars on Paper: The Fight in Congress and Their Interpretations

Several members of Congress recognize that space tourism will play an important role in the future of space technology and that space tourism requires a proper foundation in order to prosper. "Failing to provide a precise and consistent form of management will negatively affect the industry's ability to plan for its future, compete with international providers and attract financing from investors."¹⁹² Supporters felt that

[t]his is about a lot more than joyrides in space, although there is nothing wrong with such an enterprise. This is about the future of the U.S. aerospace industry. As in most areas of American enterprise, the greatest innovations in aerospace are most likely to come from small entrepreneurs The goal of this bill is to promote robust experimentation, to make sure that entrepreneurs and inventors have the incentives and the capabilities they need to pursue their ideas. That is important to our Nation's future.¹⁹³

Supporters further contended these trailblazing space entrepreneurs "just need government to get out of the way," but still "are seeking a government regulatory regime that will provide predictability, . . . stability and support to help them attract private capital In short, this industry requires government regulation, but not so much regulation as to stifle it."¹⁹⁴

Supporters in Congress' main argument was balance—creating a regulatory system that would protect crew and general

¹⁹⁰ 49 U.S.C.A. § 70105(b)(4) (West 2004).

¹⁹¹ 49 U.S.C.A. § 70105(b)(6)(A) (West 2004).

¹⁹² 150 CONG. REC. H786 (daily ed. Mar. 3, 2004) (statement of Rep. Reynolds).

¹⁹³ 150 CONG. REC. H835 (daily ed. Mar. 4, 2004) (statement of Rep. Boehlert). Science Committee Chairman Sherwood Boehlert of New York has been called the greenest Republican in the House, thus his support was especially notable considering the provision's environmental regulation exemptions. Boehlert went from finding the legislation "flighty" to "one of the most important measures this committee will move this year." See *Commercial Space at a Tipping Point*, *supra* note 89, at 66.

¹⁹⁴ 150 CONG. REC. H835-36 (daily ed. Mar. 4, 2004) (statement of Rep. Gordon) ("Such a framework is needed if the companies are to make their plans and attract needed capital.").

public, while still giving the industry the most latitude possible to experiment.¹⁹⁵ California Republican representative Dana Rohrabacher, who sponsored the bill, said that “[o]verall, the bill will help get this new industry on its way and on its feet and give the existing space launch industry more time to grow.”¹⁹⁶ The House almost unanimously agreed that commercial human space flight should be officially placed under the AST, and that issuance of permits and licenses needed to be streamlined.¹⁹⁷ Other provisions, however, were not so warmly embraced.

49 U.S.C.A. § 70105 was the most controversial section of the Space Launch Act. Specifically, the liability waivers and eight-year buffer, which would temporarily restrain the FAA’s regulatory control, were hotly contested. Supporters wanted to allow developers freedom to experiment and generate start-up revenue, so long as the passengers were fully informed.¹⁹⁸ The FAA must wait patiently for the industry to no longer be a “risky novelty. . . . [I]t seems to me kind of silly to regulate Burt Rutan’s vehicle, which has flown three times, as if it was a Boeing 747. If we regulate it that way, then his craft will never evolve into the equivalent of a 747.”¹⁹⁹

Congressional opponents to the Space Launch Act believed its drafters were establishing freedom in the industry at the cost of safety, where someone would have to be killed before regulators could step in.²⁰⁰ The opponents also felt that the eight-year block before the FAA could regulate was similar to the FAA’s original, but inappropriate role as both promoter and watchdog of the aerospace industry.²⁰¹ At a minimum, opponents wanted to

¹⁹⁵ 150 CONG. REC. H836 (daily ed. Mar. 4, 2004) (statement of Rep. Boehlert) (“We are still a long way off from making rockets common carriers like airplanes, but we need to promote the experimental work.”) Representative Lampson explained that “the basic purpose of [The Space Launch Act] is to establish a framework for regulating the emerging commercial human space flight industry. The Committee on Science has heard ample testimony that such a framework is needed if the companies are to make their plans and attract needed investment capital. At the same time, Congress needs to ensure that safety is protected as this new industry emerges.” 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. Lampson).

¹⁹⁶ 150 CONG. REC. H836 (daily ed. Mar. 4, 2004) (statement of Rep. Rohrabacher).

¹⁹⁷ 150 CONG. REC. H840 (daily ed. Mar. 4, 2004) (statement of Rep. Rohrabacher). The Space Launch Act first made it through the House as H.R. 3752, and was passed 402 to 1. It was amended while in the Senate to increase some of the controls and sent back to the House as H.R. 5382, the version that was eventually signed into law. 150 CONG. REC. H10048 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher).

¹⁹⁸ 49 U.S.C.A. § 70105 (West 2004).

¹⁹⁹ 150 CONG. REC. H10049 (daily ed. Nov. 19, 2004) (statement of Rep. Boehlert).

²⁰⁰ Boyle, *Private-Spaceflight Bill*, *supra* note 174. Representative Johnson asked his fellow House members to renegotiate the bill, asserting that “[u]nder no circumstances should we allow the desire for profits to ever interfere with the responsibility of maintaining safety and proper oversight.” 150 CONG. REC. E2119 (daily ed. Nov. 20, 2004) (speech of Rep. Johnson).

²⁰¹ 150 CONG. REC. H10049 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio).

delay the bill and more thoroughly discuss “when it would be appropriate to begin to regulate for the health and safety of passengers on these space crafts.”²⁰²

Supporters responded that some regulation now is better than no regulation.²⁰³ They firmly believed that there needed to be an initial framework to create security for the industry and its investors.²⁰⁴ Supporters also noted that the bill would be the only way to protect the federal government from liability for licensed launches because the FAA would “continue to license private space flights without adequate authority to protect either the safety of the public or the finances of the government.”²⁰⁵ The Space Launch Act already represented “the most feasible compromise possible in this session of Congress.”²⁰⁶ Space flight technology will be developing for far longer than the Space Launch Act allows, and Congress should be cautious with its regulatory approach.²⁰⁷

In the end, the Space Launch Act received the necessary two-thirds majority in the House, and “went virtually unmentioned on the Senate floor” when it passed in December 2004 “tacked onto a package of House bills that were approved by unanimous consent in the Senate.”²⁰⁸ Representative Rohrabacher said it was “a ‘great victory for the future of America’s space efforts.’”²⁰⁹ Representative James Oberstar has continued to contest the Space Launch Act, and in February 2005, introduced a bill, H.R. 656, to amend the Act to grant the FAA more regulatory powers, taking into account the “inherently risky nature of human space flight.”²¹⁰

Representative DeFazio claimed the eight year limit would continue to be extended until the industry matured and a horrible tragedy occurred due to failure to regulate. 150 CONG. REC. H10051 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio).

²⁰² 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio).

²⁰³ “My colleagues are going to hear today that there is not enough regulation in here to protect the consumer, but if this bill goes down, there will be no regulation to protect the consumer.” Uncertainty in the regulatory regime would have continued had this bill not been passed—at a minimum, it has given temporary clarity to the law. 150 CONG. REC. H10048 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher).

²⁰⁴ 150 CONG. REC. H836 (daily ed. Mar. 4, 2004) (statement of Rep. Gordon).

²⁰⁵ 150 CONG. REC. H10052 (daily ed. Nov. 19, 2004) (statement of Rep. Boehlert). Representative Boehlert concluded his comments by stating “[l]et us not take the position of the equivalent of not letting the Wright Brothers test their ideas without first convincing Federal officials that nothing could go wrong.” *Id.*

²⁰⁶ 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. Lampson).

²⁰⁷ Colin B. Picker, *A View From 40,000 Feet: International Law and the Invisible Hand of Technology*, 23 CARDOZO L. REV. 149, 151 (2001) (addressing how technological development has pressed the law as it presses society, and how legislatures must be cautious to not act too quickly with inaccurate information).

²⁰⁸ Boyle, *Private-Spaceflight Bill*, *supra* note 174. The Space Launch Act passed in the House by a vote of 269 to 120. *Id.*

²⁰⁹ *Id.*

²¹⁰ 151 CONG. REC. E181 (daily ed. Feb. 8, 2005) (extension of remarks by Rep. Ober-

After the Space Launch Act passed, Burt Rutan said that the “current regulatory system is [still] in need of repair and nearly destroyed his program.”²¹¹ The AST still has control over launches by private companies in the United States; their mission statement indicates they must ensure that these “activities do not harm public interests, including safety of the public and property as well as U.S. national security and foreign policy interests.”²¹² However, Rutan said that the process promulgated by the AST under the FAA “increased the risk for my test pilots. It did not reduce the risk to the non-involved public. It destroyed our safety policy of ‘always question the product, never defend it.’”²¹³ Rutan explained that the current process “is likely to be misapplied for the regulation of future commercial spaceliners,” just as it “was grossly misapplied for our research tests.”²¹⁴ Rutan also explained that the FAA was already thin on staff and could not effectively regulate the airline industry.²¹⁵ Eight years from now, giving the FAA even more power will only stretch the agency further, rendering it unable to quickly resolve regulatory problems.

3. The FAA Steps In: Proposed Regulations

Under 49 U.S.C.A. § 70120, the AST had twelve months to provide proposed regulations; these regulations would go into ef-

star); see also H.R. 656, 109th Cong. (1st Sess. 2005).

²¹¹ Leonard David, *Good News, Bad News for Space Tourism*, MSNBC.COM, Apr. 20, 2005, <http://msnbc.msn.com/id/7579297/> [hereinafter David, *Good News, Bad News*]. In addition to AST's involvement, the International Traffic in Arms Regulations (ITAR), which is enforced by the U.S. Department of State's Directorate of Defense Trade Controls (DDTC), poses significant issues for American space tourism. Under ITAR, exchange of technical information between one in the United States and anyone from a foreign nation must first be cleared by the DDTC, including the technology used in most X PRIZE team's rockets. Due to the restrictions contained in ITAR, it was not until August of 2005 that Mojave-based Rutan and London-based Branson were able to fully “activate all parts of the project.” If the space tourism industry is to achieve its full potential, either the law must be modified or special expedited procedures, like those in the Space Launch Act, must be created. The federal government must be cautious to protect our national security, but also not to destroy space's golden age before it even comes to fruition. See Leonard David, *U.S. Gives OK for SpaceShipTwo Dealings*, MSNBC.COM, Aug. 15, 2005, <http://msnbc.msn.com/id/8963138/>; Rosanna Sattler, *Transporting a Legal System for Property Rights: From the Earth to the Stars*, 6 CHI. J. INT'L L. 23, 39–41 (2005).

²¹² See Press Release, U.S. House Comm. on Transp. and Infrastructure, *supra* note 155.

²¹³ David, *Good News, Bad News*, *supra* note 211. SpaceShipOne was licensed by the FAA before the Space Launch Act was passed, and thus “had to comply with multiple and time-consuming requirements, including among others: (1) policy approval; (2) safety approval; (3) payload and payload reentry approval; (4) environmental approval; and (5) on-going reporting obligations throughout the term of the license.” Ryabinkin, *supra* note 25, at 107.

²¹⁴ David, *Good News, Bad News*, *supra* note 211.

²¹⁵ *Id.*

fect after eighteen months.²¹⁶ In early 2005, the FAA began hearings to discuss the nature of these future regulations.²¹⁷ FAA chief Marion Blakey recognized that “[i]t was more than 20 years after the Wright brothers’ first flight before government regulations concerning aviation were put into place.”²¹⁸ Initial proposed guidelines required tourists to get physical exams and sign forms accepting the risks.²¹⁹ Drafts of the FAA guidelines also stated that operators of these space vehicles should disclose to their customers their safety record and provide safety training before the launch.²²⁰ Pilots would be required to carry an FAA pilot certificate and pass a medical examination.²²¹ The FAA proposed special training with particular emphasis on “abort scenarios, emergency operations and procedures that direct the vehicle away from the public in the event of a problem during flight.”²²²

On December 29, 2005, the FAA released its proposed regulations for public review as mandated under the Space Launch Act.²²³ While the FAA interprets the Space Launch Act to mean that “the FAA has to wait for harm to occur or almost occur before it can impose restrictions, even against foreseeable harm,”²²⁴ it has interpreted its power to regulate crew training and qualifications broadly.²²⁵ The FAA already has certain design requirements within its proposed rules, such as defined environmental control, life support systems, and physical restraints for persons and objects.²²⁶ The FAA claims it is making these standards as part of its crew requirements because environmental controls are important for the crew to function efficiently, and space flight participants need to be restrained to keep them “from interfering

²¹⁶ 49 U.S.C.A. § 70120 (West 2004).

²¹⁷ Press Release, U.S. House Comm. on Transp. and Infrastructure, *supra* note 155.

²¹⁸ Associated Press, *Congress Revisits Space Tourism Debate*, MSNBC.COM, Feb. 9, 2005, <http://msnbc.msn.com/id/6942959/> [hereinafter AP, *Congress Revisits Space Tourism Debate*]. See also Ryabinkin, *supra* note 25, at 105 (noting “the Warsaw Convention and initial lack of domestic regulation provided the U.S. airline industry with the combination of protection and freedom it needed to flourish”).

²¹⁹ *FAA Outlines Guidelines for Space Tours*, MSNBC.COM, Feb. 10, 2005, <http://msnbc.msn.com/id/6948660/> [hereinafter *FAA Outlines Guidelines*]. The FAA is essentially formalizing the regulations required by the Space Launch Act.

²²⁰ *Id.*

²²¹ *Id.*

²²² *Id.*

²²³ Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. 77261 (Dec. 29, 2005).

²²⁴ Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. at 77270.

²²⁵ The FAA has also interpreted the term “crew” expansively. Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. at 77264.

²²⁶ Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. at 77268.

with flight crew activities.”²²⁷ In the name of setting standards for their broad classification of crew members, the FAA has begun to intrude on the innovator’s territory. Public comment closed on February 27, 2006, and the official regulations will be released soon thereafter.²²⁸

While the FAA claims it is allowing the industry itself “to determine the best way to meet the [regulatory] standards,” space entrepreneurs are still concerned that proposed and future regulations may stifle the space tourism business before it even begins.²²⁹ In response, these trailblazers have banded together to create the Industry Consensus Standards Organization, and resolved to establish their own industry requirements.²³⁰ Group member Michael Kelly told the House Infrastructure and Transportation’s subcommittee on aviation that “[i]f government regulates safety aspects of space fliers themselves, it would be tantamount to killing the industry.”²³¹ On February 8, 2005, these entrepreneurs joined to officially become the Personal Spaceflight Federation, hoping “to work with federal regulators to help draw up the ‘rules of the road’ for suborbital space tourism.”²³² The Federation’s goal is to press a greater self-policing model within the industry instead of regulation by an outside entity.²³³

4. “This Bill is Not Some Wild-eyed Libertarian Scheme.”²³⁴

For commercial human space travel to thrive, the FAA must intrude as little as possible. The AST under the FAA already works with its parent, the Department of Transportation, in conjunction with the Secretary of Defense and the Administrator of NASA, to schedule commercial launches of satellites to prevent collisions and protect the public.²³⁵ The Space Launch Act already protects participants, requiring that tourists be informed and given the freedom to make their own risk evaluations.²³⁶

²²⁷ Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. at 77269.

²²⁸ Human Space Flight Requirements for Crew and Space Flight Participants, 70 Fed. Reg. at 77262.

²²⁹ *FAA Outlines Guidelines*, *supra* note 219; AP, *Congress Revisits Space Tourism Debate*, *supra* note 218.

²³⁰ AP, *Congress Revisits Space Tourism Debate*, *supra* note 218.

²³¹ *Id.*

²³² Alan Boyle, *Space Racers Unite in Federation*, MSNBC.COM, Feb. 8, 2005, <http://msnbc.msn.com/id/6936543/>.

²³³ *See id.*

²³⁴ *Commercial Space At a Tipping Point*, *supra* note 89, at 66. Other scholars have even called it “sensible.” Reynolds, *supra* note 175, at 71.

²³⁵ Commercial Space Launch Amendments Act of 2004, 49 U.S.C.A. §§ 70109 (West 2004).

²³⁶ *See, e.g.*, 150 CONG. REC. H10048 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher) (“[The Space Launch Act’s] central premise still is that people have a right and, especially in a developing industry, it is important to have that type of citizen input

The Space Launch Act's notifications and "fly at your own risk" provisions are all that are truly needed to guarantee both the safety of future passengers and freedom of growth for the industry.²³⁷ However, some members of Congress feel that these requirements give too much power to space travel businesses, and that the Space Launch Act's drafters allowed the industry's "desire for profits to . . . interfere with the responsibility of maintaining safety and proper oversight."²³⁸ Representative Oberstar claimed that the lack of immediate FAA control "could encourage a 'tombstone mentality,' in which regulators would have to stand by until someone got killed or seriously hurt."²³⁹

This claim is exaggerated. The industry has every incentive to hold itself to high safety standards in order to generate greater profit, and the Space Launch Act will also prevent any unscrupulous companies from overlooking safety entirely. In addition, the Space Launch Act does not mandate a fatality or even a serious injury before the government may step in: "[the FAA] may come in . . . [when] there is a risk."²⁴⁰ The AST has unlimited authority to regulate in order to protect third parties, and the Space Launch Act gave a clear eight year timetable for when that unlimited authority will extend to passengers.²⁴¹

Another argument by opponents is that this timetable is too long before the FAA can fully regulate commercial space flight passengers; it is impractical for the FAA to be both promoting and monitoring the same business. Representative DeFazio compared it to when the FAA inherited the Civil Aeronautics Board (CAB)'s duty to promote the aeronautics industry; these conflicting responsibilities resulted in a tragic accident.²⁴² Perhaps Representative DeFazio is correct that the FAA's dual role will only lead to a similar tragedy in the space industry. The

which would give them the right to waive certain safety requirements they would not waive in time when we are dealing with advanced technology and technology that has already been commercialized.")

²³⁷ See, e.g., 150 CONG. REC. S10052 (daily ed. Sept. 30, 2004) (statement of Sen. Inhofe) ("Without such a [liability] waiver, the investors fear excessive lawsuits by trial lawyers. Without the investors, many of these fledgling entrepreneurial space companies will not be able to get off the ground, both literally and figuratively.")

²³⁸ 150 CONG. REC. E2119 (daily ed. Nov. 20, 2004) (speech of Rep. Johnson).

²³⁹ Boyle, *Private-Spaceflight Bill*, *supra* note 174.

²⁴⁰ See 150 CONG. REC. H10048 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher). Representative Rohrabacher, the Space Launch Act's proponent, made the above statement. This suggests that the AST's powers are much more broad than the face of the Act indicates, demonstrating that the Space Launch Act is not as hands-off as it should be, or as the industry wanted.

²⁴¹ See 150 CONG. REC. H10049 (daily ed. Nov. 19, 2004) (statement of Rep. Boehlert).

²⁴² See 150 CONG. REC. H10049 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio). Representative DeFazio claimed the eight-year limit would continue to be extended until the industry matured and a horrible tragedy occurred due to failure to regulate. *Id.* at H10051.

proper remedy, therefore, is for the FAA to allow the industry to both promote and regulate itself.

Space flight will be developing for far longer than eight years—it “is years from being routine, or even a mode of transportation per se. Transportation refers to reaching a desired destination. Space flight, for the foreseeable future, will be an end in itself.”²⁴³ The Space Launch Act has already granted expansive powers to the FAA, and giving the FAA full power after eight years may drive away investors. Both Congress and the FAA should refrain from interfering until they and the industry itself has “accumulated some actual experience with commercial operations” of space flight.²⁴⁴ Representative DeFazio’s example represented a catastrophic result from over sixty years of the FAA’s dual duties—and he is trying to compare it to an un-lived eight.

There are several other flaws with Representative DeFazio’s analogy to early aeronautics and the FAA. When the aviation industry first began, it was not regulated for twenty years.²⁴⁵ Also, the sole reason the FAA was given the responsibility of promoting the aerospace industry was due to CAB’s over-regulation in the first place, which almost destroyed commercial air transportation.²⁴⁶

During this eight-year buffer, the space industry will be charged with the task of foreseeing all possible dangerous scenarios and designing safety features and protocols to protect against them. After winning the X PRIZE, Burt Rutan said: “I absolutely have to develop a manned space tourism system that’s at least a hundred times safer than anything that’s ever flown man to space, and probably a lot more. I have to do that.”²⁴⁷

As Burt Rutan explained, heavy FAA regulation may create a greater risk of harm to passengers and the public rather than lessen it. If design safety regulations are formalized, or if the FAA reads its limited powers in the Space Launch Act expansively, the space industry could fall into the dangerous habit of only doing the required minimum. While the hope is that the space industry would still go above and beyond the government’s regulations, since an accident could destroy any business, it still creates a very dangerous avenue for these businesses to avoid taking responsibility. In addition, instead of allowing designers the freedom to create optimal safety systems compatible with

²⁴³ Montgomery, *supra* note 180, at 27.

²⁴⁴ 150 CONG. REC. H836 (daily ed. Mar. 4, 2004) (statement of Rep. Gordon). Even then, it is debatable whether they should move forward.

²⁴⁵ Ryabinkin, *supra* note 25, at 105.

²⁴⁶ See ALFRED E. KAHN, LESSONS FROM DEREGULATION 6–7, 47 (2004).

²⁴⁷ *Winning the X Prize*, *supra* note 106.

their unique creations, the FAA will constrict designers with mandatory, incompatible safety features that will only hinder development.

Representative Oberstar supports full regulation of the industry, and has asserted he “[does] not think we have ever over-regulated safety.”²⁴⁸ Representative Oberstar dismissed industry concerns that the “FAA might not have the technology skills to deal with . . . a new class of vehicle. They would be groping around with this new class of vehicle and would not think creatively.”²⁴⁹ Representative Oberstar answered by listing jet aviation and Cirrus Aviation’s “all-composite general aviation aircraft that had never been attempted before” as examples of where the “FAA did not strangle that new technology in its crib but nurtured it along in a safe manner so that it could be safely deployed.”²⁵⁰ Representative DeFazio agreed, saying that “regulation at the outset” is the only way to prevent tragedy, “given the expertise of the FAA.”²⁵¹

Representative Oberstar’s jet aviation example fails because jet technology was developed during World War II in response to the German Messerschmitt Me 262, the first jet fighter.²⁵² Because the technology was first developed for military rather than private use, the FAA had little involvement and safety standards were greatly relaxed. In addition, Representative Oberstar’s composite aircraft example is completely inaccurate. The Beech Starship, designed by Burt Rutan for Raytheon, was the first composite aircraft to obtain FAA certification.²⁵³ The FAA’s inexperience with this entirely new technology resulted in a series of expensive overlapping prophylactic requirements. The cost of attaining the FAA’s approval drove the Starship’s final price tag too high, which ultimately led to the demise of this unique aircraft.²⁵⁴ Only fifty-three Starships were built, and Raytheon has

²⁴⁸ 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. Oberstar).

²⁴⁹ 150 CONG. REC. H10051 (daily ed. Nov. 19, 2004) (statement of Rep. Oberstar).

²⁵⁰ 150 CONG. REC. H10051 (daily ed. Nov. 19, 2004) (statement of Rep. Oberstar).

²⁵¹ 150 CONG. REC. H10051 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio).

Representative Oberstar recommended changing the language of the Space Launch Act to allow the FAA to “[p]rescribe minimum standards necessary for safety of design features [sic] and operation of a launched vehicle, taking into account the inherently risky nature of human space flight.” *Id.*

²⁵² See TOM CROUCH, WINGS: A HISTORY OF AVIATION FROM KITES TO THE SPACE AGE 443–44 (2003).

²⁵³ NASA, A HISTORY OF FULL-SCALE AIRCRAFT AND ROTORCRAFT CRASH TESTING AND SIMULATION AT NASA LANGLEY RESEARCH CENTER 6 (2004), available at <http://techreports.larc.nasa.gov/ltrs/PDF/2004/mtg/NASA-2004-4icns-kej.pdf>; see also *Boneyard*, *supra* note 103 (noting “no other business class airplane has an all composite wing and fuselage”). It had other revolutionary features, such as a forward canard wing, pusher engines, and the “first certificated all glass cockpit in general aviation.” *Id.*

²⁵⁴ *Boneyard*, *supra* note 103 (“[T]he FAA had never certified a composite airframe,

recently recalled and scrapped all leased Starships to save on support costs.²⁵⁵ Thus, despite Representative Oberstar's positive portrayal of the FAA's ability to regulate new technology, experience has shown that FAA regulation in newly innovated areas destroys original concepts before they take off.

As a last resort, opponents of the Space Launch Act question whether space tourism should be supported at all. Representative DeFazio argues that if "presumably much wealthier people [are] paying gigabucks to have the experience," and "there are already entrepreneurs out there experimenting," then "it is not necessary to attract entrepreneurs."²⁵⁶ Representative DeFazio believes that paying customers may not be very knowledgeable and "would be subject[] to those risks without any regulation. It just does not seem necessary to promote this industry at this point in time."²⁵⁷ However, regulating less is not the equivalent of "promoting" the industry, and allowing an industry to develop should not be regarded as a privilege.

"At your own risk" legislation recognizes that people willing to spend \$200,000 to go to space are responsible enough to assess the dangers, and will also contribute funds to develop new types of spacecraft.²⁵⁸

[T]his industry is at the stage when it is the preserve of visionaries and daredevils and adventurers. These are people who will fly at their own risk to try out new technologies. These are people who do not expect and should not expect to be protected by the government. Such protection would only stifle innovation.

The "fly at your own risk" provision in the Space Launch Act will "enable space tourists to be informed consumers."²⁵⁹ If commercial spaceliners take all steps necessary to minimize the risk, fully-informed passengers can accept what danger remains. It appears that opponents to the "fly at your own risk" provision do not believe that adventurers willing to pay hundreds of thousands of dollars to be strapped to the top of a pile of explosives and shot into the infinite black vacuum over sixty miles above the planet's surface do not understand that what they are doing may be dangerous and hazardous to their health.

The public and passengers are further protected because of the need for capital—investments will be near impossible to ob-

and required significant modifications . . . costs soared").

²⁵⁵ *Id.* Being held in a boneyard in Arizona, they are scheduled to be shredded and burned. *Id.*

²⁵⁶ 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. DeFazio).

²⁵⁷ *Id.*

²⁵⁸ 150 CONG. REC. H10050 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher).

²⁵⁹ Montgomery, *supra* note 180, at 27.

tain unless the industry is profitable. Space tourism in the first eight years (and likely for a good while thereafter) is a luxury good, a component of the entertainment industry. Like rollercoasters, part of the thrill is doing something a little dangerous. But no one needs to ride a rollercoaster, and no one will pay to ride one that is unsafe.²⁶⁰ If the industry does not hold itself to the highest levels of both safety and service, it will never be profitable or reach maturity.

Recognizing the immense task before them, the industry is asking for a clear and stable legal framework that gives them broad discretion needed to balance safety and experimental innovation. The industry is not requesting “the laissez faire approach which existed during the barnstorming days of aviation.”²⁶¹ They are legitimately concerned that if the FAA exerts any additional restrictions, space tourism may be doomed before given an opportunity to begin.²⁶² Rutan has already experienced this problem, and it almost “destroyed his program.”²⁶³

Congress should support the space tourism industry’s development by maintaining a hands-off approach. This approach should extend beyond the initial eight years so that competition can fund other space technology outside entertainment. Similar to how video games funded the revolution in computer technology, space tourism as a form of entertainment will allow private entrepreneurs to participate in scientific research and exploration.

V. CONCLUSION

Dedicated dreamers like the X PRIZE Foundation, Burt Rutan, and Sir Richard Branson have worked tirelessly to make space tourism a reality. The spark needed to fuel the industry

²⁶⁰ Representative Jackson-Lee of Texas stated: “if that is all that industry is, an expensive amusement ride, then perhaps the federal government should limit its role to issuing safety guidelines and regulations for liability insurance requirements and waivers and then let the private sector do the rest.” 150 CONG. REC. H837 (daily ed. Mar. 4, 2004) (statement of Rep. Jackson-Lee).

²⁶¹ 150 CONG. REC. S10054 (daily ed. Sept. 30, 2004) (Exhibit 2, a letter to the Committee on Commerce, Science, & Transportation, written by several members of the developing space tourism industry).

²⁶² “The question is whether the FAA and the bureaucracy should be able to control the design of a new space launch vehicle before there are any problems. Should then the space launch bureaucrats, the people who are in government, who are in public service override the entrepreneur, oversee [sic] the scientist, override the experts and should they be in the pilot seat even if there is no indication that there is any problem with the design?”

Now I think that would strangle the baby in the crib. In fact, it would destroy this fledgling industry and send it overseas.” 150 CONG. REC.H10051 (daily ed. Nov. 19, 2004) (statement of Rep. Rohrabacher).

²⁶³ David, *Good News, Bad News*, *supra* note 211.

has launched a competitive business, with several companies fighting to be first to transport paying customers into space. As commercial space tourism develops in the coming years, consumers will take orbital rides, stay in space hotels, and go to low gravity resorts on the moon. Competition will increase, prices will drop, and the everyday family will get to ride the real Space Mountain.²⁶⁴ The space industry, not the FAA or AST or any other regulatory agency, is in the best position to make space travel both efficient and safe. As pure entertainment, it must offer the highest standards of safety and service. Space tourism will deliver one of the greatest experiences of this generation. “You really do get the feeling that you’ve touched the face of God.”²⁶⁵

²⁶⁴ See *Agents Plot to Ship the Rich Into Outer Space*, SPACE.COM, Nov. 15, 1999, http://www.space.com/missionlaunches/launches/space_tourism_991115.html.

²⁶⁵ Boyle, *Private Rocket Ship*, *supra* note 113.