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## What is Privatization

### What Privitazation is—a definition

Kevin R. Kosar [Analyst in American National Government Government and Finance Division, 12/28/06, http://www.fas.org/sgp/crs/misc/RL33777.pdf, “Privatization and the Federal Government:

An Introduction”]

During the past two decades, the privatization of federal agencies and activities has been much debated. That said, privatization — here defined as the use of the private sector in the provision of a good or service, the components of which include financing, operations (supplying, production, delivery), and quality control — is not a recent phenomenon. Since its founding in 1789, the federal government has used private firms to provide goods and services. Hence, privatization is of perennial interest to Congress.

### Privitization--- More in depth definition

Kevin R. Kosar [Analyst in American National Government Government and Finance Division, 12/28/06, http://www.fas.org/sgp/crs/misc/RL33777.pdf, “Privatization and the Federal Government:

An Introduction”]

Economists, political leaders, and government officials tend to define “privatization” differently.8 The breadth of activities covered by the term “privatization” varies greatly. The Congressional Budget Office (CBO), for example, has defined “privatization” narrowly to refer to activities that “involve a genuine sale of assets and termination of a federal activity.”9 The Oxford English Dictionary, meanwhile, defines the term more broadly to mean “the policy or process of making

private as opposed to public.”10 Perhaps most commonly, “privatization” is used to

refer to “any shift of activities or functions from the state to the private sector.”11

### **Privatization not marketization**

Kevin R. Kosar [Analyst in American National Government Government and Finance Division, 12/28/06, http://www.fas.org/sgp/crs/misc/RL33777.pdf, “Privatization and the Federal Government: An Introduction”]

Next, the report explains the distinction between privatization and marketization, an alternative to privatization, which is “the structuring of a government agency so that it provides goods and services in the efficient manner of a private firm.” Marketization retains an activity within the governmental sector; privatization moves the components of an activity to the private sector. This distinction is significant because entities within these differing sectors tend to behave differently. Private sector firms tend to be self-directing and profit-seeking; government agencies tend to be process-oriented and pursue the multiple and sometimes conflicting goals assigned to them by Congress and the President. Hence, policymakers who wish to improve an agency’s efficiency or performance, but are leery of privatization, may find marketization an attractive option.

## 1NC Privatization CP

### The United States federal government should use monetary incentives to spur private sector action to \_\_\_\_\_\_\_\_

### Government involvement politicizes space exploration and makes sustainable exploration/development impossible—only the free market can solve.

Robert Garmong [Ph.D. in philosophy, was a writer for the Ayn Rand Institute from 2003 to 2004 “Privatize the Space Program” 3/15/03, http://www.capitalismmagazine.com/science/space/2558-privatize-the-space-program.html]

**There is a contradiction at the heart of the space program: space exploration, as the grandest of man's technological advancements, requires the kind of bold innovation possible only to minds left free to pursue the best of their thinking and judgment. Yet by placing the space program under governmental funding, we necessarily place it at the mercy of governmental whim.** The results are written all over the past twenty years of NASA's history: the space program is a political animal, marked by shifting, inconsistent and ill-defined goals. The space shuttle was built and maintained to please clashing constituencies, not to do a clearly defined job for which there was an economic and technical need. The shuttle was to launch satellites for the Department of Defense and private contractors--which could be done more cheaply by lightweight, disposable rockets. It was to carry scientific experiments--which could be done more efficiently by unmanned vehicles. But one "need" came before all technical issues: NASA's political need for showy manned vehicles. The result, as great a technical achievement as it is, was an over-sized, over-complicated, over-budget overly dangerous vehicle that does everything poorly and nothing well. Indeed, the space shuttle program was supposed to be phased out years ago, but the search for its replacement has been halted, largely because space contractors enjoy collecting on the overpriced shuttle without the expense and bother of researching cheaper alternatives. A private industry could have fired them--but not so in a government project, with home-district congressmen to lobby on their behalf. Now comes evidence that the political nature of the space program may have even been directly responsible for the Columbia disaster. Fox News reported that NASA chose to stick with non-Freon-based foam insulation on the booster rockets, despite evidence that this type of foam causes up to 11 times as much damage to thermal tiles as the older, Freon-based foam. Although NASA was exempted from the restrictions on Freon use, which environmentalists believe causes ozone depletion, and despite the fact that the amount of Freon released by NASA's rockets would have been trivial, the space agency elected to stick with the politically correct foam. It is impossible to integrate the contradictory. **To whatever extent an engineer is forced to base his decisions, not on the realities of science but on the arbitrary, unpredictable, and often impossible demands of a politicized system, he is stymied.** Yet this **politicizing** is an unavoidable consequence of governmental control over scientific research and development. If space development is to be transformed from an expensive national bauble whose central purpose is to assert national pride, to a practical industry with real and direct benefits, it will only be by unleashing the creative force of free and rational minds. Nor would it be difficult to spur the private exploration of space. After government involvement in space exploration is phased out, the free market will work to produce whatever there is demand for, just as it now does with traditional aircraft, both military and civilian. In addition, Congress should develop a system of property rights to any stellar body reached and exploited by an American company. This would provide economic incentive for the sorts of extremely ambitious projects NASA would not dare to propose to its Congressional purse-holders. Extending man's reach into space is not, as some have claimed, our "destiny." Standing between us and the stars are enormous technical difficulties, the solution of which will require even more heroic determination than that which tamed the seas and the continents. But first, we must make a fundamental choice: will America continue to hold its best engineering minds captive to politics, or will we set them free?

## Government Control Bad NB

### Government control over space ensures safety problems—only private sector is sustainable

Ronald D. Dittemore [9/28,/01,Manager, Space Shuttle, “CONCEPT OF PRIVATIZATION OF THE SPACE SHUTTLE PROGRAM”http://www.hq.nasa.gov/office/hqlibrary/documents/o56403525.pdf]

**The safety of the Space Shuttle Program (SSP) is dependent upon strong check and balance processes. These processes are integral to the structure of the program and must be maintained in order to safely conduct space flight operations.** Just as process drift or creep can affect the capability of hardware components, organizational requirements and responsibilities can also drift and significantly affect established checks and balances critical to sustained safe operations. Erosion of critical skills and experience through attrition and personnel change can result in similar impacts. Since 1993, the NASA SSP civil service workforce has been reduced nearly 50 percent, resulting in a significant loss of skills and experience. The NASA skill base continues to erode as more functions transition to the Space Flight Operations Contract (SFOC). For the last 5 years, the SSP has approached privatization through a series of contract consolidations. The transition from NASA oversight to insight associated with these consolidations, has evolved far enough in the last several years to recognize that continuing transition, combined with the continuing loss of NASA skills and experience, will result in serious erosion of checks and balances within the program, critical to safety and mission success. **Continued consolidation utilizing the existing approach results in a serious threat to safety and mission success.** A different approach is required to sustain safe and successful operations for the next 20 years.

### NASA empirically proven to fail – private sector more efficient

Zimmerman, 03 [Managing Director & PR Expert, USA Today, Say no to NASA, Yes to Private Companies, http://www.usatoday.com/news/opinion/editorials/2003-09-23-zimmerman-edit\_x.htm]

The report described how, since the 1980s, nearly $5 billion — practically as much as it cost to build the original shuttle fleet — had been wasted in an effort to build some form of shuttle replacement. None of the programs NASA started — and that Congress had approved — ever got off the ground. Most of the programs never even built usable hardware. Each failure makes a strong case for turning to private enterprise, as we did so successfully in the 1960s and with less success in the 1990s. • The National Aerospace Plane was proposed by President Reagan in 1986 during his State of the Union address. This cutting-edge technology, Reagan proclaimed, would "by the end of the decade take off from Dulles Airport, accelerate up to 25 times the speed of sound, attaining low-Earth orbit, or fly to Tokyo within two hours." After spending $1.7 billion, and building nothing, the program was canceled in 1992. • The X-33 was announced with much fanfare by Vice President Al Gore on July 4, 1996. The program was going to produce a single-stage-to-orbit reusable spacecraft. "This is the craft that can carry America's dreams aloft and launch our nation into a sparkling new century," Gore enthused. After five years and $1.2 billion, the X-33 was canceled when cracks were found in the spacecraft's experimental fuel tanks. • During the same years as the X-33, NASA pursued the X-34, a smaller two-stage reusable rocket launched from a belly of a L-1011 jet, and the X-38, a reusable lifeboat for the International Space Station. After four years, more than $1 billion but little hardware production, both were scrubbed. • In 2000, even as the previous projects were being put to the torch, NASA came up with another program, the Space Launch Initiative. For two years, the agency spent $800 million drawing blueprints for a plethora of proposed shuttle replacements. Nothing was built. In 2002, the Space Launch Initiative was scrapped like the rest. During these years, as money disappeared into NASA's bureaucratic black hole, what were McCain, Hollings, Brownback and the rest of Congress' members doing? Not much. Mindlessly, they rubber-stamped each new program. Partisanship wasn't involved in this failure of oversight. Members of both political parties willingly participated in these wastes of the taxpayers' money. Now, after junking the Space Launch Initiative, NASA is once again starting over with its next project du jour, the Orbital Space Plane. First proposed two months before the loss of Columbia, this new manned vehicle, a reusable vehicle mounted on an expendable rocket, was initially expected to cost about $4 billion and be completed by 2012. After Columbia, NASA offered to hasten construction. With the hearty approval of Congress, the space agency is prepared to spend as much as $14 billion to complete the job by 2008 — with no guarantee that it will do any better than its previous attempts. It's time to remember an old saying: "Fool me once, shame on you. Fool me twice, shame on me." Although it is essential that the United States continue manned space exploration, it is time someone in Congress finally said no to NASA. Finally, Congress should give the job to someone else.

NASA fails – private sector key to improving space exploration

Hudgins, 04 [Director of Advocacy and Senior Scholar & former Senior Economist for the Joint Economic Committee of the U.S. Congress, Move Aside, NASA, http://www.cato.org/pub\_display.php?pub\_id=2514]

If Americans are again to walk on the moon and make their way to Mars, NASA will actually need to be downsized and the private sector allowed to lead the way to the next frontier. The lunar landings of over three decades ago were among the greatest human achievements. Ayn Rand wrote that Apollo 11 "was like a dramatist's emphasis on the dimension of reason's power." We were inspired at the sight of humans at our best, traveling to another world. In announcing NASA's new mission, President Bush echoed such sentiments, speaking of the American values of "daring, discipline, ingenuity," and "the spirit of discovery." Edward L. Hudgins, director of The Objectivist Center, is the editor of the Cato Institute book, Space: The Free-Market Frontier. But after the triumphs of Apollo, NASA failed to make space more accessible to mankind. There were supposed to be shuttle flights every week; instead, there have been about four per year. The space station was projected to cost $8 billion, house a crew of 12 and be in orbit by the mid-1990s. Instead, its price tag will be $100 billion and it will have only a crew of three. Worse, neither the station nor the shuttle does much important science. Governments simply cannot provide commercial goods and services. Only private entrepreneurs can improve quality, bring down the prices, and make accessible to all individuals cars, airline trips, computers, the Internet, you name it. Thus, to avoid the errors of the shuttle and space station, NASA's mission must be very narrowly focused on exploring the moon and planets, and perhaps conducting some basic research, which also might serve a defense function. This will mean leaving low Earth orbit to the private sector.

## Spending NB

### Privatization eases budget deficit

### Chris **Edwards** [Journalist, February **2009**, http://www.downsizinggovernment.org/privatization, “Privatization”]

Privatization of federal assets makes sense for many reasons. First, sales of federal assets would cut the budget deficit. Second, privatization would reduce the responsibilities of the government so that policymakers could better focus on their core responsibilities, such as national security. Third, there is vast foreign privatization experience that could be drawn on in pursuing U.S. reforms. Fourth, privatization would spur economic growth by opening new markets to entrepreneurs. For example, repeal of the postal monopoly could bring major innovation to the mail industry, just as the 1980s' breakup of AT&T brought innovation to the telecommunications industry.

### Privatization leads to a lower budget deficit and stronger public sector

Sheshinski and López-Calva, 03 [Eytan Sheshinski and Luis F. López-Calva, Professor of Public Finance and economist, Associate Professor and Chair, Master’s in Public Economics and Researcher of economics, Privatization and Its Benefits: Theory and Evidence, CESifo Economic Studies, Vol. 49, 3/2003, 429–459, http://www.ecpol.vwl.uni-muenchen.de/downloads/wipo1/ss09/sheshinski.pdf]

The first interaction between privatization and macroeconomics comes from the fact that macro instability, especially large budget deficits, tend to accelerate privatization. The effect of poor public sector financial health on the willingness to reform and on the political acceptability of such reform results in a clear relation between higher public deficits and faster public sector restructuring. The evidence has been shown in Serven et. al. (1994) and López-De- Silanes et. al. (1997), among others. It is immediately obvious thus to look at the interaction between privatization and public sector financial health. It should be expected that more aggressive privatization programs would lead to lower budget deficits, ceteris paribus.17 Privatization allows the government to raise funds in the short term and eliminates the need of permanent subsidies to previously publicly owned enterprises. The fact that privatization entails necessarily a fiscal gain is incorrect, though under the assumption that firms will perform better and net subsidies will be eliminated – supported by the micro evidence – that is a plausible scenario. If firms go from deficit to surplus in their operation, the government will not only eliminate subsidies, but actually start collecting taxes from them. The actual change in the financial position of the government is determined by the difference between foregone dividends and taxes collected from the company. Future higher dividends of the firms under private ownership should also be reflected in the proceeds the government obtains during the sale, corrected for underpricing in the case of public offerings. The use of the proceeds from privatization determines to a large extent the impact of privatization on public sector's cash flows. If the revenue from the sales is used to reduce public debt, as has been the case in most countries, we would observe lower interest payments and consequently a stronger cash-flow position of the public sector. The common policy advice has been to use the proceeds for once-and-for-all disbursements, especially if those eliminate future negative cash flows, in lieu of using them for permanent expenditure.19 The effect of privatization on public sector borrowing requirements should be reflected in lower interest rates, which foster investment, growth, and lower inflation.

## Spending NB

### Privatization increases reliability and reduces the cost of space exploration

Rutkowski 09 - a masters degree candidate at Johns Hopkins University School of Advanced International Studies (SAIS) - Nanjing University Center for Chinese - American Studies [Ryan Rutkowski, Privatizing Outer Space, 10/14/2009]

The primary promise of commercial space flight is to increase the reliability and reduce the cost of space exploration. On April 12, 1981 NASA launched its first Space Transportation System (STS) vehicle (“The Space Shuttle”) promising to usher in a new generation of safe, reliable, and cheap space travel. Decades later, the space shuttle has fallen short of its promise to bring the space travel to the average American with two catastrophic failures and high costs ($300 million per flight) have limited the space shuttle’s usability as a safe and reliable launch system. Arianespace Ariane 5 launch Private space companies promise to reduce costs and increase the reliability of travel to low-Earth orbit (LEO) for companies and adventurous travelers alike. Indeed, Space Exploration Technologies Corporation (Space X) – an up-and-coming orbital transportation service provider promises to bring the cost of launch to as low as $1,300 per pound with its new Falcon 9 rocket compared with $4,729 per pound for the US Space Shuttle, $2,273 per pound for the Russian Soyuz, and $4,854 for the US Delta 2 rockets. Commercial space flight promises to re-kindle the public’s interest in space exploration. Space tourism will make space travel possible for a growing contingent of earthlings. On March 26, 2009, Charles Simonyi became the first space tourist to return to ISS after his first flight on April 2007. Space Tourism companies like Virgin Galactic, Incredible Adventures, and Space Adventures promise to bring the cost of space travel to as low as $98,000 – 190,000 per person. The President of Virgin Galactic, Will Whitehorn said, "The indications are that we can create a show that would give people the chance to go into space. It would be a cross between Dr Who, Star Trek and the Krypton Factor."

## Spending NB

### Solves spending – 40 to 1 payoff reward

Sattler 04 – Rosanna has been named Massachusetts Super Lawyer in Business Litigation every year from 2004- 2010. She was also named one of the "Top 10 Attorneys" in Women's Business in 2007. She is past co-president of the Boston Inn of Court, and is currently a member of its Board of Directors. [TRANSPORTING A LEGAL SYSTEM FOR PROPERTY RIGHTS FROM THE EARTH TO THE STARS, pg. 3, 2004]

One incentive has already been shown to spark “entrepreneurial investment” in space technologies. In October 2004, the non-profit X-Prize Foundation awarded a $10 million Ansari X-Prize to the spacecraft SpaceShipOne, for achieving suborbital flight twice within one week.8 The Commission report estimates that over $400 million was invested by competitors in developing their technologies, a 40 to 1 payoff reward for the development of this technology.9 Corporate sponsors, including M&M Candies, paid an estimated $2 million to have their logos on SpaceShipOne. Richard Branson, CEO of the Virgin Group, which includes Virgin Airlines and Virgin Records, reportedly agreed to pay up to $21 million over the next 15 years to provide spaceships and technology for a proposed sub-orbital space airline, Virgin Galactic. Discussions are underway for similar deals with four other spaceline operators.10 A director of Virgin Galactic states that the company is prepared to invest another $100 million to develop this business. The first five-passenger flights are planned for 2008, with ticket prices set at $210,000.11 The birth of this nascent commercial space tourism industry is supported by President Bush, who on December 23, 2004 signed into law HR5382, The Commercial Space Launch Amendments Act of 2004. This new law will stimulate private investment in sub-orbital space ventures, and assist the flight of the American public into space.12

### Privatizing space costs less and solves economic collapse by creating job growth

**Segal 05**- Geoffrey F. Segal is the director of government reform at the Reason Foundation (www.reason.org) and an adjunct scholar at the Commonwealth [Jeffrey F. Segal, Reason Foundation, 19th Annual Privatization Report, pg 101-102, 2005]

Will space exploration return to aviations freewheeling roots? Who could have imagined that a small team would need only three years and $25 million to send a private astronaut into space twice within one week. Besides fulfilling their own curiosity, the team members behind SpaceShipOne had the extra incentive of the $10 million Ansari X Prize, offered by a private foundation. But however inspiring SpaceShipOnes story might be, it is hardly unprecedented. Aviation began with a great burst of decentralized experimentation, in which inventors ambitions were stoked by more than 100 private incentive prizes. When Charles Lindbergh crossed the Atlantic alone and without stopping, he collected a privately funded purse, the $25,000 Orteig prize. This environment produced all sorts of rickety contraptions, but the good ideas separated themselves from the pack, and the march of progress was brisk. Imagine that only 24 years separated Lindberghs trans- Atlantic trip from the Wright Brothers’ herky-jerky jaunt into history. Still, many find it difficult to trust small groups of private people to continue such progress into space. Leaving the ground is one thing, they say, but leaving Earth’s atmosphere requires the kind of might only government can muster. Indeed space exploration has proceeded differently than aviation. A presidential declaration spurred Neil Armstrongs moon walk, and space exploration has always been dominated by top-down government control. The recently released Aldridge Report, the product of a presidential commission on space policy, notes that “today an independent space industry does not really exist.” However, the same report suggests changing course, recommending that: NASA recognize and implement a far larger presence of private industry in space operations with the specific goal of allowing private industry to assume the primary role of providing services to NASA, and most immediately in accessing low-Earth orbit. In NASA decisions, the preferred choice for operational activities must be competitively awarded contracts with private and non-profit organizations … Recalling the spirit of the early days of aviation incentive prizes, the reports suggests that the government could offer as much as $1 billion “to the first organization to place humans on the Moon and sustain them for a fixed period.” Meanwhile, the private sector is already dangling new carrots. The X Prize Foundation has plans for at least six more competitions, including prizes for the highest altitude and most passengers carried. And the day after SpaceShipOne made its claim on the original X Prize by reaching a suborbital altitude of 62 miles, hotel magnate Robert Bigelow offered $50 million to the first private craft that can go four times higher and reach orbit. Chances are the most lucrative prizes won’t be announced in advance, but will be offered by investors eager to get in on a project that shows early promise. British billionaire Richard Branson has already joined with the team behind SpaceShipOne and committed over $100 million to create his Virgin Galactic space-bound passenger service. NASA has long turned away would-be space tourists like Dennis Tito and pop singer Lance Bass who were willing to fork over tens of millions of dollars to tag along on a trip into space. Already, the private sector has dropped the price of space travel to $200,000 and found a new market. Roughly 7000 people have joined actor William Shatner on the waiting list, and Burt Rutan envisions a day when such trips cost about as much as a luxury cruise, meaning that the market will continue to expand. A larger private-sector presence in space could also mean more jobs. Its always tricky to predict what sort of job creation figures a given innovation will yield, but if it turns out to be at all analogous to the aviation industry, the space industry gushes with job growth potential. Over 100,000 Americans get paid to fly planes, but most of those with aviation-related jobs are not pilots, theyre engineers, mechanics, airport managers, aviation educators, crew schedulers, and so on. Just one century after the Wright Brothers, the aviation industry employs 2.2 million American civilians. Just as the Wright brothers could not anticipate airport managers or crew schedulers we cannot know what kind of space-related jobs will someday become commonplace. With the right legal framework, perhaps some day entrepreneurs will offer same-day parcel delivery, super fast transcontinental shuttles or even lunar honeymoon packages.

## Jobs NB

### Privitization creates more jobs for decades

Charles Bolden [NASA's administrator,7/24/11, “NASA administrator: NASA enters new era of space exploration”,http://articles.orlandosentinel.com/2011-07-24/news/os-ed-charles-bolden-space-072411-20110722\_1\_human-space-flight-space-exploration-nasa]

We don't need to be in the costly business of owning and operating such transportation systems when industry can do it. **There are innovative, American entrepreneurs and traditional aerospace companies that are ready to take the trail NASA has blazed and make it their own.** By facilitating their success, we at NASA **will start a job-creating engine that will hum for decades, expanding opportunities for the American economy, while freeing us to focus on pushing the boundaries of exploration and discovery into deep space.** The International Space Station is complete, thanks to the shuttle, and American astronauts will be living, working and conducting research on it until at least 2020. Its breakthroughs and technology demonstrations will help us understand human health in space and reach those next destinations. The benefits will be multiplied here on Earth, as they already are in new technologies that improve life for people everywhere.

## Politics NB

### The counterplan avoids politics—government control over big space programs ensures a highly politicizes atmosphere—that’s the 1NC Garmond evidence—only shifting control to the free market can avoid controversy

### Privatization is preferable to government-control in big space exploration projects

Garmong, 04 [Robert, Ph.D., Philosophy, University of Texas at Austin, Accuracy in Media, Privatize Space Exploration, http://www.aim.org/guest-column/privatize-space-exploration-2/]

We often hear that the most ambitious projects can only be undertaken by government, but in fact the opposite is true. The more ambitious a project is, the more it demands to be broken into achievable, profit-making steps–and freed from the unavoidable politicizing of government-controlled science. If space development is to be transformed from an expensive national bauble whose central purpose is to assert national pride to a practical industry, it will only be by unleashing the creative force of free and rational minds. We have now made the first steps toward the stars. Before us are enormous technical difficulties, the solution of which will require even more heroic determination than that which tamed the seas and the continents. To solve them, America must unleash its best engineering minds, as only the free market can do.

### Governmental Space Programs are unpopular – cost too much and partisan

Handberg 11 – Roger Handberg is Professor and Chair of the Department of Political Science at the University of Central Florida [Roger Handberg, The Space Review, The beginning of the end or the end of the beginning? Monday, July 25, 2011, http://www.thespacereview.com/article/1890/1]

That “vision thing” (the deficiency attributed to President George H.W. Bush) has been a long-standing problem in the US space program. Future directions have largely been destination driven (the Space Exploration Initiative and the Vision for Space Exploration, or the various space science missions in the solar system), an outgrowth of the concern with space “firsts” which characterized the early space race. Now, though, most of the obvious locations have been visited at least by robotic missions, so there is nothing under the sun that is completely new except for sending humans down the same trail. The problem is that there is no political will to drive such missions with their large and likely to escalate costs. The American political process at its best has difficulty with long-term government programs when the same program is revisited each fiscal year for the next budget allocation. With partisan animosity growing, NASA is being sucked into the whirlpool of congressional and presidential politics. The reality is that nothing of major significance is likely to happen until after the 2012 presidential and congressional elections. Apollo was a pure and shining moment in US space history when there was national unity on the question of future directions for the US manned space program. That unity proved short-lived as budget issues arose in subsequent years but the differences were never so politically partisan as to endanger future directions for NASA. NASA was clearly supported for idealistic and very mundane political reasons: the Apollo program was a giant technological enterprise whose bounty was spread across numerous states and congressional districts, a technological TVA for the South. Now, in the absence of a viable national space objective, the process is reduced to partisan bickering and self-serving short-term choices. Slowly, the nonpartisan aura of the US human space program is dissipating, leaving a mix of bad feelings and distrust on all sides. How much damage will be done, no one knows.

### Prizes key to solving private and public interest in space exploration

Diamandis 04 - the Chairman and CEO of the X PRIZE Foundation [Dr. Diamandis, NASA CONTESTS AND PRIZES: HOW CAN THEY HELP ADVANCE SPACE EXPLORATION? HEARING BEFORE THE SUBCOMMITTEE ON SPACE AND AERONAUTICS COMMITTEE ON SCIENCE HOUSE OF REPRESENTATIVES ONE HUNDRED EIGHTH CONGRESS SECOND SESSION, Serial No. 108–66, pg 58, JULY 15, 2004]

I—to answer your first question, I think that, quite frankly, private industry would love to work with NASA to amplify. The more prizes, the more money, the better, especially if they are an organized fashion building toward larger and larger goals, as Mr. Walker suggested. So I think it would not dry it up at all. I think, in fact. The return is clearly psychic return and making their personal dreams come true. We have, on our board, a number of billionaires and multi-millionaires who have given us the funds to make this happen. I give, as an example, that the America’s Cup each year, the average team on the America’s Cup spends $60 million to $80 million per ship and for a zero cash prize. When Larry Ellison backs his vehicle, it is ego money. A prize basically credentials something as being worth doing. That is where—the more money, the more worth it is doing in the eyes of the public. And then it attracts two flavors of money. It attracts ego money and sponsorship money. There are $20 billion a year spent each year in sponsorship, which goes to car racing and football and baseball and so forth. None of it goes toward building rockets, at least not until recently. So before, if you wanted to build a rocket, if Burt Rutan— he would have to go and prove a marketplace, prove a return on investment for that. Now, by putting up a prize, he doesn’t have to have an ROI. He can say, ‘‘Paul Allen, do you want to be known for history—historical purposes,’’ yet again? Or in our case, we are in negotiations with other sponsors now. A lot of people, the Chairman of HP, who was on the Aldridge Commission report, came up to me after the presentation and said, ‘‘HP wants to be involved in the X–Prize in supporting the next follow-on activities. How can we get’’—it is great. It will bring corporate America into the picture and allow us to have that fun and bring that excitement back to the public.

## Politics NB

### The x-prize is publically popular

**NASA Acadamy 08** - [ROADMAP TO A SPACE FARING CIVILIZATION: Suggestions for the commercial development of space, NASA ACADEMY Goddard Space Flight Center August 2008, http://www.eng.buffalo.edu/~cheetham/index\_files/NA08\_GSFC\_RSFC\_VER\_1.0.pdf]

Community and public outreach events like the X PRIZE Cup are catalysts to the commercialization of space because they energize the public and generate support for the industry. The X PRIZE Cup is a space expo that was started in 2004 where airplanes and rockets fly together for crowds of up to 85,000 people (79). These types of events can be considered catalysts because they involve the public in the industry. The public becomes thrust into the action of the emerging technology scene for the Space Industry, and their interest is peaked. The public‟s intensified interest is critical because the more excited the public is about space, the more stable the market will become, and the more investment there will be by private industry.

### Prizes engage the public

**NASA Acadamy 08** - [ROADMAP TO A SPACE FARING CIVILIZATION: Suggestions for the commercial development of space, NASA ACADEMY Goddard Space Flight Center August 2008, http://www.eng.buffalo.edu/~cheetham/index\_files/NA08\_GSFC\_RSFC\_VER\_1.0.pdf]

This portion shows the committee's plans for external communication that will be used to actively engage the public. It will explain how the prize design committee team will build its own prize's philosophy, and organize events surrounding the prize competition. Events that can be organized around the prize include preliminary competitions, technology demonstrations, web casts, blogs, public shows, and public award ceremonies. This section will also show how the prize design team plans to involve private industry, students, universities and the government. A preliminary budget may be suggested here, which can serve as a business plan.

## Privatization Solves—Investors

### **Privatizing Space is good—convinces investors to invest**

A.J. Mackenzie [1/10/05  [is neither wealthy nor patient enough to invest in Patriots season tickets ttp://www.thespacereview.com/article/300/1](http://www.thespacereview.com/article/300/1), neither wealthy nor patient enough to invest in Patriots season tickets, let alone a space company]public-spending more

The idea behind both proposals, of course, is to encourage private funding of space startups by giving investors an immediate reward for putting up their money, regardless if the startup eventually succeeds or fails. This reward, then, would convince otherwise recalcitrant investors to pony up, know that even if they lose their money, they still got a tax credit out of it. I’ve even seen some commentators take tax policy and space to extremes: on the Space Politics weblog last week one person claimed that the proposals by liberals to roll back President Bush’s tax cuts for the wealthy, including those like Paul Allen who have already invested in space ventures, meant that the “far left is not only against public space travel, but the private kind as well.”

## Privatization Solves—Funding

**The only way to solve is to privatize.**

**Jain, 2011** (Naveen, Executive president and founder of Moon Express, Intelius, InfoSpace, 4/20/11, Huffington Post, http://www.huffingtonpost.com/naveen-jain/our-sputnik-moment-us-ent\_b\_851312.html)

To re-launch our space program, we need private enterprise to step into the void. Government funding only needs to take us to the point where the technology has been developed to get us to the Moon -- and we already have that. It's a model that's been used successfully in the past: the military first developed the Internet, and private enterprise then seized on its commercial potential; the same thing occurred with GPS technology. Naturally, there are barriers to entrepreneurs leading the charge to the Moon. For one thing, ownership is always a point of discussion -- but the fact is that "everyone" and "no one" owns the Moon. Much like when mining resources from international waters (as in fishing), entrepreneurs would need to respect the rights of other business and government players. There is legal precedent for explorers finding and keeping resources that they have uncovered via private investment. There's also the question of whether we can transport resources from the Moon in a cost-effective manner. Perhaps the cost of rocket launches -- by far the greatest expense for a Moon mission -- will come down as more entrepreneurs move into this market, or new technology will make them cheaper. It's even possible to create rocket fuel from resources on the Moon, which would slash return costs and even lower launch costs from Earth. On the other hand, mining and transporting these resources back to the Earth could depress prices as supplies grow, making such ventures less appealing to entrepreneurs. As with all private market endeavors, many will want to take a wait-and-see approach to the Moon's market potential. But therein lies the opportunity for early movers who apply entrepreneurship to the opening of whole new markets, and in the case of the Moon, a whole new world.

## Privatization Solves—Tourism

### Privatization solves space tourism – shorter timeframe and more competitive

Segal 05- Geoffrey F. Segal is the director of government reform at the Reason Foundation (www.reason.org) and an adjunct scholar at the Commonwealth [Jeffrey F. Segal, Reason Foundation, 19th Annual Privatization Report, pg 102-103, 2005]

When people look back in the history books, 2005 might be known as the beginning of the era of the Space Entrepreneur. Tremendous progress has been made since this report was last published. The X Prize has been won, the X Prize Cup has been established, and new space ventures were announced. Progress in privatizing space is dependent upon overcoming emerging policy issues and increased investment in entrepreneurial endeavors. On October 4, 2004, Scaled Composites became the first private manned spacecraft to exceed an altitude of 328,000 feet twice within the span of a 14-day period, thus claiming the $10 million Ansari X Prize. Just as Charles Lindburgh won the Orteig Prize in 1927 to usher in the era of commercial air travel, the X Prize has ushered in the era of commercial space travel. Granted, Space Adventures was the first to charge a tourist to go into space and it should be recognized for its landmark achievement in helping found the Space Tourism industry. The fundamental difference between the two is that the X Prize was focused on a sub-orbital flight that lasts a few minutes while the first space tourists took an orbital flight lasting a full week. With the price of an orbital experience still around $20 million, it is out of reach of almost everyone. To contrast, the initial cost of a sub-orbital experience is around $200,000 and is projected to go down as more flights and providers launch service. Most importantly, this has demonstrated to the whole world that the space industry is most productive when privatized and placed in the hands of entrepreneurs. The use of prizes and competition has ignited a market for people to push the envelope and achieve something most people only dream of. In a move of marketing brilliance, Virgin Galactic sponsored the historic flights and has subsequently licensed the Scaled Composites design and related technology to develop the world’s first privately funded spaceships dedicated to carrying commercial passengers on space flights. According to testimony given at a hearing of the House Science Committee’s space subcommittee on April 20, Will Whitehorn, president of Virgin Galactic, the subsidiary of Richard Branson’s Virgin Group, said as of the date of the hearing that “29,000 people have said they’re willing to pay deposits of up to $20,000 for spaceflights within a range of prices of up to $200,000.” He expanded upon that comment saying “100 people have signed contracts with Virgin Galactic to pay the full $200,000 up front.” According to testimony given at that same hearing, Burt Rutan said, “By the twelfth year of operations 50,000 to 100,000 astronauts will have enjoyed that black sky view.” This is amazing since as of the date of this publication, only 500 people have traveled into space. With flights scheduled for 2008 and new competitors preparing to launch service, we can confidently say that the “Era of Personal Spaceflight” has begun.

### Privatization encourages space tourism – getting the public into space

**NASA Acadamy 08** - [ROADMAP TO A SPACE FARING CIVILIZATION: Suggestions for the commercial development of space, NASA ACADEMY Goddard Space Flight Center August 2008, <http://www.eng.buffalo.edu/~cheetham/index_files/NA08_GSFC_RSFC_VER_1.0.pdf>]

A final catalyst for the development of the commercial space industry is the growth of the market for Space Tourism. As NASA and other international government agencies continue to explore space, the public is becoming more interested and intrigued by what lies beyond our planet. Space Tourism provides the public with the opportunity to explore this interest and makes space accessible to a wider range of people, rather than just a select astronaut core. Space Tourism is a major catalyst for commercial development, because NASA is not interested in helping get the public to space. NASA more importantly does not have the resources or the budget to do so. But, still the demand to go to space remains and in order to fill this demand, the private companies must emerge and supply opportunities for Space Tourism. Currently the market for Space Tourism is in an early development phase as many new companies are starting up and presenting new experiences and products to the public. One current opportunity presented by Bigelow Aerospace, the inventors and manufacturers of inflatable orbiting modules, is the “Fly Your Stuff” Program. In this program, Bigelow will fly personal items in their Genesis II module and take pictures of the items floating in space (80). Bigelow‟s end goal is to develop inflatable habitats, which could function as a suborbital space hotel (81). A second major experience that is in development by Virgin Galactic, are suborbital space tourism flights. These flights are going to take the public to space beginning around 2010 and ticket prices will be about $200,000.00 US dollars (81). Many other companies, like Space Adventures, XCOR, and RocketPlane Limited, are looking to compete with Virgin Galactic as space airlines as they begin to develop their own suborbital spaceflight programs. In addition to suborbital flights, Space Adventures is currently conducting orbital flights by flying private citizens on the Russian Soyuz to the International Space Station for $20 million US dollars (82). Many opportunities are being developed for Space Tourism by private companies, but there is room for many more once in a lifetime adventures. The key to Space Tourism being a catalyst to the commercialization of space is that the government is unwilling to participate in the market, but the demand for this market is still thriving. This flourishing new industry of Space Tourism provides a great economic opportunity for the private companies.

## Privatization Solves—Space Elevator

### Private companies create space elevator

Segal 05- Geoffrey F. Segal is the director of government reform at the Reason Foundation (www.reason.org) and an adjunct scholar at the Commonwealth [Jeffrey F. Segal, Reason Foundation, 19th Annual Privatization Report, pg 104, 2005]

These companies are focused on the launch process, which includes the traditional use of rockets or moveable platforms. The use of rockets is not new, but companies like SpaceX are currently rethinking all aspects of this method to dramatically lower the cost of delivery by a factor of four. This means that all types or increased frequency of missions are now within economic reach of government agencies and corporations. They already have contracts and are launching their first rocket in 2005. Looking a little farther out are moveable platforms, or what is being called the “Space Elevator.” A space elevator is a physical connection from the surface of the Earth via an ocean- or land-based platform to a platform located in geostationary Earth orbit. The goal is to move people, payloads, power, and gases between the surface of the Earth and space. Current Space Elevator ventures like LiftPort and education foundations like Elevator:2010 are working hard to push through the technology barriers (i.e., carbon nano-tubes, beam power) by 2010 to place a Space Elevator into use by 2020.

## Privatization Solves—Colonization

### Government funded colonization too risky – space mission budgets always get cut and compomised

Carberry 10 - Executive Director, Explore Mars, Inc; President, Explore Mars, Inc; Project Leader, ISRU Challenge, Explore Mars, Inc.[C.A. Carberry, Artemis Westenberg, and Blake Ortner, The Mars Prize and Private Missions to the Red Planet, Journal of Cosmology, 2010, Vol 12, 4081-4089]

Dramatic reductions of launch costs could go a long way to drive down overall costs. However, another option discussed in the last few years is the "One-Way" option (Schulze-Makuch and Davies, 2010). Traditional mission architectures all assumed that the astronauts would return to Earth. There are a growing number of people who feel that the first mission may very well be a one-way trip (Boston, 2010; Schulze-Makuch and Davies, 2010). According to Schulze-Makuch and Davies (2010) A human mission to Mars is so hugely expensive that is makes more sense to have one-way human mission to Mars as this would cut the costs several fold and ensure a continuous commitment to the exploration of Mars. They suggest the sending of four astronauts initially, two on each of two space craft, each with a lander and sufficient supplies, to stake a single outpost on Mars. The astronauts would be re-supplied on a periodic basis from Earth until they became increasingly proficient at harvesting and utilizing resources available on Mars. Eventually the outpost would reach self-sufficiency. This viewpoint is also argued by X-Prize founder Peter Diamandis. "The cost, complexity and risk of round trip missions is too high…Government space mission budgets always get cut and compromised." Diamandis added, "and the science and meaningful long-term infrastructure is what gets cut out. With a one-way mission, you have to make sure you have the long-term infrastructure in place" (Diamandis 2010). In an NPR interview, Arizona State University physicist Lawrence Krauss echoes this viewpoint, arguing that a one-way mission should be attempted, particularly since it does not require a return vehicle (Flatow 2009). Krauss stated, "From a monetary point of view, we'd save a lot because really, whenever you want to bring people back, you have to send the fuel for the voyage along on the way out… And it's not just a factor of two. It's a huge factor in terms of just the cost of the fuel and the mass of the rocket ship." Krauss states this is not a new idea. "There's a long tradition of that in human history. The explorers didn't necessarily expect to come back. Certainly, colonists and pilgrims never expected to go home" (Flatow 2009). It should be noted, however, that explorers to the American continent knew that in most cases, there would be a plentiful supply of air, food, and usable space that did not require the cutting edge use of technology. Even with the use of ISRU technology, these basic necessities will be far more tenuous than they were for the early European settlers in America. Krauss also fails to point out that ISRU propellant production can remove or drastically reduce the need for fuel for the return voyage. Despite the fact that the first people on Mars would face the large possibility of not surviving beyond a few years, there are still apparently many people who would still willingly take the risk. In a Mars Exploration Magazine article, Google's Tiffany Montague was asked if she would go to Mars if she had the chance. She replied, "Oh, hell yes! Not only would I go, I would elbow everyone else out of the way – even if you told me it was a one-way trip. Hopefully you send me with the means to make my own greenhouse, but even if it was going to be a very short abrupt one-way trip, I'd still go and I'd still elbow everyone else out of the way" (Montague 2010).

## Privatization Solves—Mining

### Private companies are key to the success of mining

Andrieu 04 - member of the executive commitee at FERA [Michel Andrieu, Organisation for Economic Co-operation and Development, EVALUATION OF FUTURE SPACE MARKETS Project on The Commercialisation of Space and the Development of Space Infrastructure: The Role of Public and Private Actors, SG/AU/SPA(2004)5, p 48, 7th May 2004]

Aside from exploration considerations, some space enthusiasts intend to encourage mining on extraterrestrial bodies, such as the moon and asteroids. Though no business cases are really credible yet due to launch costs considerations and current technical limitations, some academic and materials experts are looking at possible commercial ventures in the space-mining sector. The capability to extract and utilize space resources in time, particularly from the Moon, Mars, and near-Earth asteroids, would provide an alternative to transporting certain products from Earth into space and would also provide our planet with new resources. This technology area includes exploring for resources; mining and refining raw materials; processing, manufacturing, and storing materials derived from raw resources; transporting materials to their point of use; and identifying potential uses or customers. Technology development in this area would focus on extraction, processing, and storage, although advances in other areas, such as power, automation and robotics, and space transportation, will also be required for many applications. The Colorado School of Mines (CSM), which has many research institutes in the fields of energy, environment, materials and minerals, founded in 1989 a Center for Space Mining. One of the research professors explained, "Space mining is 10 to 20 years, or even further out. However, somebody has to start thinking about these things now."57 Their workshops tend to bring together space enthusiasts and minerals experts. Other space-mining proponents, such as Apollo 17 astronaut Harrison Schmitt, lobby for mining the moon for helium 3, a rare element not found on Earth, which could be used for energy consumption on Earth, but could also be turned into rocket fuel onsite to facilitate exploration of the solar system. The in-situ production of propellant from extraterrestrial resources could significantly increase the performance and lower the costs of planetary exploration missions that require the return of people or hardware to Earth. Extraterrestrial resources could also be used for shielding or constructing human habitats. Surface materials, such as the lunar regolith, might be much cheaper than materials delivered from Earth, particularly for applications that require large masses of material (such as radiation shielding for lunar surface habitats). If in-space transportation for bulk material from the Moon or nearby asteroids became cost effective, it could also enable and accelerate the development of new generations of government and commercial in-space capabilities that require large masses of material, such as large space stations, or hotels or power stations, beyond low Earth orbit. Aside from basic costs considerations for such enterprises, potential regulatory barriers in the international space law framework do exist (e.g. ownership of property on the moon), and would need to be clearly addressed in any business scenario.

## Tax Breaks Solve—Space

### **Tax incentives work**

Federal Aviation Administration 2008 [licenses and regulates U.S. commercial space launch and reentry activity, as well as the operation of non-federal launch, “State Support for Commercial Space Activities” http://www.faa.gov/about/office\_org/headquarters\_offices/ast/media/State%20Support%20for%20Commercial%20Space%20Activities.pdf]

Perhaps one of the most common tools employed by states to encourage space transportation companies to locate within their borders are traditional financial incentives. These incentives can and do take many forms, but the most common are tax rebates or exemptions. Such exemptions are often tied to the specific industry that a particular company is engaged in, how much it pays its employees, and what kind of activity the company intends to conduct in the state. Each of these categories has an entire range incentives tied to them. An example of an incentive intended to support a particular industry would be an aerospace tax credit program, or more commonly a high-technology tax credit program, under which aerospace usually qualifies. In some cases the incentives are extremely narrow and focus not only on a particular industry, but on an industry segment. The fact that aerospace jobs, like most other high-tech jobs, are generally high paying is the primary reason that states are interested in encouraging their propagation.

### Tax breaks bring about private sector interest

Leroy Baker[8/19/10, “Tax Breaks To Boost Private Space Exploration”, reporter for taxnews.com, http://www.usa-tax-news.com/story/Tax\_Breaks\_To\_Boost\_Private\_Space\_Exploration\_\_\_\_44876.html]

United States Senator Bill Nelson has announced legislation that would offer major tax and other incentives to encourage growth in the private space exploration industry. Nelson's plan would create up to five regional business enterprise zones around the country as "magnets for commercial space ventures." As it grapples with record federal deficits, the Obama administration no longer perceives the funding of space exploration a priority and is cancelling the space shuttle program. One more shuttle flight is scheduled for next year after the Senate approved a bill to provide additional funding to the program, but a cloud of uncertainty currently hangs over the US space industry, not to mention the hundreds of high technology firms supplying equipment to the US space program. Nelson's bill, known as the Commercial Space Jobs and Investment Act of 2010 would create a new 'commercial space capital formation credit' allowing investors to claim a tax credit worth 20% of their equity investment in a business producing equipment such as launch vehicles and re-entry vehicles. The equity investment would have to be held for a minimum of five years for the investor to qualify for the tax credit. The bill would also give the Secretary of Commerce authority to designate up to five 'Commercial Space Enterprise Zones' in areas suffering from high unemployment or economic dislocation. Companies established in these zones would be entitled to an enhanced research and development tax credit of 30% (instead of 20%) and could claim a special depreciation allowance on 'qualified commercial space property.' Nelson, a Florida Democrat, says that his proposals would attract jobs to areas where there are lots of scientists and engineers, especially near places where the space exploration is already well established, such as Florida's Kennedy Space Center (KSC). “President Kennedy was right when he predicted that space exploration would create a great number of new companies and strengthen our economy,” Nelson said. “What we’re doing now is everything we can to ensure KSC’s continued importance to our nation’s space exploration effort, while also broadening the economic opportunities along our Space Coast.” Frank DiBello, President of Space Florida said that Nelson's proposals represent "a significant step forward in ensuring the right incentives are in place to attract industry to Florida, and the broader domestic marketplace." "This bill will stimulate the commercial space industry to create jobs in our state, at a time when we need it most," he added.

### Tax Relief is an effective step toward the future

WILLIAM LEE ANDREWS, III [Spring, 2003,B.A. in economics from Washington & Lee University, an M.B.A. from the College of William & Mary, a J.D. from Regent University, “A Mighty Stone for David's Sling: The International Space Company”, http://www.lexisnexis.com.turing.library.northwestern.edu/hottopics/lnacademic/]

**Tax relief on space commerce would be a move into the future and a path for a new frontier. What is called for is essentially a tax holiday for new space related activities (products made and services performed in space), efficient space launches, and space asset capital gains.** An important feature would be a sunset provision to phase out the statute and insure against lingering, unanticipated, ill-effects. U.S. Congressman Dana Rohrabacher has been sponsoring a draft bill with similar features. For other countries to remain competitive, their leaders would need to make similar attempts.

## Tax Breaks Solve—Exploration/Development

### Tax incentives for a five year investment in space development and exploraiton

Mike Schneider [The assosciated press, 8/16/2010 “Senator wants tax breaks for commercial space industry”, http://www.msnbc.msn.com/id/38729490/ns/technology\_and\_science-space/t/senator-wants-tax-breaks-commercial-space-industry/]

ORLANDO, Fla. — U.S. Sen. Bill Nelson, D-Fla., wants to create five business enterprise zones around the country, including one possibly at the Kennedy Space Center, where investors who put their money in commercial space ventures would get major tax breaks. Nelson will produce legislation Tuesday that would give tax breaks worth 20 percent of their outlays to investors in private space-related businesses. The Commercial Space Jobs and Investment Act would help attract engineers and scientists to these enterprise zones and create jobs in a space industry facing uncertainty, Nelson said. "What we're doing now is everything we can to ensure KSC's continued importance to our nation's space exploration effort, while also broadening the economic opportunities along our Space Coast," Nelson said in a statement. The U.S. space program is undergoing its biggest transformation in a generation with the last space shuttle flight scheduled for next year. Thousands of workers are expected to lose their jobs when the shuttle program ends. The Obama administration has pledged $40 million to Florida's Space Coast to help ease the transition. Another $60 million has been proposed for other regions around the nation affected by the end of the program. Nelson's bill would amend the 1986 tax code to give investors a credit worth 20 percent of their investment in businesses that create launch vehicles, re-entry vehicles, related equipment or are part of those operations. The investment would have to be for no less than five years. The bill also would raise a tax credit for research and development in these zones from 20 percent to 30 percent if it is conducted on space-related tests in those enterprise zones. States vying to get the enterprise zones would have to show they have been impacted by the loss of space jobs and already have space-related infrastructure in place. The zones would be chosen by the U.S. Commerce Secretary, said Bryan Gulley, Nelson's press secretary. "You couldn't do it in Iowa, or you couldn't do it where there is no space industry and no high unemployment," Gulley said. "Clearly, it's intended to help communities where there already has been an established space industry, and communities where NASA already has a presence."

## Tax Breaks Solve—Funding

### Tax incentives spur the private sector to fund research.

OECD, 03 [Organization for Economic Co-Operation and Development, Tax Incentives for Research and Development: Trends and Issues, http://www.oecd.org/dataoecd/12/27/2498389.pdf]

With regard to benefits, many studies show a correlation between R&D tax incentives and increases in private research spending within individual countries. Although it is difficult to relate heightened R&D intensity directly to fiscal measures, it appears that, on average, tax incentives can increase private research spending by an amount equal to the loss in tax revenue. An examination of panel data on tax changes and R&D spending in nine OECD countries over a nineteen-year period (1979-97) found that a 10% decrease in the cost of R&D through tax incentives stimulated just over a 1% increase in the level of R&D in the short-run and just under a 10% rise in R&D in the long-run (Bloom et. al., 2000). A Canadian study found that each dollar of tax revenue foregone through tax incentives generated CD 1.38 in additional business research spending and concluded that the federal R&D tax incentive is cost-effective in stimulating additional R&D (Finance Canada, 1998). A review of country studies of the effectiveness of R&D tax credits reported similar findings.

## Tax Breaks Solve—Exploration

### Short-term government incnetives k2 long term private sector exploration

David Heyman [Senior Fellow and Project Director, February 2005, The Still Untrodden Heights: Global Imperatives for Space Exploration in the 21st Century http://csis.org/files/media/csis/pubs/suth.pdf]

It is conceivable and even desirable that in future space exploration activities, private companies will move beyond their government “contractor” supporting roles to more entrepreneurial leadership roles in developing solutions to technical challenges. Government funds will still be necessary to help catalyze private sector activity, but one could envision space activities becoming self-financing after a period of time. To achieve this, however, a number of creative funding mechanisms, including tax incentives, monetary prizes, and new venture funds would need to be adopted. Opening traditionally national space markets to broader international competition would force “national champion” aerospace firms to become more competitive.

### **Private sector achieves space exploration more efficiently than the NASA/USFG**

Bonnie E. Fought 1988 [Chief Operating Officer and General Counsel, Connectix Corp, “Legal Aspects Of The Commerciazlization of Space Transportation System”, ,http://www.law.berkeley.edu/journals/btlj/articles/vol3/fought.html]

On February 11, 1988 President Reagan announced a new national space policy including a fifteen-point commercial space initiative which provides a revised framework for U.S. space activities. [FN4] In designating one of the three major components of the new policy as the "creati on of opportunities for U.S. commerce in space," [FN5] the President stressed that "United States commercial launch operations are an integral element of a robust national space launch capability." [FN6] The new space policy seeks to encourage the private sector's role in assuring access to space by providing favorable government policies toward commercial launch ventures - short of direct government subsidies - and by requiring federal agencies to procure launch services from the private sector to the fullest extent feasible. [FN7] In addition, the Space Policy reaffirmed limitations on NASA's commercial launch services; NASA will not maintain an expendable launch vehicle system, nor will NASA provide commercial launch services except where the payloads must be mantended, require the unique capabilities of the shuttle, or are required for national security or foreign policy reasons. [FN8] Thus, NASA's primary focus will be on non-commercial applications of the Space Transportation System (STS) or shuttle program. [FN9] In addition, the new National Space Policy announced a fifteen-point Commercial Space Initiative to promote a "vigorous U.S. commercial presence in Earth orbit and beyond." [FN10] Specifically in the area of space transportation, a major objective of the Space Policy is "assuring a highway to space." [FN11] In an attempt to promote the development of private launch service companies the Space Policy requires that all federal agencies purchase expendable launch services from the private sector to the "fullest extent feasible." [FN12] The remainder of the initiative regarding the commercialization of space transportation is the Reagan Administration's proposals for the future, including placing limits on liability which might result from a commercial launch accident, [FN13] consulting with the private sector on the potential construction and use by the Federal Government of a commercial launch range separate from federal facilities, [FN14] and providing government vouchers to research payload owners scheduled on a shuttle flight which could be used to purchase a one time launch on an alternative U.S. commercial launch service vehicle. [FN15]

## Prizes Solve—Exploration

**T**he Government should set aside the money for NASA as a prize for space companies achievements

Newt Gingrich [01/16/2007, Republican candidate in 2012 for President of the United States Ph.D. in modern European history from Tulane University in New Orleans, “Bold Solutions Based on Bold Colors” http://www.humanevents.com/article.php?id=18968]

NASA has become a slow and paper-dominated bureaucracy. It is proposing to spend billions very slowly and very bureaucratically. It will both waste the taxpayers' money and actually slow the speed of getting into space. **A bold alternative solution would be to: Focus the NASA bureaucracy on science projects and inexpensive unmanned space exploration. Set aside the money currently allocated for manned space exploration for getting to the moon and Mars and turn it into prizes with bigger rewards for earlier achievements and smaller prizes for later achievements. Entrepreneurial startups and bold adventurers will get into space much faster and more excitingly than a government bureaucracy.** Change the FAA and NASA rules to make it easy for entrepreneurs and explorers to get into space at a much higher risk than we would tolerate for government programs. Establish an equivalency with mountain climbing as an acceptable risk informed adults could take in space launches.

### prizes creates competition and thus leads to technological innovation

### Hudgins 04 - Edward Hudgins is a Cato Institute Adjunct Scholar and editor of the Cato book Space: The Free-Market Frontier [X-Prize Proves the Power of Entrepreneurship, CATO Institute, October 7, 2004, http://www.cato.org/pub\_display.php?pub\_id=2842]

On October 4, 2004, on the 47th anniversary of the launch of Sputnik, humanity again made spaceflight history. SpaceShipOne, designed by Burt Rutan and his company Scaled Composites and built with money from Microsoft co-founder Paul Allen, won the privately funded $10 million Ansari X Prize by becoming the first private vehicle, capable of carrying three individual, to fly into space twice in a two-week period. SpaceShipOne's triumph teaches us four lessons: First, it reminds us of the power of competition. Entrepreneurs who compete with one another generate the dynamism of free enterprise. They cannot simply offer adequate goods and services when competitors might offer the excellent. Competition pushes entrepreneurs to strive to satisfy and thus keep their customers. Whether it's automobiles, personal computers, the Internet, consumer electronics or airline flights, only entrepreneurs can commercialize goods and services, making them available to all. The X Prize stimulated competition in spaceflight, which has for too long been dominated by government. The result is SpaceShipOne's triumph. Edward Hudgins is a Cato Institute Adjunct Scholar and editor of the Cato book Space: The Free-Market Frontier (2003). Second, it shows us the power of pride. Rutan's team, as well as the other two dozen competitors for the X Prize, struggled with limited resources to develop new, innovative and ingenious ways to travel 100 kilometer above the Earth, into space. They called upon the best within themselves and gave themselves something no one else could give them: the knowledge of a job superlatively done in the face of great challenges and a manifestation of their creativity and rationality, which made the achievement possible. Third, it demonstrates the motivational power of profit. Private cash prizes were heavily used in the development of civil aviation; Charles Lindbergh won by $25,000 Orteig prize in 1927 when be became the first individual to fly nonstop across the Atlantic. In the wake of the X Prize success, Robert Bigelow, the founder of Bigelow Aerospace, which plans to place a private station in space, has offered a $50 million prize for the development of a vehicle capable of carrying as many as seven individuals to an orbital outpost - hopefully, one of Bigelow's. Rutan used some $20 million invested by Allen to win $10 million. That doesn't sound very profitable, but Rutan's efforts aim at long-term profit - he plans a business carrying passengers on sub-orbital trips and eventually orbital flights into space. In fact, billionaire Richard Branson, founder of Virgin Atlantic airline, is partnering with Rutan and Allen in hopes of carrying 3,000 private astronauts into space in the next five years. Prosperity is a good thing and, in the process of pursuing their own economic and spiritual well-being, these space entrepreneurs will create a commercial revolution as Allen did with Microsoft and Branson did with Virgin. And fourth, SpaceShipOne marks a paradigm shift. For nearly five decades, most people thought of space as a government program and believed that travel beyond the atmosphere simply was too costly for the private sector to provide. Of course, it was because the government was providing the service that the cost stayed high, and government regulations helped to discourage private entrepreneurs from trying to create their own space businesses. But Peter Diamandis, president of the X Prize Foundation, sought to create a revolution not only by sparking entrepreneurial competition but by changing the way people think about space - it can be a place to which private providers can take you to private facilities for your own private edification. Rutan was the man who designed the Voyager, the first plane to fly around the world without stopping or refueling. That craft now hangs in the Smithsonian Air and Space Museum in Washington, along with Lindbergh's Spirit of St. Louis, the Wright Brothers' 1903 flyer, Chuck Yeager's X-1, and the Apollo 11 craft that carried the first men to the Moon. SpaceShipOne should one day hang beside those pioneering craft, in tribute to the private entrepreneurs who opened space to all of mankind.

## Prizes Solve—Exploration

### Prizes will provide an extra incentive to work quickly – solves on timeframe

BARCELONA Moon Team 11 - a multidisciplinary joint venture bringing together entrepreneurial, industrial and academic capabilities representing the only Spanish based team at the GLXP. [Outreach, BMT-Press\_Brochure-v06-ENG, Issue 1 Rev6, pgs 6-7, 2011-03-01]

The X PRIZE Foundation is an educational nonprofit prize institute whose mission is to create radical breakthroughs for the benefit of humanity. In 2004, the Foundation captured the world’s attention when the Burt Rutan-led team, backed by Microsoft co-founder Paul Allen, built and flew the world’s first private spaceship to win the $10 million Ansari X PRIZE for suborbital spaceflight. The Foundation has since launched the $10 million Archon X PRIZE for Genomics, the $30 million Google Lunar X PRIZE and the $10 million Progressive Insurance Automotive X PRIZE. The Foundation, with the support of its partner, BT Global Services, is creating prizes in Space and Ocean Exploration, Life Sciences, Energy and Environment, Education and Global Development. The Foundation is widely recognized as a leader in fostering innovation through competition. The $30 million Google Lunar X PRIZE is an unprecedented international competition that challenges and inspires engineers and entrepreneurs from around the world to develop low-cost methods of robotic space exploration. The competition's grand prize is worth $20 million. To provide an extra incentive for teams to work quickly, the grand prize value will change to $15 million whenever a government-funded mission successfully explores the lunar surface, currently projected to occur in 2013. To win the Grand Prize, a team must successfully soft land a privately funded spacecraft on the Moon, rove on the lunar surface for a minimum of 500 meters, and transmit a specific set of video, images and data back to the Earth. Additionally, a second place prize of $5 million will be available for the second team to complete the competition objectives. $4 million in bonus prizes are available for achieving other specific mission objectives, including operation at night; traveling more than 5km over the lunar surface; detection of water; and precision landing near an Apollo site or other lunar sites of interest (such as landing/crash sites of man-made space hardware). And last, a $1 million award will go to the team that demonstrates the greatest attempts to promote diversity in the field of space exploration.

### Prize incentives work better than funding

Kulkarni et al 11 – Tapan R. Kulkarni, Jason Dunn, Dillon Sances, and Ruben D. Nunez, GNC Lead, Earthrise Space Inc, AIAA Senior Member. Chief Engineer, Earthrise Space Inc., AIAA Member. Lunar Spacecraft Development Lead, Earthrise Space Inc., AIAA Student Member. Project Director, Earthrise Space Inc., [Guidance, Navigation Control and Challenges for Team Omega Envoy’s GLXP Mission Design, pg 1, FEBRUARY 5, 2010]

Incentive based prizes have often been the necessary step in making certain industries or products become commercialized. This has surely been the case for the aerospace industry: In 1919 Raymond Orteig, a wealthy business man, offered the 25,000 dollar Orteig Prize for the first person to make a non-stop flight from New York to Paris. Orteig could have easily used this money to fund a project with one of the leaders in the airplane industry to have this aircraft built, but he knew that by making it a competition he would have thousands more people working to complete this goal, and from all different view points and angles. The Orteig Prize led to Charles Lindbergh making his historic flight across the Atlantic. Lindbergh‟s flight was the necessary step to creating a public airline industry. Most recently incentive based prizes have been introduced in the space industry to help privatize space the way the Orteig Prize did with the airline industry. The X Prize Foundation (XPF) first sponsored the Ansari X PRIZE; a prize purse of 10 million dollars for the first privately funded group to put a space ship in sub-orbital flight twice in two weeks1. In 2004 this prize was won by Burt Rutan, and only five years later, the technology he developed is being used by Virgin Galactic for space tourism.

### NASA should expand its Centennial prize program to encourage technological innovation

Aldridge 04 – Chairman of the President's Commission on the Implementation of United States Space Exploration Policy [Edward "Pete" Cleveland Aldridge Jr , Recommendation 5-2 from "A Journey to Inspire, Innovate, and Discover," the report of the President's Commission on the Implementation of United States Space Exploration Policy, June 2004]

Although many companies exist and more are emerging in the field of space, an increase in both the number and variety of such businesses would vastly increase the processes and materials available for space exploration. The private sector will continue to push the envelope to succeed competitively in the space field. It is the stated policy of the act creating and enabling NASA that it encourage and nuture private sector space. The Commission heard testimony on both positive incentives and potential bottlenecks encountered by the private sector as they attempt to exploit these commercial opportunities. A space industry capable of contributing to economic growth, producing new products throught the creation of new knowledge and leading the world in invention and innovation, will be a national treasure. Such an industry will rely upon proven players with aerospace capabilities, but increasingly should encourage entrepreneurial activity. Prizes. The Commission heard testimony from a variety of sources commenting on the value of prizes for the achievement of technology breakthroughs. Examples of the success of such an approach include the Orteig Prize, collected by Charles Lindbergh for his solo flight to Europe, and the current X-Prize for human suborbital flight. It is estimated that over $400 million has been invested in developing technology by the X-Prize competitors that will vie for a $10 million prize - a 40 to 1 payoff for technolgy. The Commission strongly supports the Centennial Challenge program recently established by NASA. This program provides up to $50 million in any given fiscal year for the payment of cash prizes for achievement of space or aeronautical technologies, with no single prize in excess of $10 million without the approval of the NASA Administrator. The focus of cash prizes should be on maturing the enabling technologies associated with the vision. NASA should expand its Centennial prize program to encourage entrepreneurs and risk-takers to undertake major space missions. Give the complexity and challenges of the new vision, the Commission suggests that a more substantial prize might be appropriate to accelerate the development of enabling technologies. As an example of a particularly challenging prize concept, $100 million to $1 billion could be offered to the first organization to place humans on the Moon and sustain them for a fixed period before they return to Earth. The Commission suggests that more substantial prize programs be considered and, if found appropriate, NASA should work with the Congress to develop how the funding for such a prize would be provided.

### Prizes create competition and a wide range of projects that are more innovative than funding one organization

**Chang 11** - a science reporter for The New York Times [Kenneth Chang, The New York Times, Race to the Moon Heats Up for Private Firms, July 21, 2011, http://www.nytimes.com/2011/07/22/science/space/22moon.html?pagewanted=all]

Now that the last space shuttle has landed back on Earth, a new generation of space entrepreneurs would like to whip up excitement about the prospect of returning to the Moon. Spurred by a $30 million purse put up by Google, 29 teams have signed up for a competition to become the first private venture to land on the Moon. Most of them are unlikely to overcome the financial and technical challenges to meet the contest deadline of December 2015, but several teams think they have a good shot to win — and to take an early lead in a race to take commercial advantage of our celestial neighbor. At the very least, a flotilla of unmanned spacecraft could be headed Moonward within the next few years, with goals that range from lofty to goofy. One Silicon Valley venture, Moon Express, is positioning itself as a future FedEx for Moon deliveries: if you have something to send there, the company would like to take it. Moon Express was having a party on Thursday night to show off the flight capabilities of its lunar lander, based on technology it licensed from NASA, and “to begin the next era of the private commercial race to the Moon,” as the invitation put it. “In the near future, the Moon Express lunar lander will be mining the Moon for precious resources that we need here on Earth,” the invitation promised. “Years from now, we will all remember we were there.” Naveen Jain, an Internet billionaire and a founder of Moon Express, says the company will spend $70 million to $100 million to try to win the Google Lunar X Prize, but could recoup its investment on its first flight. He envisions selling exclusive broadcast rights for video from the Moon, as well as sponsorships, à la Nascar, for companies to put their logos on the lander. Or, perhaps, a tie-in to reality television. “Wouldn’t it be nice if you could have a ‘Moon Idol,’ just like ‘American Idol?’ “ suggested Mr. Jain, who previously founded Infospace and Intelius. “You take the top 10 contestants and play their voices on the Moon, record it and see who sounds the best.”

### Space prizes solve on timeframe – SpaceShipOne built a successful spacecraft in 2 weeks

Diamandis 04 – the Chairman and CEO of the X PRIZE Foundation [Peter Harry Diamandis, MIT, Infinite Connection: News and Views: Building a Private Path to the Space Frontier, Technology Review, July 2005, http://alum.mit.edu/news/AlumniProfiles/Archive/Peter\_Harry\_Diamandis\_-2783-2C\_SM\_-2788]

With skill, charm and relentless energy, space evangelist and entrepreneur Peter Diamandis '83, SM '88 drags "can't-be-done" projects across the finish line on a regular basis. On October 4, 2004, millions of people watched SpaceShipOne, the first private manned spacecraft reach the border of space twice in two weeks. Burt Rutan collected the $10 million Ansari X Prize for winning this space-flight competition. The X Prize was the brainchild of Diamandis and it's very personal. "Space is my passion. Since I was nine, everything in my life has been about my going to space one day," he explains. "I spent a decade of my life at MIT and Harvard earning medical and engineering degrees in order to become an astronaut." After a candid conversation with astronaut Byron Lichtenberg, he realized that he would not make a good government astronaut. So Plan B meant finding a private sector route to space. To that end, Diamandis built companies and organizations to create the technology, the marketplace and the leadership required to irreversibly pry open the space frontier and lower the cost to get there. "The X Prize lit a fuse," says Diamandis, "Twenty-six teams from seven nations generated over $50 million of investment." Starting in fall 2006, an annual X Prize Cup and a 10-day Personal Spaceflight Exposition will be held annually in Las Cruces, New Mexico. Competitive races with cash prizes will showcase Reusable Launch Vehicles designed to carry the paying public into space. Prizes played a huge role in early aviation's development and are a big part of the Diamandis formula. "A prize gives people permission to take risks," he says. "A prize is typically not intended for incumbent players. They know it can't be done."

### Prizes stimulate innovation and solves on timeframe – a suborbital vehicle was built in three years

Belfiore 04 - Author, journalist for the New York Times, Smithsonian, Air & Space, and speaker on the innovations shaping our world [Michael Belfiore, Air & Space Magazine, The O Prize Will Rocketplane launch spacecraft from Oklahoma? November 01, 2007, <http://www.airspacemag.com/space-exploration/o-prize.html>]

WHEN THE ANSARI X-PRIZE was awarded in 2004 to Burt Rutan’s Scaled Composites for making the first privately funded manned trips to space, the other teams that had been vying for the $10 million prize money, though no doubt disappointed, kept plugging away at their designs for commercial spacecraft. Some, Rocketplane Global among them, are now racing to be the first to offer suborbital tourist flights; I chronicle these efforts in my recent book Rocketeers. Since the book was printed, Rocketplane hit some turbulence on the way toward launching Rocketplane XP, its space tourism vehicle. In August 2006, the company won a contract through NASA’s new Commercial Orbital Transportation Services program to develop orbital cargo ships for servicing the International Space Station. Because the NASA money is earmarked strictly for orbital ships, the company began channeling its engineering resources away from the suborbital Rocketplane XP and into an orbital spaceship under development by Rocketplane’s newly acquired Kistler Aerospace. The decision delayed launch of the suborbital vehicle by at least a year; the first flight is now planned for 2009 instead of 2008, and only if the company can raise additional funds. Among the casualties of the work slowdown: chief engineer David Urie, who was laid off last May. The company also says to expect changes in Rocketplane XP. “It will still have the same bizjet look,” says Rocketplane’s George French III, and the mission profile will be the same. As this issue of Air & Space/Smithsonian went to press, the company had not released specific information about the modifications. In the meantime, the contest for the suborbital tourism market has a new entrant. In June, EADS Astrium, a division of the formidable European Aeronautic Defence and Space Company, announced its design for a tourist spaceship. EADS Astrium’s vehicle, which has yet to receive a name, will send four passengers and a pilot into space, using twin jet engines to climb to 39,000 feet before firing a rocket engine fueled by methane and liquid oxygen. The design bears more than a passing resemblance to Rocketplane XP. Explains Astrium chief technical officer Robert Lainé: “A self-propelled plane is going to be the best for the operator because then they can fly from [any] airport,” with no special launch infrastructure required.

### Prizes incentivize innovation

**NASA Acadamy 08** - [ROADMAP TO A SPACE FARING CIVILIZATION: Suggestions for the commercial development of space, NASA ACADEMY Goddard Space Flight Center August 2008, p 31]

A proven way of accelerating an industry is through the use of prizes. Prize competitions are challenges proposed in areas in which increased involvement by private individuals or the commercial sector is sought. Prize competitions attract innovative people who are driven by passion, prestige, and personal achievement. Throughout history, prize competitions have been used to foster crucial development in many areas [Appendix C]. Prizes can create heroes, reflecting the level of visibility of the prize and the level of commitment of the general public. An example of this is Charles Lindbergh. The Ansari X PRIZE initiated the commercial development of sub-orbital space flight. The new Google Lunar X PRIZE has started a new, commercial race to the Moon. In order for man to get back to the Moon, NASA and the private industry will be forced to complete lunar characterization missions to determine the locations of the best landing sites, habitable regions and available resources.

### Prizes revitalize an industry – solve better than tax breaks

**NASA Acadamy 08** - [ROADMAP TO A SPACE FARING CIVILIZATION: Suggestions for the commercial development of space, NASA ACADEMY Goddard Space Flight Center August 2008, http://www.eng.buffalo.edu/~cheetham/index\_files/NA08\_GSFC\_RSFC\_VER\_1.0.pdf]

Early on, many of the other companies who flew the mail started carrying passengers on airmail flights. In 1926, airlines in the US carried 6,000 passengers. By 1930, passengers flying on US airlines had soared to 400,000. Thus the shift from cargo to passengers began. This transition was significantly catalyzed by the effect of Charles Lindbergh‟s trans-Atlantic flight in 1927. Lindbergh‟s $15,000 flight was supported and made possible by the Orteig Prize. Set up by a wealthy private citizen, the $25,000 prize spurred numerous attempts at the flight, and led to Lindbergh‟s success, which in turn led to a huge growth in the aviation industry. The winner of the 1930 Best Woman Aviator of the Year Award, Elinor Smith Sullivan, said that before Lindbergh's flight, "people seemed to think we [aviators] were from outer space or something. But after Charles Lindbergh's flight, we could do no wrong. It's hard to describe the B-15 impact Lindbergh had on people. [His flight] changed aviation forever because all of a sudden the Wall Streeters were banging on doors looking for airplanes to invest in. We'd been standing on our heads trying to get them to notice us but after Lindbergh, suddenly everyone wanted to fly, and there weren't enough planes to carry them” (84). Over the remainder of 1927 applications for pilot's licenses in the U.S. tripled, the number of licensed aircraft of all types quadrupled, and U.S. Airline passengers grew between 1926 and 1929 by 3,000% from 5,782 to 173,405 (16). The support and competitive nature of the prize created the opportunity for investors to take seriously something as risky as aviation, and because of it, the industry was revitalized and took significantly critical steps to the thriving sector it is today.

## Prizes Solve—Rovers

### Prize incentives solve exploration (rovers)

Kulkarni et al 11 – Tapan R. Kulkarni, Jason Dunn, Dillon Sances, and Ruben D. Nunez, GNC Lead, Earthrise Space Inc, AIAA Senior Member. Chief Engineer, Earthrise Space Inc., AIAA Member. Lunar Spacecraft Development Lead, Earthrise Space Inc., AIAA Student Member. Project Director, Earthrise Space Inc., [Guidance, Navigation Control and Challenges for Team Omega Envoy’s GLXP Mission Design, pg 2, FEBRUARY 5, 2010]

The GLXP is essentially a rover mission. The overall goal for the development of the Omega Envoy Rover, Sagan, is to create a system that can accomplish the GLXP mission in as simple a manner as possible. Since there is no restriction on how the rover must operate; whether it drives on wheels, crawls, slithers, or flys, there are many possibilities for how to design such a rover. After many trade studies however, OE has found that a traditional wheeled rover is the best op-tion for creating a simple system to complete the GLXP requirements. The Sagan rover concept is illustrated in Figure 1. Typically, a rover sent to another planet or moon goes there on a scientific basis, and thus has several sophisticated scientific payloads on board. This is not the case for the Omega Envoy rover though; in fact, the only payload on the rover is the camera system that is needed to document the journey and win the GLXP. That being said, Sagan becomes a relatively simple machine with only a few major components. The rover will have four wheels with in wheel motors to avoid the destructive lunar regolith from moving parts, individual suspension for each wheel, a light weight body that will house the necessary hardware, a solar panel array for charging the onboard batter-ies, and lastly the camera system. Sagan will be in direct communication with a lunar lander vehi-cle, which will serve as the relay station for communication with ground control on Earth

## Prizes Solve—Mars

### Privatization is the only cost effect method to explore Mars

Carberry 10 - Executive Director, Explore Mars, Inc; President, Explore Mars, Inc; Project Leader, ISRU Challenge, Explore Mars, Inc.[C.A. Carberry, Artemis Westenberg, and Blake Ortner, The Mars Prize and Private Missions to the Red Planet, Journal of Cosmology, 2010, Vol 12, 4081-4089]

The key question is: Can this same concept be applied to space exploration and particularly, exploration of Mars? Over the past couple of decades, estimates for a NASA-run human mission to Mars have ranged anywhere from $150 billion to $1 trillion (Flatow 2009; Zubrin 1996; Day 2004). If this is true, it is highly unlikely that a private mission of any kind will be achievable in the near future. There are many individuals, however, who believe that a human mission to Mars can be accomplished at a dramatically lower cost if a market model is utilized. In 1994, Robert Zubrin and United States Representative Newt Gingrich came up with the Mars Prize bill that would offer a $20 billion prize to the "first private organization to successfully land a crew on Mars and return them to Earth…" (Zubrin 1996). At the time, this was quite an innovative concept. The Mars Prize bill predated the X-Prize by two years and few people were taking this type of program seriously. Although Zubrin's 1996 estimate for his Mars Direct plan for sending humans to Mars was $30 billion, he hypothesized that a privately developed mission would be substantially less expensive. Using a market model, it could cost $4 to $6 billion. This estimate was based on using Titan, Atlas, Delta, or Russian Energia launch vehicles. Zubrin's model also predated any of the current commercial launch vehicles that are now in development (Zubrin 1996). Gingrich did not actively promote the Mars Prize concept for over a decade, but he also did not abandon a prize based Mars exploration program altogether. In an April 2007 speech, Gingrich proposed a $20 billion prize again which would be tax free. He noted that being tax free is extremely important because Americans do not like paying taxes. He claimed that a tax free $20 billion prize would be psychologically more attractive than a $40 billion prize with taxes. As with the Gingrich-Zubrin concept of 1994, the first team to get to Mars and return safely would win the prize. (Gingrich 2008) It is not surprising that former Speaker Gingrich revived the Mars Prize concept. Two years after the Mars Prize bill was proposed (and essentially died), Peter Diamandis and a group of other visionaries founded the X-Prize which offered a $10 million prize to the first non-government team to successfully launch a human occupied spacecraft into space twice within a two week period. Eight years later this prize was won by Burt Rutan's SpaceShipOne, which had been financed by Microsoft co-founded, Paul Allen. In addition, over $100 million was invested in this contest by the various competing teams; $25 million was invested by Paul Allen alone (Brekke 2004). While this achievement represented only a tiny fraction of the complexity and cost of what a Mars mission would entail, it represented a paradigm shift in what was possible and what individuals and corporations may be willing to invest in. At that moment, a Mars Prize did not appear to be nearly as farfetched. It also inspired the next step for the X-Prize Foundation with the announcement in 2007 of the $30 million Google Lunar X-Prize (Diamandis 2008). When asked if the Google Lunar X-Prize could lead to Mars related prizes, Tiffany Montague, Director of Google‟s space initiatives stated, "I don't think there is any reason that it wouldn't. I do think that we need to walk before we can run. The preamble to that is demonstrating that we can send rovers successfully to the Moon" (Montague 2010). Could this concept be applicable to sending humans to Mars? In 2008, X-Prize founder, Peter Diamandis proposed Mega X-prizes including a human mission to Mars. However, in a recent interview, Diamandis stated that it was unlikely there would be a Mega X-Prize geared to a human mission to Mars. "I don't see a Mars Mega-X PRIZE… An incentive prize works when there's a long-term business model and the prize can drive numerous teams to spend the money to play. A private Mars mission is likely a $5B - $10B endeavor and you won't see multiple teams each raising this level…If we ever re-invented launch technology to reduce the cost by 100-fold, then I think a "humans to Mars prize" would make a lot of sense" (Diamandis 2010). While not likely to reduce launch costs by 100-fold, if SpaceX can deliver on its goal of dramatically reducing launch costs, it may bring a Mars mission down to the level where an X-Prize may be viable. In a September 7, 2010 email interview with the first author (Carberry), Elon Musk said he thought a privately financed mission would only cost $2 billion and that a prize would only have to be $1 billion. He added that it would take "ten years from starting fundraising to landing back on Earth." If Musk is correct, not only would hundreds of individuals in the United States alone have the means to fund such a prize, but hundreds would also be able to fund teams to compete.

## Prizes Solve—SPS

### Prizes key to incentivize private investment for Sps – Sps is too risky for the government

Globus 10 - Al Globus is the chairman of the Space Settlement Committee of the National Space Society. [Online Journal of Space Communication An International Electronic Journal, Issue 16: SPS Solutions, Space solar Power Via Prizes, Winter 2010, http://spacejournal.ohio.edu/issue16/globus.html]

The primary risk is that the prize is too small to stimulate SSP development, i.e., that $1billion at $5/kw-hr is insufficient to fund the first satellite, even when matched by private sector investment. However, it is encouraging to note that PG&E, a major power company in California, announced in 2009 a deal to purchase 200 megawatts of electricity for a 15-year period from Solaren Corp., an 8-year-old company based in Manhattan Beach, California (California, 2009). This level of power production is expected to be available beginning in 2016. While the exact price PG&E agreed to pay is unknown, it is certainly far less than $0.50/kw-hr, suggesting that $5kw-hr for the initial prize will be attractive to potential providers. In the above scenario, as successful contestants are free to sell power on the open market once they’ve received all the prize money to which they are entitled, they could simply sell subsequent power to PG&E or other utilities at the same price Solaren Corp. is receiving. A $21 billion public investment, structured as prizes, would in all likelihood provide an incentive sufficient to jump-start our SSP industry. Having 21 satellites in operation should be more than sufficient to set the U.S. on a course to lead the world in energy production. Supplying our own energy from space could have four great consequences: 1) an inexhaustible supply of electrical power 2) much less dependence on imported fossil fuels, 3) a huge reduction in green-house gas and other atmospheric emissions and 4) increased investment in access to space transport and infrastructure enabling a wide variety of unreachable space capabilities, including settlement.

## Prizes Solve—Asteroids

### Prizes key to solving asteroids

**Woo 10-** co-founder of LTD Space [Marcus Woo, California Institute of Technology, Caltech Space Challenge: Mission to an Asteroid, 06/15/11, http://features.caltech.edu/features/189]

"Designing a human-exploration mission to a near-Earth asteroid is both timely and exciting," says Donald Yeomans, who manages NASA's Near-Earth Object Program Office at JPL and is one of the faculty mentors for the workshop. "The most spacecraft-accessible asteroids in Earth's neighborhood are also the most dangerous in terms of their ability to collide with Earth." Experts from Caltech and JPL will give talks and mentor the students, providing them with the basic knowledge to plan a space mission. The two teams will then put their heads together and come up with a target and trajectory, a spacecraft design, experiments and instruments, and everything else needed for a mission. The workshop will look for students from a variety of fields—chemists, mechanical engineers, software engineers, and, for a manned mission, even someone with a medical background, says Prakhar Mehrotra, one of the graduate students leading the project. Mehrotra says he came up with the idea after taking part in a similar program with the European Space Agency in 2009. In that program, called the Space Station Design Workshop, participants had to design a mission to the moon. The experience was so rewarding that he wanted to do something similar at Caltech, taking advantage of the resources at JPL to receive practical training in engineering and research. In 2010, President Obama announced his goal to land an astronaut on an asteroid by 2025. So this year, Mehrotra teamed up with Jon Mihaly, a graduate student in aerospace engineering, to organize a workshop that challenges students to plan a mission that does just that. In addition to developing possible techniques to divert a future, life-threatening asteroid impact, Yeomans says, an asteroid mission will help scientists learn more about the origins of the solar system and life on Earth. NEOs were left over from the processes that formed the solar system, and they likely brought with them water and organic compounds that are crucial for life when they slammed into Earth early in the planet's history. These kinds of impacts played a critical role in shaping the evolution of life. One such collision might have led to the demise of the dinosaurs, for example. After the workshop, scientists and engineers from JPL will cull the ideas and apply them toward the design of an asteroid mission, Mehorotra says. Participants might be able to parlay their experiences into research internships at JPL. "I really think it's important to get people interested in this field," adds Mihaly. With an aging NASA, it's crucial to train the mission planners of the future.

## AT OST

### Private companies aren’t barred by the Outer Space Treaty

Chang 11 - a science reporter for The New York Times [Kenneth Chang, The New York Times, Race to the Moon Heats Up for Private Firms, July 21, 2011, <http://www.nytimes.com/2011/07/22/science/space/22moon.html?pagewanted=all>]

“We can make a lot of money even if we do not win the prize,” said David Gump, president of Astrobotic, which is based in Pittsburgh. “We will be making substantial profit on the first flight. Basically, we’ll break even by selling a third of the payload.” The X Prize competitors might all be beaten by landers and rovers that China, Russia and India plan to send up over the next couple of years. But those fall more in the mold of traditional, government-built science probes. While NASA had wanted to send astronauts back to the Moon, its program was canceled last year, a victim of budget cuts and shifting priorities. But it has awarded $500,000 each to Moon Express, Astrobotic and a third competitor, Rocket City Space Pioneers, the first installments of up to $30 million that it will contribute to the X Prize efforts. George Xenofos, manager of NASA’s Innovative Lunar Demonstrations Data program, said he expected one or more teams to make it to the Moon. “It’s definitely not the technical issues that’s stopping them,” he said. The contestants’ goals do not appear to face legal hurdles. The Outer Space Treaty of 1967, ratified by 100 nations, bars countries from claiming sovereignty over any part of the Moon, but does not prevent private companies from setting up shop. As for mining the Moon, it could fall under similar legal parameters as fishing in international waters.

### Private companies can create markets where the NASA is limited to the treaty

Sattler 04 – Rosanna has been named Massachusetts Super Lawyer in Business Litigation every year from 2004- 2010. She was also named one of the "Top 10 Attorneys" in Women's Business in 2007. She is past co-president of the Boston Inn of Court, and is currently a member of its Board of Directors. [TRANSPORTING A LEGAL SYSTEM FOR PROPERTY RIGHTS FROM THE EARTH TO THE STARS, pg. 21-22, 2004]

The regulations state that launching a vehicle or payload is not considered exporting; but selling or transferring the contents of the vehicle or the vehicle itself “may” be subject to the controls.106 The regulations allow for temporary imports of dual use items to be brought into the United States from a foreign country and then later returned to that country.107 Critics argue that the regulations regarding export controls are too vague and reflect cold-war era alliances and enemies rather than today’s global economy. For instance, the prize-winning SpaceShipOne may well have difficulties because, as a supersonic rocket, it may be subject to the ITAR restrictions.108 These restrictions severely limit the ability of multi-national companies to develop and trade the sophisticated technology necessary for space exploration and development. The United States government is walking a tightrope between protecting the world and encouraging space development.109 Additionally, if NASA continues to act as the coordinating agency and provides launch services, it may be very difficult to then transfer the launched materials to other countries and foreign companies in space. Continually seeking licensing for what could become routine work would be cumbersome, expensive and ultimately inhibit the development of space. Alternatively, companies would look to the launch services provided by other space agencies, such as the Russian, European or Canadian Space Agencies, as a means of launching dual-use technologies into outer space. In that event, United States companies providing the same services would lose their market share.

## AT Prizes Now

### NASA has no current plans to depend on prizes

**Steidle 04 -** REAR ADMIRAL CRAIG E. STEIDLE (RET.), ASSOCIATE ADMINISTRATOR, OFFICE OF EXPLORATION SYSTEMS, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION[NASA Contests and Prizes: How Can They Help Advance Space Exploration?, House of Representatives, Subcommittee on Space and Aeronautics, Committee on Science, pg 63-64, July 15, 2004]

There are no plans within NASA to depend on prizes for the development of immediate need ‘‘critical path’’ technologies that are essential to exploration. Centennial Challenges is part of a portfolio of technology investments that support the Vision for Space Exploration and ongoing NASA missions. Prize competitions are a small part of that portfolio that allow NASA to tap new sources of inno- vation and generate technical solutions that would go unexplored in standard procurement processes. Centennial Challenges complements, but does not replace, standard technology development mechanisms.

# \*\*Aff\*\*

## Aff Answers to Privitization CP

### Only large governmental programs solve, private companies fail to deliver similar quality

Freeman 10 - Journalist for for Inc. Magazine, The Atlantic, Scientific American, The New York Times, Discover, and Technology Review. [David H. Freeman, Jump-Starting the Orbital Economy, Scientific American Dec2010, Vol. 303 Issue 6, p88-93]

Risks are, too. Yet no one knows if start-up companies will be able to deliver safe, affordable, reliable spacecraft. If they fail, human exploration of space could be set back by decades. TWO YEARS AGO DECEASED STAR TREK ACTOR JAMES "SCOTTY" DOOHAN WAS GRANTED one last adventure, courtesy of Space Exploration Technologies Corporation. SpaceX, a privately funded company based in Hawthorne, Calif., had been formed in 2002 with the mission of going where no start-up had gone before: Earth orbit. In August 2008 SpaceX loaded Doohan's cremated remains onto the third test flight of its Falcon 1, a liquid oxygen- and kerosene-fueled rocket bound for orbit. Yet about two minutes into the flight Doohan's final voyage ended prematurely when the rocket's first stage crashed into the second stage during separation. It was SpaceX's third failure in three attempts. Well, what did you expect? sneered old NASA hands, aerospace executives and the many others who hew to the conventional wisdom that safely ushering payloads and especially people hundreds of kilometers above Earth is a job for no less than armies of engineers, technicians and managers backed by billions in funding and decades-long development cycles. Space, after all, is hard. A small, private operation might be able to send a little stunt ship wobbling up tens of kilometers, as entrepreneur-engineer Burt Rutan did in 2004 to win the X-Prize. But that was a parlor trick compared with the kinds of operations NASA has been running over the years with the space shuttle and International Space Station. When you're going orbital, 100 kilometers is merely the length of the driveway, at the end of which you'd better be accelerating hard toward the seven kilometers a second needed to keep a payload falling around Earth 300 kilometers up.

### Privatization would delay exploration for decades

Freeman 10 - Journalist for for Inc. Magazine, The Atlantic, Scientific American, The New York Times, Discover, and Technology Review. [David H. Freeman, Jump-Starting the Orbital Economy, Scientific American Dec2010, Vol. 303 Issue 6, p88-93]

What, then, could the Obama administration have been thinking when it announced this past February that NASA should essentially get out of the manned-spaceship business and turn it over to private industry? Under the plan, NASA will write off most of the $9 billion invested so far in Constellation, the program to develop a replacement vehicle for the space shuttle capable of ferrying astronauts and supplies to the space station and, eventually, to the moon. Instead the agency will provide seed money to start-ups such as SpaceX, then agree to buy tickets to the space station on their rockets. It is a naive and reckless plan, a chorus of voices charged. Among the loudest was that of former astronaut and space icon Neil Armstrong, who was quick to scoff at the notion that the private sector is ready to take over from NASA. "It will require many years and substantial investment to reach the necessary level of safety and reliability," he stated. Leaving orbital ferrying in the hands of private companies, Armstrong and others insisted, would at best be setting the clock back on manned space exploration. And were private enterprise to drop the ball, perhaps even catastrophically, as many believe it would, the entire grand enterprise of sending people into space might come to a long-term or even permanent halt. Once NASA's massive manned-spaceflight machine is dismantled, rebuilding it might take far more time and money than anyone would want to spend. Yet despite these concerns, Congress reluctantly agreed to the plan this fall.

### Space Privatization creates more space debris, violates international law and creates a conflict zone where corporations try to control resources and maximize profit.

Gagnon 03 – coordinator of the Global Network Against Weapons & Nuclear Power in Space [Bruce Gagnon, SPACE PRIVATIZATION: ROAD TO CONFLICT? June 21, 2003, http://www.space4peace.org/articles/road\_to\_conflict.htm]

The news brings us the story of "space pioneers" launching privately funded craft into the heavens. A special prize is offered to the first private aerospace corporation who can successfully take a pilot and a "space tourist" into orbit. Is this "privatization" of space a good thing? Is there any reason to be concerned about the trend? Are there any serious questions that should be raised at this historic moment? Three major issues come immediately to mind concerning space privatization. Space as an environment, space law, and profit in space. We've all probably heard about the growing problem of space junk where over 100,000 bits of debris are now tracked on the radar screens at NORAD in Colorado as they orbit the earth at 18,000 m.p.h. Several space shuttles have been nicked by bits of debris in the past resulting in cracked windshields. The International Space Station (ISS) recently was moved to a higher orbit because space junk was coming dangerously close. Some space writers have predicted that the ISS will one day be destroyed by debris. As we see a flurry of launches by private space corporations the chances of accidents, and thus more debris, becomes a serious reality to consider. Very soon we will reach the point of no return, where space pollution will be so great that an orbiting minefield will have been created that hinders all access to space. The time as certainly come for a global discussion about how we treat the sensitive environment called space before it is too late. When the United Nations concluded the 1979 Moon Treaty the U.S. refused, and still does, to sign it. One key reason is that the treaty outlaws military bases on it but also outlaws any nation, corporation, or individual from making land "claims" on the planetary body. The 1967 U.N. Outer Space Treaty takes similar position in regard to all of the planetary bodies. The U.N., realizing we needed to preempt potential conflict over "ownership" of the planetary bodies, made claim that the heavens were the province of all humankind. As the privateers move into space, in addition to building space hotels and the like, they also want to claim ownership of the planets because they hope to mine the sky. Gold has been discovered on asteroids, helium-3 on the moon, and magnesium, cobalt and uranium on Mars. It was recently reported that the Haliburton Corporation is now working with NASA to develop new drilling capabilities to mine Mars. One organization that seeks to rewrite space law is called United Societies in Space (USIS). They state, "USIS provides legal and policy support for those who intend to go to space. USIS encourages private property rights and investment. Space is the Free Market Frontier." The taxpayers, especially in the U.S. where NASA has been funded with taxpayer dollars since its inception, have paid billions of dollars in space technology research and development (R & D). As the aerospace industry moves toward forcing privatization of space what they are really saying is that the technological base is now at the point where the government can get out of the way and lets private industry begin to make profit and control space. Thus the idea that space is a "free market frontier." Of course this means that after the taxpayer paid all the R & D, private industry now intends to gorge itself in profits. One Republican Congressman from Southern California, an ally of the aerospace industry, has introduced legislation in Congress to make all space profits "tax free". In this vision the taxpayers won't see any return on our "collective investment." So let's just imagine for a moment that this private sector vision for space comes true. Profitable mining on the moon and Mars. Who would keep competitors from sneaking in and creating conflict over the new 21st century gold rush? Who will be the space police? In the Congressional study published in 1989 called Military Space Forces: The Next 50 Years we get some inkling of the answer. The forward of the book was signed by many politicians like former Sen. John Glenn (D-OH) and Sen. Bill Nelson (D-FL). The author reported to Congress on the importance of military bases on the moon and suggested that with bases there the U.S. could control the pathway, or the "gravity well", between the Earth and the moon. The author reported to Congress that "Armed forces might lie in wait at that location to hijack rival shipments on return." Plans are now underway to make space the next "conflict zone" where corporations intend to control resources and maximize profit. The so-called private "space pioneers" are the first step in this new direction. And ultimately the taxpayers will be asked to pay the enormous cost incurred by creating a military space infrastructure that would control the "shipping lanes" on and off the planet Earth.

### Privitaztion sets the industry back decades

Dr. Molly K. **Macauley,** [7/18/**00** ,Senior Fellow Resources for the Future, http://www.rff.org/RFF/Documents/RFF-CTst-00-macauley-July18.pdf]

For activities that generate taxable income, income tax exemptions under the "Zero Gravity, Zero Tax" bill could prop up otherwise unsuccessful projects for the proposed twenty-five year duration of the exemption. Loan guarantees may have the same undesirable effect. Investments might be made solely for the tax advantages yet the investments may simply not make sense and thus not lead to a viable industry. Although the proposals have "sunset" provisions, some space businesses may survive only because of the tax breaks rather than being robust on their own. For instance, the Omnibus Energy Act of several years ago allowed tax credits for investment in renewable energy. Investments in solar, geothermal, biomass, windfarms, and other energy technologies were made on the basis of the tax break rather than economic soundness of the technologies. When the tax preferences ended, the development of the industries was set back at least a decade. Subsidies as part of the business model are the wrong model.

### Priv fails

Dr. Molly K. Macauley, [7/18/00 ,Senior Fellow Resources for the Future, http://www.rff.org/RFF/Documents/RFF-CTst-00-macauley-July18.pdf]

Effect on the budget. To maintain the government's budget each year, taxpayers must make up the difference in tax revenue when credits, exemptions, and loan guarantees (when default occurs) reduce revenue that would otherwise flow to the public treasury. Who bears the risk. In contrast with the risk that the private sector is taking in financing our “dot.com” industry, in which case the risk is borne by the investor rather than other taxpayers, supporting space commerce through the tax code forces all taxpayers to bear the risk in that industry. By forcing taxpayers to take the risk of space investment, the legislative proposals imply, from a public policy perspective, that space commerce is more desirable for the good of the country -- thus worth underwriting by the public at large -- than other activities that might be given similar tax breaks (for example, income tax exemption for investments in medical research, tax credits for investment in magnetic levitation (maglev) transportation development).

### The Government sets the amount of insurance needed---cheaper for government to explore space

Bonnie E. Fought 1988 [Chief Operating Officer and General Counsel, Connectix Corp, “Legal Aspects Of The Commerciazlization of Space Transportation System”, ,http://www.law.berkeley.edu/journals/btlj/articles/vol3/fought.html]

Furthermore, the Agreement requires companies to cover their potential liability by obtaining the maximum insurance coverage available at a reasonable price with commercially reasonable terms. [FN147] "**The amount of maximum available insurance commercially available ... and what is a reasonable price for such insurance for a specific launch or particular associated activities shall be determined by the Government and its decision on the matter shall be final."** [FN148] The term "Government" is defined by the Agreement to be the United States Air Force. [FN149] Thus, the Air Force reserves to itself responsibility for the establishment of the liability insurance requirements for private launch companies. **While the launch company is required to obtain the maximum insurance available in the commercial market, the company's liability is not limited to the amount of its insurance coverage**. In the event the Government is unable to recover its full damages from the company's insurance carrier, the Agreement preserves the Government's right to pursue legal claims (under either domestic or international law) against the company for any additional damage incurred. [FN150] Thus, there is no limit on the potential liability a private company could face in either a domestic or an international arena. In summary, under the current Agreement, the private launch company is liable for damage which results from the negligent acts of the Government or its contractors or subcontractors. In addition, the company is responsible for obtaining an unspecified amount of liability insurance (the maximum amount of insurance available in the commercial market) to cover this liability. And finally, there is no limit on the company's potential liability, especially in light of broad contractual language regarding the distribution of liability.

### Privitization is already happening (Finish underlining)

Seth Borenstien [Associated Press Reporter,7/20/11, “NASA to Privitize Space Travel After Last Shuttle Lands” http://www.huffingtonpost.com/2011/07/20/nasa-privatize-space-future-changes\_n\_905186.html]

With the space shuttle's retirement Thursday, no longer will flying people and cargo up to the International Space Station be a government program where costs balloon. NASA is turning to private industry with fixed prices, contracts and profit margins. The space agency will be the customer, not the boss. At least when it comes to the routine part of going to and from the space station, NASA hopes to rely on companies that will be the space version of FedEx and Yellow Cab. The company that has been leading the commercial space race is hoping to launch its privately built rocket and capsule to the space station late this year. It won't carry astronauts, but if all goes well the unmanned ship will dock with the station and deliver food, water and clothing. And its major private cargo competitor may only be a month or two on its heels. Getting people to orbit on a new American ship is a different story. Some ambitious companies hope to launch astronauts that way in three years, maybe four. Until then, the Russians will fly astronauts on a pay-for-play basis. Some space veterans like John Glenn, the first American in orbit, think five to 10 years is more realistic. But two of the major players have surprised people before – the tech tycoons who founded PayPal and Amazon. NASA has hired two companies – Space Exploration Technologies Corp. of Hawthorne, Calif., and Orbital Sciences of Dulles, Va. – to deliver 40 tons of supplies to the space station in 20 flights. The cost is $3.5 billion, about the same price per pound as it was during the space shuttle's 30-year history. "It's time. Once NASA blazes the trail, creates the technology and it's available for private companies to take advantage of, this is the time" for the private firms to take over, said NASA commercial cargo chief Alan Lindenmoyer. NASA met on Wednesday with companies wanting to taxi astronauts to the station. The agency hopes the money it saves by not flying the shuttle can be spent on new deep-space missions that will send astronauts to an asteroid and on to Mars. Six private companies are working with NASA to send ships to the space station – either unmanned cargo ships or eventually astronauts in crew capsules. For well more than a decade, boosters of commercial space have said they are ready to take over the job of going into low-Earth orbit on their own nongovernment ships, but hadn't done it. Now one has: Space Exploration Technologies, which often goes by the name SpaceX and is run by risk-embracing PayPal founder Elon Musk, launched his unmanned Dragon capsule into orbit last December. Now his company is lining up for the first private visit to the space station. The lower and upper stages of the rocket are at Cape Canaveral, Fla. The capsule is almost finished. "What we want to do is get back into space as quickly as possible and as sustainably as possible," said former astronaut Garrett Reisman, who now runs SpaceX's "Dragon Rider" program. And maybe a month or two later, Orbital hopes to have its first test flight to the station. First, it has to finish building its launch site at Wallops Island, Va., which should be done in just a few weeks. Then later this year it will have a test launch of its new rocket, the Taurus II, and finally it will use that new rocket to launch its capsule, Cygnus, to the space station, said company spokesman Barron Beneski. "Just like a person hires FedEx to deliver a package across the country and you pay him 50 bucks, we're delivering a 2,000-kilogram package to space, a few hundred miles above Earth, for a fixed price," Beneski said. Four companies are building spaceships to take astronauts to the space station on a pay-per-seat basis. They are all constructing ships that would be launched on top of private rockets. SpaceX appears to be leading the pack. Right behind it is Boeing, a giant in aerospace, which hopes to launch astronauts using its capsule as early as 2014. A third company, Sierra Nevada Corp., is taking a different route, proposing a shuttle-like spaceplane instead of a capsule. It is hoping to launch around 2015. And Amazon's Jeff Bezos is heading a fourth company, Blue Origin, that is much more circumspect about its plans for a gumdrop-shaped ship. A fifth company, United Launch Alliance, just signed an agreement with NASA. It hopes to get its Atlas V rockets eventually approved for use in launching humans. Normally, Atlas rockets are used to put satellites in orbit. SpaceX is building its own private rockets, the Falcon series. The crew of the final shuttle flight, Atlantis, left on the space station a small U.S. flag that flew on the inaugural shuttle voyage in 1981. The flag is the prize for the first rocket maker that brings Americans back to the station on a mission launched from the U.S. President Barack Obama described it last week as "a capture-the-flag moment here for commercial spaceflight." For these companies, it's also about capturing the cash. NASA will soon be paying the Russians about $63 million for each U.S. astronaut who flies on that country's Soyuz rocket to the space station. Boeing's Jon Elbon, manager of the CST-100, which is what the company is calling its ship, said Boeing's prices will be competitive with what the Russians are charging. Boeing is also working with Bigelow Aerospace on bringing paying tourists up to a potential private space hotel. Musk, who also started an electric sports car company and hopes to someday send his rockets to the Mars and fly families for $1 million for one-way tickets, promises to undercut the Russians' price substantially. For all the talk of launching soon, George Abbey, former director of NASA's Johnson Space Center, remains skeptical: "I'm not sure it will happen anytime soon." Former astronaut Glenn likes the idea; he just doesn't think it will happen as quickly as the companies do. "To me that's not all bad," he said. "The government has always stepped out and done the things that private industry wouldn't or couldn't do" and then let companies run it when it is more affordable. He pointed to the Pentagon-inspired Internet. NASA is hoping these companies are ready. Just minutes after Atlantis lifted off on the final space shuttle mission, NASA spokesman Bob Jacobs turned to his counterpart from SpaceX and told him, "It's your turn now.”

### Tax Competition is good for the economy

Robert D. Atkinson | [July 2009, President of the Information Technology and Innovation Foundation, “Effective Corporate Tax Reform in the Global Innovation Economy”, http://www.itif.org/files/090723\_CorpTax.pdf]

Even if greater coordination were possible, it may not be desirable. Some studies have found that tax competition has positive economic impacts. For example, Sorenson found that tax competition leads to higher GDP, higher wages, and greater investment than either tax systems of global or regional coordination or tax systems that levy taxes on national location of the corporation (like the United States does).21 As a result, given the inevitability of corporate tax competition, policymakers need to use it to generate the most beneficial results for their nations. This does not, however, necessarily mean simply cutting rates, but rather cutting effective tax rates by providing much more generous incentives for investment in research and development, new capital equipment, and skills