# \*\*\*Plan Text\*\*\*

The United States Department of State's Directorate of Defense Trade Controls should grant a "passenger experience" exemption from International Traffic in Arms Regulations to space tourism companies.

# \*\*\*Solvency/Add on modules\*\*\*

# Generic

DDTC is willing—they have issued a “passenger experience” exemption in the past

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

One way that a company can escape the burdens of ITAR compliance is to ask the DDTC to remove the company’s technology from the USML by way of a “commodity jurisdiction request” (referred to hereinafter as a “CJ request”).50 When submitting a CJ request, the applicant is requesting that the DDTC remove the applicant’s technology from the USML, thus transferring the technology to the jurisdiction of the Department of Commerce which regulates exports under the more lenient Export Administration Regulations.51 On December 27, 2007, Bigelow Aerospace submitted a CJ request to the DDTC seeking to remove its expandable space platform technology from the USML.52 Although the DDTC typically makes a determination within sixty days of a submission, a decision was not to be issued in this case for sixteen months.53 The suspense was broken on April 22, 2009 when Bigelow Aerospace announced that the DDTC had responded favorably to its CJ request.54 The DDTC had ruled that the presence of foreign nationals on a Bigelow space station as well as the training of these private astronauts and marketing efforts, referred to collectively by Mr. Gold as the “passenger experience,” was “non-licensable” under ITAR, meaning that the obligations imposed by ITAR would not apply to this aspect of Bigelow’s operations. Michael Gold had succeeded in his argument that just because a person has seen a space station does not mean that he or she can build one.

DDTC is key—other branches won’t act in time

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Finally, as discussed in the following section, if the DDTC does not provide relief to the space tourism industry, then it is likely that no relief will be provided to the space industry, since neither Congress nor the President are likely to act given the political paralysis that has gripped our nation’s capital.

# Econ

ITAR regulations are the only thing standing in the way of space tourism companies competing

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Despite this bright outlook for commercial human spaceflight, the industry faces several significant challenges before it achieves sustainability. Although these challenges are largely technological and financial, one of the more serious obstacles to the industry’s success is regulatory in nature, namely, the burdensome export control regulations under U.S. law. Export controls on space technology are notoriously strict in the United States, where all technology related to spacecraft is deemed to be munitions and is therefore subject to the complicated and restrictive International Traffic in Arms Regulations (ITAR).3 In fact, the United States is the only country in the world that treats commercial space technology as munitions. The application of ITAR has harmed the ability of U.S. space companies to compete on the world market, as is perhaps best illustrated by the practice of certain European satellite manufacturers to market “ITAR-free” satellites – that is, satellites that do not incorporate any components manufactured in the United States and are therefore free of the regulatory complexities and compliance costs that flow from ITAR. As a result, European satellite sales have increased sharply, cutting deeply into the market-share of U.S. manufacturers. On August 13, 2009, the Obama administration announced that the President had ordered a broad-based review of U.S. export controls, which would presumably include a review of those controls applicable to space technology.7 However, no changes have yet been made and, given the complexity of the regulations and the political sensitivity of the topic of arms control, change is not expected anytime soon. In the meantime, the only hope for relief from the burdens of ITAR lies in the hands of the Department of State’s Directorate of Defense Trade Controls (DDTC), the administrative agency that oversees the application and enforcement of ITAR. As described in this Article, the DDTC has indicated that it is willing to exercise its administrative discretion in a manner that will enable the nascent human spaceflight industry to survive and even flourish in the global marketplace. This indication was given last year when the DDTC exempted Bigelow Aerospace from the need to acquire a license and comply with other requirements under ITAR before allowing foreign nationals aboard their expandable space stations. This ruling was heralded as a breakthrough for the human spaceflight industry which now hopes to be granted the opportunity to operate under a reduced regulatory burden, provided that the Bigelow ruling is extended to other spaceflight companies, such as those offering space tourism services.

Plan spurs a dramatic increase in competitiveness—removing regs is essential to open up new markets

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The DDTC’s ruling on Bigelow’s CJ request has been heralded by other spaceflight companies as a major breakthrough that promises to significantly ease the regulatory burden on their operations.57 For example, Marc Holzapfel, counsel to Virgin Galactic, called the ruling a “major development” that will enable space companies to avoid the “complicated, expensive, and dilatory export approval process.”58 Likewise, the chief counsel of SpaceX, Tim Hughes, praised the DDTC for adopting “a common-sense approach to ITAR.”59 However, as stated above, the Bigelow ruling only provides relief to Bigelow Aerospace and does not apply to either Virgin Galactic or SpaceX. Therefore, these companies, as well as other space tourism companies, will have to seek similar relief on their own. Since Bigelow Aerospace announced the receipt of its favorable ruling, there have been unconfirmed reports that certain space tourism companies have already filed their own CJ requests that will rely on the Bigelow’s ruling as precedent. When the DDTC receives the requests from the space tourism companies to render the “passenger experience” exempt from ITAR – as was done for Bigelow Aerospace – the DDTC should grant this exemption for two reasons. First, the refusal to grant such an exemption to the space tourism companies would render the Bigelow ruling a nullity. Second, the circumstances for granting an exemption under Section 126.3 of ITAR are clearly met in the case of space tourism companies in light of (i) the exceptional hardship that would be caused by the strict application of ITAR and (ii) the strong interest that the United States has in supporting the success of the private human spaceflight industry. The first point is a rather obvious one, namely, that the DDTC’s previous ruling regarding Bigelow’s operations would be meaningless unless similar relief is granted to the companies that will deliver people to the Bigelow space stations. The companies that Bigelow is likely to rely upon to deliver scientists, manufacturers, and recreational visitors to its space stations are likely to be the same companies that are now offering suborbital tourism. These companies will continue to refine their technology until they are able to provide orbital delivery. However, without relief from ITAR the tourism companies may not be able to survive even for the short term, let alone long enough to develop orbital delivery capabilities. And without such services being available, Bigelow Aerospace’s space station venture will collapse since there is no sense in placing a space station in orbit if they will stand empty. In addition to this first point, and independent from it, the DDTC should exempt the “passenger experience” of the space tourism companies from ITAR under Section 126.3 because the grounds for granting such an exemption are clearly met. As explained above, the DDTC has the power to suspend the application of ITAR in those cases where event of “exceptional or undue hardship, or when it is otherwise in the interest of the United States.”60 Although it is only necessary to show either exceptional hardship or that the exception is in the interest of the United States, both prerequisites are easily met in this case. First, that the space tourism companies face exceptional hardship under the ITAR regulations is undeniable. In fact, the space tourism companies face even greater hardship than the hardship faced by Bigelow Aerospace. For example, space tourism companies will have a much higher number of passengers per year than Bigelow would have on its space stations and would have to apply for many more export licenses to allow for the disclosures to the passengers that are mandated under the Human Space Flight Regulations, as well as for allowing the passengers on board (and thereby potentially disclosing “technical data” related to the spacecraft by means of visual inspection). In addition, the disclosure of any technical data would also likely constitute a “defense service” which, in turn, would require Virgin Galactic to enter into a Technical Assistance Agreement with each individual passenger – an agreement which must then be submitted to the DDTC for approval prior to the disclosure of any such data. Virgin Galactic plans on eventually launching multiple flights per day with six passengers per flight, which would amount to thousands of passengers every year. The cost and complexity of acquiring licenses and entering into Technical Assistance Agreements for each passenger would be colossal. Moreover, these requirements may harm the company’s ability to attract foreign customers who might prefer to fly with a foreign space tourism that is not subject to the cost, uncertainty, and delay of the licensing process.

Exemption increases US competitiveness—opens space tourism up to European markets

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To make one final point regarding Section 124.15, the DDTC could also choose to interpret the section as applying only to “defense services” related to the launch of a satellite (and not the launch of a spaceplane)j, since the opening of the section mentions the export of satellites in particular – in which case the entire specter of Section 124.15 would evaporate. In the event, that this narrow reading of the section does not gain ground, the DDTC should simply waive its application with respect to disclosures made to space tourists. In addition to the grounds of “exceptional hardship” that space tourism companies would be suffer under ITAR, a “passenger experience” exemption from ITAR could be based solely on the fact that such an exemption would be in the interest in the United States. The interest that would be served is two-fold. First, the space tourism industry is a significant development in commercialization of space and the technological developments that result from these early tourism ventures are likely to lead to more substantial commercial ventures such as orbital manufacturing, orbital research laboratories, point-to-point space travel, and even the mining of the moon or other celestial bodies. The United States has a great interest from an economic perspective in being at the forefront of this industry and should therefore modulate the application of ITAR in a manner that will foster the competitiveness of U.S. companies.

# Democracy

Only the DDTC can solve—paralysis and factions doom Congressional action—small agencies alone can solve for democracy

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Although the current political environment – characterized by factionalism, a split government, and, in the end, governmental paralysis – has made it impossible for Congress or the President to respond to the clear need to reform ITAR, the DDTC has used its discretion wisely to exempt Bigelow Aerospace from the those aspects of ITAR that threatened the survival of the company. This use of administrative discretion to modify the application of law when the constitutional organs of government are unable to act is a powerful example of the importance of administrative agencies to our democracy – when government breaks down, the agencies can take over the work of government. This Article has made the case for why the DDTC should continue to exercise its discretion by granting similar exemptions for the “passenger experience” to the space tourism companies that will soon begin to fly customers into space. The need for such an exemption is even stronger for such companies than was the case for Bigelow Aerospace, since the space tourism companies will actually be launching passengers and will therefore be more likely to trigger special ITAR controls. Moreover, the interests of the United States demand that these exemptions be granted. A successful domestic commercial spaceflight industry will not only bring jobs, prosperity and technological advantages to U.S. citizens, but will also ensure the strength of our government space program (including its military programs) which, under the Obama administration’s new space policy, will rely more than ever before on private industry.

Global democratic consolidation prevents many scenarios for war and extinction.

Diamond 95

Larry Diamond, senior fellow at the Hoover Institution, December 1995, Promoting Democracy in the 1990s, http://wwics.si.edu/subsites/ccpdc/pubs/di/1.htm

OTHER THREATS This hardly exhausts the lists of threats to our security and well-being in the coming years and decades. In the former Yugoslavia nationalist aggression tears at the stability of Europe and could easily spread. The flow of illegal drugs intensifies through increasingly powerful international crime syndicates that have made common cause with authoritarian regimes and have utterly corrupted the institutions of tenuous, democratic ones. Nuclear, chemical, and biological weapons continue to proliferate. The very source of life on Earth, the global ecosystem, appears increasingly endangered. Most of these new and unconventional threats to security are associated with or aggravated by the weakness or absence of democracy, with its provisions for legality, accountability, popular sovereignty, and openness. LESSONS OF THE TWENTIETH CENTURY The experience of this century offers important lessons. Countries that govern themselves in a truly democratic fashion do not go to war with one another. They do not aggress against their neighbors to aggrandize themselves or glorify their leaders. Democratic governments do not ethnically "cleanse" their own populations, and they are much less likely to face ethnic insurgency. Democracies do not sponsor terrorism against one another. They do not build weapons of mass destruction to use on or to threaten one another. Democratic countries form more reliable, open, and enduring trading partnerships. In the long run they offer better and more stable climates for investment. They are more environmentally responsible because they must answer to their own citizens, who organize to protest the destruction of their environments. They are better bets to honor international treaties since they value legal obligations and because their openness makes it much more difficult to breach agreements in secret. Precisely because, within their own borders, they respect competition, civil liberties, property rights, and the rule of law, democracies are the only reliable foundation on which a new world order of international security and prosperity can be built.

# Heg

Strong space presence means a strong US primacy—tourism can fill in for the cancelled spaceflight program

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In addition to the economic interests at stake, the United States has a strong interest in ensuring the success of U.S. human spaceflight companies from the standpoint of national security. A strong space presence has for a long time been an important component of American strength and national security.64 Now that the Obama administration plans to eliminate NASA’s spaceflight program and rely instead on the private space industry to meet the government’s spacefaring needs, it has become essential for the government to make every effort to facilitate the success of the private spacefight industry – which at this point means supporting the space tourism industry. This does not mean that certain export controls cannot be kept in place when required to prevent the proliferation of dangerous technologies, but it does mean that the DDTC should grant exemptions wherever possible in order to ease the regulatory burden on these young companies.

U.S. hegemony solves nuclear war.

Zalmay **Khalilzad 95**(Dep. Secretary of Defense) Spring 1995 The Washington Quarterly.}RC

A world in which the United States exercises leadership would have tremendous advantages. First, the global environment would be more open and receptive to American values--democracy, free markets, and the rule of law. Second, such a world would have a better chance of dealing cooperatively with the world's major problems, such as nuclear proliferation, renegade states, and low level conflicts. Finally, U S leadership would help preclude the rise of another global rival, enabling the U S and the world to avoid another cold or hot war and all the attendant dangers, including a global nuclear exchange.

# \*\*\*Advantage Modules/AFF EXTENSINOS\*\*\*

# Overview effect

Contention \_\_: The Overview Effect

First, humanity is like a fish trapped in the ocean—only going to space can explode these shackles and open room for fundamental transformation.

Frank White, author of six books about space exploration, founder of the Overview Effect Institute, frequently speaks at conferences about space exploration, holds a B.A. from Harvard College and an M.Phil. from Oxford University, 1987 (“The Explorer Fish,” *The Overview Effect: Space Exploration and Human Evolution*, Published by Houghton Mifflin Company, ISBN 0395430844, p. 6-7)

A fish glides through a liquid world, aware of light and dark, predators and prey, dimly perceiving the ocean bottom below. On occasion, it may leap out of the water and experience “something else” strange and different. That experience, however, is rare and not an essential element of the fish’s life. This is “fish consciousness” — in regard to land, water, air, and sky, the fish’s knowledge of reality is highly conditioned and extremely restricted by its physical surroundings. If you were a fish, you would have no idea what land is like and only the vaguest notion of what water is like, because water would be the fundamental medium in which you lived. An idea of “sky” would be far beyond your comprehension.

To us, it is a strange and limited life. However, in terms of consciousness and evolution, we are closer to living the life of a fish than we care to realize. Until recently, all human beings have existed in a state much like that of the fish and other marine animals. The planet Earth has been our ocean, from which we have been unable to escape. Even the remote possibility of leaving the planet became imaginable relatively recently.

As a result, it has been extremely difficult to conceive of life off [end page 6] the planet, and without direct experience, we have been limited to speculation. Scientists and science fiction writers have tried to understand the nature of the physical universe beyond our atmosphere, but their attempts were purely conceptual until 1961, when the first human being actually ventured into space.

Since that brief and historic orbital flight by Yuri Gagarin, about two hundred human beings have experienced this wholly new form of existence: living and working in space. Their nonterrestrial time has been brief — several months on the longest journey. Compared to the time humans have spent on this planet, their time in space is hardly measurable. Nevertheless, the vital importance of their experiences is beginning to emerge.

The evidence suggests that humanity’s expansion into the solar system and beyond will result in a fundamental transformation of the human species, an evolutionary step unprecedented in human history. To begin the process of understanding why this is so, let’s return to the example of our ancestors, the fish.

Second, space exploration prevents human extinction and decreases the risk of war—it’s a bigger impact than anything we could imagine on Earth.

Gerard K. O’Neill, President of the Space Studies Institute, Professor Emeritus of Physics at Princeton University where he was one of the world’s most distinguished authors and scientists in the field of space colonization, holds a Ph.D. in Physics from Cornell University, 1987 (Foreword to *The Overview Effect: Space Exploration and Human Evolution* written by Frank White, Published by Houghton Mifflin Company, ISBN 0395430844, p. xiv-xv)

It is the hope of those who work toward the breakout from planet Earth that the establishment of permanent, self-sustaining colonies of humans off-Earth will have three vital consequences. First, it will make human life forever unkillable, removing it from the endangered species list, where it now stands on a fragile Earth over-armed with nuclear weapons. Second, the opening of virtually unlimited new land area in space will reduce territorial pressures and therefore diminish warfare on Earth itself. Third, the small scale of space colonies, the largest some tens of thousands of people, will lead to local governments that are simple in form, responsive to the desires of their people, and as reachable and intimate as were the New England town meetings of America’s heritage.

Beyond those immediate needs of survival and freedom, we look to our purpose as a species. We are far too diverse, far too contentious, and far too divided by conflicting religious and ideological dogmas ever to be likely to agree on a single long-term goal for humanity. And we are far too impatient, too short in our attention spans, to hold to such a goal for a time of many generations. But [end page xiv] fortunately, the realities of time and space in the era when humanity is freed of Earth’s bonds will lead inevitably to results that will transcend any program we might devise.

In a relatively short time they will bring a higher degree of independence to human communities than is now possible on Earth. In a longer time the effects of genetic drift will show, as human groups separated by great distances evolve into noticeably different forms of humanity. In a much longer time — but a time still short compared to the interval over which Homo sapiens evolved — there will spread throughout our galaxy a variety of civilizations, all traceable, though some may forget their origins, to one beautiful and precious planet, circling a minor star near the galaxy’s edge.

Third, space exploration is a d-rule—it outweighs mere human survival.

Frank White, author of six books about space exploration, founder of the Overview Effect Institute, frequently speaks at conferences about space exploration, holds a B.A. from Harvard College and an M.Phil. from Oxford University, 1987 (“Prologue,” *The Overview Effect: Space Exploration and Human Evolution*, Published by Houghton Mifflin Company, ISBN 0395430844, p. xvii-xviii)

During the forced stand-down in the space program following the accident, many Americans asked themselves, “What is the fundamental purpose of space exploration; what is the vision that guides our space program?” It is appropriate that this debate ensued, because it is part of taking responsibility for what has happened in the past and what can happen in the future in space. In charting our future in space, we are also choosing our future in general, because space exploration is not just another government program. It may be a key to human survival and evolution, and perhaps even more than that. [end page xvii]

The thesis of this book is that we are not simply reaching out into space to use extraterrestrial resources and opportunities here on Earth. Rather, we are laying the foundations for a series of new civilizations that are the next logical steps in the evolution of human society and human consciousness.

That in itself should be enough to make us take space exploration seriously and to move ahead vigorously. However, I will also argue that human exploration of space may serve an even higher purpose than our own evolution as a species, performing a vital function for the universe as a whole.

Seen this way, space exploration is not a luxury to be pursued after other social priorities have been handled. Rather, it is the most important activity of all. It is important for everyone, but for Americans in particular, to grasp this point because of our heritage as explorers, innovators, and leaders.

A relevant interchange occurred on the television program “This Week with David Brinkley” shortly after the Challenger accident. At one point, columnist George Will said to author Tom Wolfe, “It seems we have justified space exploration in a very banal way; we have sold it on the basis that it produced nonstick frying pans and so on.”

“Yes,” responded Wolfe. “We have never had a philosophy of space exploration.”

With a new century and a new millennium only a few years away, the time is right for the people of the United States and of planet Earth to develop a comprehensive philosophy of space. The purpose of this book is to help begin that process. The goal is to focus on the vision and purpose of space exploration that the old space program sometimes failed to articulate and to show how a new space program can be different.

Fourth, space exploration is key—only a different physical location makes possible a different worldview.

Frank White, author of six books about space exploration, founder of the Overview Effect Institute, frequently speaks at conferences about space exploration, holds a B.A. from Harvard College and an M.Phil. from Oxford University, 1987 (“The Overview Project,” *The Overview Effect: Space Exploration and Human Evolution*, Published by Houghton Mifflin Company, ISBN 0395430844, p. 3-4)

This line of thought led to a simple but important realization: mental processes and views of life cannot be separated from physical location. Our “world view” as a conceptual framework depends quite literally on our view of the world from a physical place in the universe. [end page 3]

Later, as the plane flew over the deserts and mountains of the western states, the flood of insights continued. I could look down on the network below and actually “see the future.” I knew that the car on Route 110 would soon meet up with that other car on Route 37, though the two drivers were not yet aware of it. If they were about to have an accident, I would see it, but they wouldn’t.

From the airplane, the message that scientists, philosophers, spiritual teachers, and systems theorists have been trying to tell us for centuries was obvious: everything is interconnected and interrelated, each part a subsystem of a larger whole system.

Finally, after I spent several hours looking out at Earth’s surface, all the insights linked into a single gestalt. This is how I expressed it at the time:

People living in space settlements will always have an overview! They will be able to see how everything is related, that what appears to be “the world” to people on Earth is merely a small planet in space, and what appears to be “the present” is merely a limited viewpoint to one looking from a higher level. People who live in space will take for granted philosophical insights that have taken those on Earth thousands of years to formulate. They will start at a place we have labored to attain over several millennia.

That moment of realization gave birth to the term “the overview effect,” which meant, at the time, the predicted experience of astronauts and space settlers, who would have a different philosophical point of view as a result of having a different physical perspective.

Finally, this slays their critiques: space exploration is not a technology but a state of mind—vote affirmative to endorse human possibility.

Frank White, author of six books about space exploration, founder of the Overview Effect Institute, frequently speaks at conferences about space exploration, holds a B.A. from Harvard College and an M.Phil. from Oxford University, 1987 (“Creating the Future,” *The Overview Effect: Space Exploration and Human Evolution*, Published by Houghton Mifflin Company, ISBN 0395430844, p. 182-183)

For the prisoners in the cave, the wider environment had always been there. Turning around and going up into the light did not create that wider environment, but it allowed them to perceive it more fully. Initially they were chained and could not leave to see the new reality. However, once one of their number had made the trek, it became their choice to continue staring into the darkness. “It didn’t help *him* very much,” they would say.

The people in the cave are like the imaginary detractors of the explorer fish, and they are frighteningly like us today. We fail to realize that we are in space, that we have the means to experience it on a vast scale, and that doing so will free us from the illusory reality in which we daily indulge. Instead, we spend our time trying to fit outer space into our current paradigm and criticizing our astronauts for failing to explain the light in terms that the darkness can understand. Unfortunately, this is the perfect prescription for our continued solitary confinement from the rest of the universe.

Going into space is not the point. Realizing that we are in space and beginning to deal with the broader implications is the point. We are in space and we cannot be anywhere else, ever. The question is whether our expanded awareness will have a positive impact on social evolution. Seen from this point of view, the issue is whether we are ready to mature as a species, look beyond our narrow [end page 182] parochial concerns, and become true citizens of the universe.

Realizing that we are in space is mind-expanding, but we hate to admit it because it brings us back up against the issues of awareness and choice today, not in the future. The new civilizations, like the Kingdom of God, are within us.

Ultimately, going to space is not about a technological achievement, but about the human spirit and our contribution to universal purpose. Space, as used in the new space movement, is a metaphor for expansiveness, opportunity, and freedom. More than a place or even an experience, it is a state of mind. It is a physical, mental, and spiritual dimension in which humanity can move beyond the current equilibrium point, begin to change, and eventually transform itself into something so extraordinary that we cannot even imagine it.

Space exploration, in all its forms, should become humanity’s modern central project, and the human space program the central project for all five billion of us. The goal should be to get us out of the cave, freeing us to see reality rather than the illusions that persist for a species chained to a planetary surface. The choice of becoming citizens of the universe can be rejected, but humanity can no longer plead ignorance of what is truly possible.

Space travel leads to a new planetary consciousness and solves the root causes of conflict

**Collins 91’** (Patrick, staff writer for Space News, “Benefits of Commercial Passenger Space Travel for Society,” <http://spacefuture.com/archive/benefits_of_commercial_passenger_space_travel_for_society.shtml>)

For those who have the opportunity to visit orbit, of course, it will be a popular experience, and the objective of greatly increasing the number of people who have this opportunity is a desirable and democratic one. It is one of the strengths of commercial competition that it seeks to expand markets. Following the rapid growth of air travel in recent years it is likely that passenger space travel would quickly become widely available, although for a long time it will remain a once-off experience for which people will have to save seriously. This benefit will be wider than solely for those who visit orbit. The public has greatly enjoyed such space photographs as those taken by the Apollo astronauts and the Voyager spacecraft. The beginning of ordinary passenger travel to space, albeit only to low Earth orbit initially, will provide a decisive step beyond this, which will offer a new and inspiring goal for popular aspirations. In addition, of course, "travel broadens the mind," and space travel may help to give more people the "planetary consciousness" that is so needed if humans are to overcome the global problems of the next few critical decades. (Interestingly, in "Gundam", Japanese popular culture has generated the idea of "new type" consciousness to refer specifically to the psychologically beneficial effects of living in space.) Beyond this, passenger space travel will start to open a genuine new frontier for humanity. The existence of a frontier provides a foundation for public optimism, and helps to create a popular mood that the future is open and promising, something which is of real if intangible social value. Is it too fanciful to see the surprising popularity in the technologically advanced countries of new and irrational religions as perhaps partly due to the conventional, but mistaken, view of the world as closed? A closed world system would be less able to overcome the ecological problems caused by increasing population and industrialization, and the vision of an entirely Earth-bound future lacks excitement and challenge.

# Resource Wars

The status quo will lead to inevitable resource wars – expanding space tourism is the only way to solve

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” [http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V1N-4XG3D5J-1-3&_cdi=5679&_user=655954&_pii=S0094576509004512&_origin=&_coverDate=07%2F31%2F2010&_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.p)] WZ

As an alternative to the ‘‘resource wars’’ already devastating many countries today, opening access to the unlimited resources of near-Earth space could clearly facilitate world peace and security. The US National Security Space Office, at the start of its report on the potential of space-based solar power (SSP) published in early 2007, stated: ‘‘Expanding human populations and declining natural resources are potential sources of local and strategic conflict in the 21st Century, and many see energy as the foremost threat to national security’’ [38]. The report ended by encouraging urgent research on the feasibility of SSP: ‘‘Considering the timescales that are involved, and the exponential growth of population and resource pressures within that same strategic period, it is imperative that this work for ‘‘drilling up’’ vs. drilling down for energy security begins immediately’’ [38].

Although the use of extra-terrestrial resources on a substantial scale may still be some decades away, it is important to recognise that simply acknowledging its feasibility using known technology is the surest way of ending the threat of resource wars. That is, if it is assumed that the resources available for human use are limited to those on Earth, then it can be argued that resource wars are inescapable [22,37]. If, by contrast, it is assumed that the resources of space are economically accessible, this not only eliminates the need for resource wars, it can also preserve the benefits of civilisation which are being eroded today by ‘‘resource war-mongers’’, most notably the governments of the ‘‘Anglo-Saxon’’ countries and their ‘‘neo-con’’ advisers. It is also worth noting that the $1 trillion that these have already committed to wars in the Middle-East in the 21st century is orders of magnitude more than the public investment needed to aid companies sufficiently to start the commercial use of space resources.

Industrial and financial groups which profit from monopolistic control of terrestrial supplies of various natural resources, like those which profit from wars, have an economic interest in protecting their profitable situa- tion. However, these groups’ continuing profits are justified neither by capitalism nor by democracy: they could be preserved only by maintaining the pretence that use of space resources is not feasible, and by preventing

the development of low-cost space travel. Once the feasibility of low-cost space travel is understood, ‘‘resource wars’’ are clearly foolish as well as tragic. A visiting extra-terrestrial would be pityingly amused at the foolish antics of homo sapiens using long- range rockets to fight each other over dwindling terrestrial resources—rather than using the same rockets to travel in space and have the use of all the resources they need!

Resource wars cause extinction

Klare 6

[Michael T. Klare Ph.D, Professor of peace and world security studies at Hampshire University, “The Coming Resource Wars” http://www.alternet.org/story/33243/the\_coming\_resource\_wars, 3/10/2006]

It's official: the era of resource wars is upon us. In a major London address, British Defense Secretary John Reid warned that global climate change and dwindling natural resources are combining to increase the likelihood of violent conflict over land, water and energy. Climate change, he indicated, "will make scarce resources, clean water, viable agricultural land even scarcer" -- and this will "make the emergence of violent conflict more rather than less likely." Although not unprecedented, Reid's prediction of an upsurge in resource conflict is significant both because of his senior rank and the vehemence of his remarks. "The blunt truth is that the lack of water and agricultural land is a significant contributory factor to the tragic conflict we see unfolding in Darfur," he declared. "We should see this as a warning sign." Resource conflicts of this type are most likely to arise in the developing world, Reid indicated, but the more advanced and affluent countries are not likely to be spared the damaging and destabilizing effects of global climate change. With sea levels rising, water and energy becoming increasingly scarce and prime agricultural lands turning into deserts, internecine warfare over access to vital resources will become a global phenomenon. Reid's speech, delivered at the prestigious Chatham House in London (Britain's equivalent of the Council on Foreign Relations), is but the most recent expression of a growing trend in strategic circles to view environmental and resource effects -- rather than political orientation and ideology -- as the most potent source of armed conflict in the decades to come. With the world population rising, global consumption rates soaring, energy supplies rapidly disappearing and climate change eradicating valuable farmland, the stage is being set for persistent and worldwide struggles over vital resources. Religious and political strife will not disappear in this scenario, but rather will be channeled into contests over valuable sources of water, food and energy. Prior to Reid's address, the most significant expression of this outlook was a report prepared for the U.S. Department of Defense by a California-based consulting firm in October 2003. Entitled "An Abrupt Climate Change Scenario and Its Implications for United States National Security," the report warned that global climate change is more likely to result in sudden, cataclysmic environmental events than a gradual (and therefore manageable) rise in average temperatures. Such events could include a substantial increase in global sea levels, intense storms and hurricanes and continent-wide "dust bowl" effects. This would trigger pitched battles between the survivors of these effects for access to food, water, habitable land and energy supplies. "Violence and disruption stemming from the stresses created by abrupt changes in the climate pose a different type of threat to national security than we are accustomed to today," the 2003 report noted. "Military confrontation may be triggered by a desperate need for natural resources such as energy, food and water rather than by conflicts over ideology, religion or national honor." Until now, this mode of analysis has failed to command the attention of top American and British policymakers. For the most part, they insist that ideological and religious differences -- notably, the clash between values of tolerance and democracy on one hand and extremist forms of Islam on the other -- remain the main drivers of international conflict. But Reid's speech at Chatham House suggests that a major shift in strategic thinking may be under way. Environmental perils may soon dominate the world security agenda. This shift is due in part to the growing weight of evidence pointing to a significant human role in altering the planet's basic climate systems. Recent studies showing the rapid shrinkage of the polar ice caps, the accelerated melting of North American glaciers, the increased frequency of severe hurricanes and a number of other such effects all suggest that dramatic and potentially harmful changes to the global climate have begun to occur. More importantly, they conclude that human behavior -- most importantly, the burning of fossil fuels in factories, power plants, and motor vehicles -- is the most likely cause of these changes. This assessment may not have yet penetrated the White House and other bastions of head-in-the-sand thinking, but it is clearly gaining ground among scientists and thoughtful analysts around the world. For the most part, public discussion of global climate change has tended to describe its effects as an environmental problem -- as a threat to safe water, arable soil, temperate forests, certain species and so on. And, of course, climate change is a potent threat to the environment; in fact, the greatest threat imaginable. But viewing climate change as an environmental problem fails to do justice to the magnitude of the peril it poses. As Reid's speech and the 2003 Pentagon study make clear, the greatest danger posed by global climate change is not the degradation of ecosystems per se, but rather the disintegration of entire human societies, producing wholesale starvation, mass migrations and recurring conflict over resources. "As famine, disease, and weather-related disasters strike due to abrupt climate change," the Pentagon report notes, "many countries' needs will exceed their carrying capacity" -- that is, their ability to provide the minimum requirements for human survival. This "will create a sense of desperation, which is likely to lead to offensive aggression" against countries with a greater stock of vital resources. "Imagine eastern European countries, struggling to feed their populations with a falling supply of food, water, and energy, eyeing Russia, whose population is already in decline, for access to its grain, minerals, and energy supply." Similar scenarios will be replicated all across the planet, as those without the means to survival invade or migrate to those with greater abundance -- producing endless struggles between resource "haves" and "have-nots." It is this prospect, more than anything, that worries John Reid. In particular, he expressed concern over the inadequate capacity of poor and unstable countries to cope with the effects of climate change, and the resulting risk of state collapse, civil war and mass migration. "More than 300 million people in Africa currently lack access to safe water," he observed, and "climate change will worsen this dire situation" -- provoking more wars like Darfur. And even if these social disasters will occur primarily in the developing world, the wealthier countries will also be caught up in them, whether by participatin9g in peacekeeping and humanitarian aid operations, by fending off unwanted migrants or by fighting for access to overseas supplies of food, oil, and minerals. When reading of these nightmarish scenarios, it is easy to conjure up images of desperate, starving people killing one another with knives, staves and clubs -- as was certainly often the case in the past, and could easily prove to be so again. But these scenarios also envision the use of more deadly weapons. "In this world of warring states," the 2003 Pentagon report predicted, "nuclear arms proliferation is inevitable." As oil and natural gas disappears, more and more countries will rely on nuclear power to meet their energy needs -- and this "will accelerate nuclear proliferation as countries develop enrichment and reprocessing capabilities to ensure their national security." Although speculative, these reports make one thing clear: when thinking about the calamitous effects of global climate change, we must emphasize its social and political consequences as much as its purely environmental effects. Drought, flooding and storms can kill us, and surely will -- but so will wars among the survivors of these catastrophes over what remains of food, water and shelter. As Reid's comments indicate, no society, however affluent, will escape involvement in these forms of conflict.

# Asteroids

Recent studies show a high risk of an incoming asteroid

Easterbrook, 8

[Gregg, American writer, lecturer, and a senior editor of The New Republic June 2008, Atlantic Magazine, “ The Sky Is Falling,” <http://www.theatlantic.com/magazine/archive/2008/06/the-sky-is-falling/6807>]

Breakthrough ideas have a way of seeming obvious in retro­spect, and about a decade ago, a Columbia University geophysicist named Dallas Abbott had a breakthrough idea. She had been pondering the craters left by comets and asteroids that smashed into Earth. Geologists had counted them and concluded that space strikes are rare events and had occurred mainly during the era of primordial mists. But, Abbott realized, this deduction was based on the number of craters found on land—and because 70 percent of Earth’s surface is water, wouldn’t most space objects hit the sea? So she began searching for underwater craters caused by impacts rather than by other forces, such as volcanoes. What she has found is spine-chilling: evidence that several enormous asteroids or comets have slammed into our planet quite recently, in geologic terms. If Abbott is right, then you may be here today, reading this magazine, only because by sheer chance those objects struck the ocean rather than land. Abbott believes that a space object about 300 meters in diameter hit the Gulf of Carpentaria, north of Australia, in 536 A.D. An object that size, striking at up to 50,000 miles per hour, could release as much energy as 1,000 nuclear bombs. Debris, dust, and gases thrown into the atmosphere by the impact would have blocked sunlight, temporarily cooling the planet—and indeed, contemporaneous accounts describe dim skies, cold summers, and poor harvests in 536 and 537. “A most dread portent took place,” the Byzantine historian Procopius wrote of 536; the sun “gave forth its light without brightness.” Frost reportedly covered China in the summertime. Still, the harm was mitigated by the ocean impact. When a space object strikes land, it kicks up more dust and debris, increasing the global-cooling effect; at the same time, the combination of shock waves and extreme heating at the point of impact generates nitric and nitrous acids, producing rain as corrosive as battery acid. If the Gulf of Carpentaria object were to strike Miami today, most of the city would be leveled, and the atmospheric effects could trigger crop failures around the world. What’s more, the Gulf of Carpentaria object was a skipping stone compared with an object that Abbott thinks whammed into the Indian Ocean near Madagascar some 4,800 years ago, or about 2,800 B.C. Researchers generally assume that a space object a kilometer or more across would cause significant global harm: widespread destruction, severe acid rain, and dust storms that would darken the world’s skies for decades. The object that hit the Indian Ocean was three to five kilometers across, Abbott believes, and caused a tsunami in the Pacific 600 feet high—many times higher than the 2004 tsunami that struck Southeast Asia. Ancient texts such as Genesis and the Epic of Gilgamesh support her conjecture, describing an unspeakable planetary flood in roughly the same time period. If the Indian Ocean object were to hit the sea now, many of the world’s coastal cities could be flattened. If it were to hit land, much of a continent would be leveled; years of winter and mass starvation would ensue. At the start of her research, which has sparked much debate among specialists, Abbott reasoned that if colossal asteroids or comets strike the sea with about the same frequency as they strike land, then given the number of known land craters, perhaps 100 large impact craters might lie beneath the oceans. In less than a decade of searching, she and a few colleagues have already found what appear to be 14 large underwater impact sites. That they’ve found so many so rapidly is hardly reassuring. Other scientists are making equally unsettling discoveries. Only in the past few decades have astronomers begun to search the nearby skies for objects such as asteroids and comets (for convenience, let’s call them “space rocks”). What they are finding suggests that near-Earth space rocks are more numerous than was once thought, and that their orbits may not be as stable as has been assumed. There is also reason to think that space rocks may not even need to reach Earth’s surface to cause cataclysmic damage. Our solar system appears to be a far more dangerous place than was previously believed. The received wisdom about the origins of the solar system goes something like this: the sun and planets formed about 4.5 billion years ago from a swirling nebula containing huge amounts of gas and dust, as well as relatively small amounts of metals and other dense substances released by ancient supernova explosions. The sun is at the center; the denser planets, including Earth, formed in the middle region, along with many asteroids—the small rocky bodies made of material that failed to incorporate into a planet. Farther out are the gas-giant planets, such as Jupiter, plus vast amounts of light elements, which formed comets on the boundary of the solar system. Early on, asteroids existed by the millions; the planets and their satellites were bombarded by constant, furious strikes. The heat and shock waves generated by these impacts regularly sterilized the young Earth. Only after the rain of space objects ceased could life begin; by then, most asteroids had already either hit something or found stable orbits that do not lead toward planets or moons. Asteroids still exist, but most were assumed to be in the asteroid belt, which lies between Mars and Jupiter, far from our blue world. As for comets, conventional wisdom held that they also bombarded the planets during the early eons. Comets are mostly frozen water mixed with dirt. An ancient deluge of comets may have helped create our oceans; lots of comets hit the moon, too, but there the light elements they were composed of evaporated. As with asteroids, most comets were thought to have smashed into something long ago; and, because the solar system is largely void, researchers deemed it statistically improbable that those remaining would cross the paths of planets. These standard assumptions—that remaining space rocks are few, and that encounters with planets were mainly confined to the past—are being upended. On March 18, 2004, for instance, a 30-meter asteroid designated 2004 FH—a hunk potentially large enough to obliterate a city—shot past Earth, not far above the orbit occupied by telecommunications satellites. (Enter “2004 FH” in the search box at Wikipedia and you can watch film of that asteroid passing through the night sky.) Looking at the broader picture, in 1992 the astronomers David Jewitt, of the University of Hawaii, and Jane Luu, of the Massachusetts Institute of Technology, discovered the Kuiper Belt, a region of asteroids and comets that starts near the orbit of Neptune and extends for immense distances outward. At least 1,000 objects big enough to be seen from Earth have already been located there. These objects are 100 kilometers across or larger, much bigger than whatever dispatched the dinosaurs; space rocks this size are referred to as “planet killers” because their impact would likely end life on Earth. Investigation of the Kuiper Belt has just begun, but there appear to be substantially more asteroids in this region than in the asteroid belt, which may need a new name. Beyond the Kuiper Belt may lie the hypothesized Oort Cloud, thought to contain as many as trillions of comets. If the Oort Cloud does exist, the number of extant comets is far greater than was once believed. Some astronomers now think that short-period comets, which swing past the sun frequently, hail from the relatively nearby Kuiper Belt, whereas comets whose return periods are longer originate in the Oort Cloud. But if large numbers of comets and asteroids are still around, several billion years after the formation of the solar system, wouldn’t they by now be in stable orbits—ones that rarely intersect those of the planets? Maybe not. During the past few decades, some astronomers have theorized that the movement of the solar system within the Milky Way varies the gravitational stresses to which the sun, and everything that revolves around it, is exposed. The solar system may periodically pass close to stars or groups of stars whose gravitational pull affects the Oort Cloud, shaking comets and asteroids loose from their orbital moorings and sending them downward, toward the inner planets. Consider objects that are already near Earth, and the picture gets even bleaker. Astronomers traditionally spent little time looking for asteroids, regarding them as a lesser class of celestial bodies, lacking the beauty of comets or the significance of planets and stars. Plus, asteroids are hard to spot—they move rapidly, compared with the rest of the heavens, and even the nearby ones are fainter than other objects in space. Not until the 1980s did scientists begin systematically searching for asteroids near Earth. They have been finding them in disconcerting abundance. Click here to find out more! In 1980, only 86 near-Earth asteroids and comets were known to exist. By 1990, the figure had risen to 170; by 2000, it was 921; as of this writing, it is 5,388. The Jet Propulsion Laboratory, part of NASA, keeps a running tally at www.neo.jpl.nasa.gov/stats. Ten years ago, 244 near-Earth space rocks one kilometer across or more—the size that would cause global calamity—were known to exist; now 741 are. Of the recently discovered nearby space objects, NASA has classified 186 as “impact risks” (details about these rocks are at www.neo.jpl.nasa.gov/risk). And because most space-rock searches to date have been low-budget affairs, conducted with equipment designed to look deep into the heavens, not at nearby space, the actual number of impact risks is undoubtedly much higher. Extrapolating from recent discoveries, NASA estimates that there are perhaps 20,000 potentially hazardous asteroids and comets in the general vicinity of Earth. There’s still more bad news. Earth has experienced several mass extinctions—the dinosaurs died about 65 million years ago, and something killed off some 96 percent of the world’s marine species about 250 million years ago. Scientists have generally assumed that whatever caused those long-ago mass extinctions—comet impacts, extreme volcanic activity—arose from conditions that have changed and no longer pose much threat. It’s a comforting notion—but what about the mass extinction that occurred close to our era? About 12,000 years ago, many large animals of North America started disappearing—woolly mammoths, saber-toothed cats, mastodons, and others. Some scientists have speculated that Paleo-Indians may have hunted some of the creatures to extinction. A millennia-long mini–Ice Age also may have been a factor. But if that’s the case, what explains the disappearance of the Clovis People, the best-documented Paleo-Indian culture, at about the same time? Their population stretched as far south as Mexico, so the mini–Ice Age probably was not solely responsible for their extinction. A team of researchers led by Richard Firestone, of the Lawrence Berkeley National Laboratory, in California, recently announced the discovery of evidence that one or two huge space rocks, each perhaps several kilometers across, exploded high above Canada 12,900 years ago. The detonation, they believe, caused widespread fires and dust clouds, and disrupted climate patterns so severely that it triggered a prolonged period of global cooling. Mammoths and other species might have been killed either by the impact itself or by starvation after their food supply was disrupted. These conclusions, though hotly disputed by other researchers, were based on extensive examinations of soil samples from across the continent; in strata from that era, scientists found widely distributed soot and also magnetic grains of iridium, an element that is rare on Earth but common in space. Iridium is the meteor-hunter’s lodestar: the discovery of iridium dating back 65 million years is what started the geologist Walter Alvarez on his path-breaking theory about the dinosaurs’ demise. A more recent event gives further cause for concern. As buffs of the television show The X Files will recall, just a century ago, in 1908, a huge explosion occurred above Tunguska, Siberia. The cause was not a malfunctioning alien star-cruiser but a small asteroid or comet that detonated as it approached the ground. The blast had hundreds of times the force of the Hiroshima bomb and devastated an area of several hundred square miles. Had the explosion occurred above London or Paris, the city would no longer exist. Mark Boslough, a researcher at the Sandia National Laboratory, in New Mexico, recently concluded that the Tunguska object was surprisingly small, perhaps only 30 meters across. Right now, astronomers are nervously tracking 99942 Apophis, an asteroid with a slight chance of striking Earth in April 2036. Apophis is also small by asteroid standards, perhaps 300 meters across, but it could hit with about 60,000 times the force of the Hiroshima bomb—enough to destroy an area the size of France. In other words, small asteroids may be more dangerous than we used to think—and may do considerable damage even if they don’t reach Earth’s surface. Until recently, nearly all the thinking about the risks of space-rock strikes has focused on counting craters. But what if most impacts don’t leave craters? This is the prospect that troubles Boslough. Exploding in the air, the Tunguska rock did plenty of damage, but if people had not seen the flashes, heard the detonation, and traveled to the remote area to photograph the scorched, flattened wasteland, we’d never know the Tunguska event had happened. Perhaps a comet or two exploding above Canada 12,900 years ago spelled the end for saber-toothed cats and Clovis society. But no obvious crater resulted; clues to the calamity were subtle and hard to come by. Comets, asteroids, and the little meteors that form pleasant shooting stars approach Earth at great speeds—at least 25,000 miles per hour. As they enter the atmosphere they heat up, from friction, and compress, because they decelerate rapidly. Many space rocks explode under this stress, especially small ones; large objects are more likely to reach Earth’s surface. The angle at which objects enter the atmosphere also matters: an asteroid or comet approaching straight down has a better chance of hitting the surface than one entering the atmosphere at a shallow angle, as the latter would have to plow through more air, heating up and compressing as it descended. The object or objects that may have detonated above Canada 12,900 years ago would probably have approached at a shallow angle. If, as Boslough thinks, most asteroids and comets explode before reaching the ground, then this is another reason to fear that the conventional thinking seriously underestimates the frequency of space-rock strikes—the small number of craters may be lulling us into complacency. After all, if a space rock were hurtling toward a city, whether it would leave a crater would not be the issue—the explosion would be the issue. A generation ago, the standard assumption was that a dangerous object would strike Earth perhaps once in a million years. By the mid-1990s, researchers began to say that the threat was greater: perhaps a strike every 300,000 years. This winter, I asked William Ailor, an asteroid specialist at The Aerospace Corporation, a think tank for the Air Force, what he thought the risk was. Ailor’s answer: a one-in-10 chance per century of a dangerous space-object strike. Regardless of which estimate is correct, the likelihood of an event is, of course, no predictor. Even if space strikes are likely only once every million years, that doesn’t mean a million years will pass before the next impact—the sky could suddenly darken tomorrow. Equally important, improbable but cataclysmic dangers ought to command attention because of their scope. A tornado is far more likely than an asteroid strike, but humanity is sure to survive the former. The chances that any one person will die in an airline crash are minute, but this does not prevent us from caring about aviation safety. And as Nathan Myhrvold, the former chief technology officer of Microsoft, put it, “The odds of a space-object strike during your lifetime may be no more than the odds you will die in a plane crash—but with space rocks, it’s like the entire human race is riding on the plane.”

Incentivizing space tourism is a prerequisite to having NASA solve existential harms

Parsons, 2007

[Catherine E Parsons, Chapman Law Review, 2005-2006, JD Candidate, Chapman University School of Law, BS in Mathematics, “Space Tourism: Regulating Passage to the Happiest Place on Earth,” http://heinonline.org/HOL/Page?handle=hein.journals/chlr9&div=22&g\_sent=1&collection=journals]WZ

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

Immediately after the United States won the space race by placing a man on the moon, space exploration technology was no longer a priority in the United States' Cold War agenda and was put on the political back-burner.1 As moon landings became routine, public interest and political support for National Aero- nautics and Space Administration (NASA) declined.12 Govern- ment development of manned space technology did not cease en- tirely, but it came close.,3 The same space shuttles that went into service in 1981 are still NASA's only means of transporting a human into space. 14 NASA has continued its existence and made remarkable scientific findings despite its slim support, but after two space shuttle disasters have essentially grounded the fleet since 2003, NASA's future is tenuous at best.15 Even President Bush's recent proposal to include a return to the moon in NASA's budget seems to have fallen on deaf ears, as congressional and public support concentrates on domestic issues.16 The public commitment to the space race that existed in the 1960's is simply not there anymore; today, people only support tax expenditures in the interest of national defense or in response to necessity.17

Waiting to investigate the vast possibilities of space explora- tion until emergencies arise will result in an inordinately small window of time to accomplish the difficult feats necessary to evade disaster. Emergencies triggering necessity include limited resources,' 8 the dying sun problem,19 asteroid strikes,20 and other planetary or stellar catastrophes-all of which are not theoreti- cally pressing matters, at least to current knowledge.21 The ne- cessity for escaping the planet is not immediate enough to moti- vate investment now-the initial monetary commitment for speculative and far-off profits is too great.

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

War and necessity regularly foster demand before technology is fully developed, resulting in greater risks to safety than are normally permitted.22 However, in today's consumer market- place, particularly in the entertainment sector where luxury good lawsuits are a part of everyday business,23 such safety risks are not tolerated.24 Currently, the only market for space tourism is affluent space enthusiasts, and the main motivation for such an individual to purchase a ticket is simple enjoyment and enter- tainment.25 If this experience is not presented and maintained as safe as possible, then demand will disappear.26

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

With individuals and industries increasingly relying on com- puters and other technological advancements, companies like Sony can utilize entertainment as a means to recover develop- ment costs and generate initial profits. This consequently drives companies to create what consumers ultimately want: something smaller, better, and faster. Gainers willing to spend hundreds of dollars on video game systems and games provide funding for further computer technology research and development.29 This fuels creative ventures that, although less profitable in the short term, ultimately aid companies in discovering the technology of the future, both safely and efficiently.30

In anticipation of this result, the impact of the Cell chip is already growing: IBM intends to use Sony's Cell chip to run its new line of blade servers.3 1 Sony, Toshiba and IBM recently re- newed their partnership for another five years.32 Originally de- veloped for the entertainment industry in Sony's PlayStation 3, the partnership is now fully "pitching to the defense, medical and entertainment industries."33 This is an excellent example of not only how war, necessity and entertainment can drive the creation of technology, but also how entertainment can fund technology that will later assist in the defense and medical industries. Likewise, space exploration will develop from space entertain- ment, and with it will come prime capital and safe technology de- velopment, later creating the tools and systems necessary to en- hance and sustain other industries, such as mineral gathering and deep space exploration.34

**Extinction**

**Brownfield ‘4**  (Roger – presented at the Planetary Defense Conference: Protecting Earth from Asteroids, Orange County, California, Feb. 23-26, 2004 -- “A Million Miles a Day…” – Brownsfield is part of the Gaiashiled project – available at: http://www.aiaa.org/content.cfm?pageid=406&gTable=Paper&gID=17092)

Once upon a time there was a Big Bang... Cause/Effect - Cause/Effect -Cause/Effect and fifteen billion years later we have this chunk of cosmos weighing in at a couple trillion tons, screaming around our solar system, somewhere, hair on fire at a million miles a day, on course to the subjective center of the universe. Left to its own fate -- on impact -- this Rock would release the kinetic energy equivalent of one Hiroshima bomb for every man, woman and child on the planet. Game Over... No Joy... Restart Darwin's clock… again. No happy ever after. There is simply no empirical logic or rational argument that this could not be the next asteroid to strike Earth or that the next impact event could not happen *tomorrow*. And as things stand we can only imagine a handful of dubious undeveloped and untested possibilities to defend ourselves with. There is nothing we have actually prepared to do in response to this event. From an empirical analysis of the dynamics and geometry of our solar system we have come to understand that the prospect of an Earth/asteroid collision is a primal and ongoing process: a solar systemic status quo that is unlikely to change in the lifetime of our species. And that the distribution of these impact events is completely aperiodic and random both their occasion and magnitude. From abstracted averaged relative frequency estimates we can project that over the course of the next 500 million years in the life of Earth we will be struck by approximately 100,000 asteroids that will warrant our consideration. Most will be relatively small, 100 to 1,000 meters in diameter, millions of tons: only major city to nation killers. 1,000 or so will be over 1,000 meters, billions of tons and large enough to do catastrophic and potentially irrecoverable damage to the entire planet: call them global civilization killers. Of those, 10 will be over 10,000 meters, trillions of tons and on impact massive enough to bring our species to extinction. All these asteroids are out there, orbiting the sun... now. Nothing more needs to happen for them to go on to eventually strike Earth. As individual and discrete impact events they are all, already, events in progress. By any definition this is an existential threat. Fortunately, our current technological potential has evolved to a point that if we choose to do so we can deflect all these impact events. Given a correspondingly evolved political will, we can effectively manage this threat to the survival of our species. But since these events are aperiodic and random we can not simply trust that any enlightened political consensus will someday develop spontaneously before we are faced with responding to this reality. If we would expect to deflect the next impact event a deliberate, rational punctuated equilibrium of our sociopolitical will is required now. The averaged relative frequency analysis described above or any derived random-chance statistical probabilistic assessment, in itself, would be strategically meaningless and irrelevant (just how many extinction level events can we afford?). However, they can be indirectly constructive in illuminating the existential and perpetual nature of the threat. Given that the most critically relevant strategic increment can be narrowly defined as the next “evergreen” 100 years, it would follow that the strategic expression of the existent risk of asteroid impact in its most likely rational postulate would be for one and only one large asteroid to be on course to strike Earth in the next 100 years... If we do eventually choose to respond to this threat, clearly there is no way we can address the dynamics or geometry of the Solar System so there is no systemic objective we can respond to here. We can not address 'The Threat of Asteroid Impact' as such. We can only respond to this threat as these objects present themselves as discrete impending impactors: one Rock at a time. This leaves us the only aspect of this threat we *can* respond to - a rationally manifest first-order and evergreen tactical definition of this threat Which unfortunately, as a product of random-chance, includes the prospect for our extinction. Asteroid impact is a randomly occurring existential condition. Therefore the next large asteroid impact event is inevitable and expectable, and that inevitable expectability begins... now. The Probability is Low: As a risk assessment: “The probability for large asteroid impact in the next century is low”... is irrelevant. Say the daily random-chance probability for large asteroid impact is one in a billion. And because in any given increment of time the chance that an impact will not happen is far greater than it will, the chance that it will happen can be characterized as low. However, if we look out the window and see a large asteroid 10 seconds away from impact the daily random-chance probability for large asteroid impact will still be one in a billion... and we must therefore still characterize the chance of impact as low... When the characterization of the probability can be seen to be tested to be in contradiction with the manifest empirical fact of the assessed event it then must also then be seen to be empirically false. Worse: true only in the abstract and as such, misleading. If we are going to *respond* to these events, when it counts the most, this method of assessment will not be relevant. If information can be seen to be irrelevant ex post it must also be seen to be irrelevant ex ante. This assessment is meaningless. Consider the current threat of the asteroid Apophis. With its discovery we abandon the average relative frequency derived annual random-chance probability for a rational conditional-empiric probabilistic threat assessment derived from observing its speed, vector and position relative to Earth. The collective result is expressed in probabilistic terms due only to our inability to meter these characteristics accurately enough to be precise to the point of potential impact. As Apophis approaches this point the observations and resulting metrics become increasingly accurate and the conditional-empiric probability will process to resolve into a certainty of either zero or one. Whereas the random-chance probability is unaffected by whether Apophis strikes Earth or not. These two probabilistic perceptions are inherently incompatible and unique, discrete and nonconstructive to each other. The only thing these two methodologies have in common is a nomenclature: probability/likelihood/chance, which has unfortunately served only to obfuscate their semantic value making one seem rational and relevant when it can never be so. However, merely because they are non rational does not make averaged relative frequency derived random-chance probabilities worthless. They do have some psychological merit and enable some intuitive 'old lady' wisdom. When we consider the occasion of some unpredictable event that may cause us harm and there is nothing tangible we can do to deflect or forestall or stop it from happening, we still want to know just how much we should worry about it. We need to quantify chance not only in in case we can prepare or safeguard or insure against potentially recoverable consequences after the fact, but to also meter how much hope we should invest against the occasion of such events. Hope mitigates fear. And when there is nothing else we can do about it only then is it wise to mitigate fear... “The probability for large asteroid impact in the next century is low” does serve that purpose. It is a metric for hope. Fifty years ago, before we began to master space and tangibly responding this threat of asteroid impact became a real course of action, hope was all we could do. Today we can do much more. Today we can hold our hope for when the time comes to successfully deflect. And then, after we have done everything we can possibly do to deflect it, there will still be of room for hope... and good luck. Until then, when anyone says that the probability for large asteroid impact or Extinction by NEO is low they are offering nothing more than a metric for hope -- not rational information constructive to metering a response or making a decision to do so or not. Here, the probability is in service to illusion... slight-of-mind... and is nothing more than comfort-food-for-thought. We still need such probabilistic comfort-food-for-thought for things like Rogue Black Holes and Gamma Bursts where we are still imaginably defenseless. But if we expect to punctuate the political equilibrium and develop the capability to effectively respond to the existential threat of asteroid impact, we must allow a rational and warranted fear of extinction by asteroid impact to drive a rational and warranted response to this threat forward. Forward into the hands and minds of those who have the aptitude and training and experience in *using* fear to handle fearful things. Fear focuses the mind... Fear reminds us that there are dire negative consequences if we fail. If we are going to concern ourselves with mounting a response and deflecting these objects and no longer tolerate and suffer this threat, would it not be far more relevant to know in which century the probability for large asteroid impact was *high* and far more effective to orient our thinking from when it *will not* to when it *will* occur? But this probabilistic perspective can not even pretend to approach providing us with that kind of information. As such, it can never be strategically relevant: contribute to the conduct of implementing a response. The same can be said when such abstract reasoning is used to forward the notion that the next asteroid to strike Earth will likely be small... This leads us to little more than a hope based Planetary Defense. If we are ever to respond to this threat well then we must begin thinking about this threat better. Large Asteroid Impacts Are Random Events. **Expect the next one to occur at any time**. Strategically speaking, this means being at DefCon 3: lock-cocked and ready to rock, prepared to defend the planet and mankind from the worst case scenario, 24/7/52... forever. Doing anything less by design, would be like planning to bring a knife to a gunfight. If we expect our technological abilities to develop and continue to shape our nascent and still politically tacit will to respond to this threat: if we are to build an effective Planetary Defense, we must abandon the debilitating sophistry of “The probability for large asteroid impact in the next century is low” in favor of rational random inevitable expectation... and its attendant fear.

# Warming

The US currently relies on fossil fuels

Badger, Bachelor of Science, 4/19/11 (Mathew, “What Are the Effects of Fossil Fuels on People?” <http://www.ehow.com/info_8254800_effects-fossil-fuels-people.html>, 6/23/11, NBM)

Developed nations, like the United States and Canada, are the world's leaders in energy consumption. By an overwhelming percentage, the U.S. and Canada rely on burning fossil fuels for the source of this energy. The Canadian Lung Association claims that roughly 72 percent of Canada's energy comes from burning fossil fuels. A report from Environment America projects a $23 trillion expenditure by the U.S. between the years 2010 and 2030. The U.S. currently depends on fossil fuels for 85 percent of its energy supply. The irony is that both countries invest exorbitant amounts of taxpayer money each year in energy sources that will eventually run out.

Warming is caused by fossil fuel use and unchecked it leads to extinction

Abbasi, Premalatha and Abbasi, Centre for Pollution Control & Environmental Engineering, Pondicherry University 10 (Tasneem, M.m S.A., Renewable and Sustainable Energy Reviews, “The return to renewables: Will it help in global warming control?” (http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6VMY-514RB5B-C-1&\_cdi=6163&\_user=655954&\_pii=S1364032110003357&\_origin=&\_coverDate=01%2F31%2F2011&\_sk=999849998&view=c&wchp=dGLzVzz-zSkWA&md5=b4de44d87ee97b145615d8716f3cb4a2&ie=/sdarticle.pdf)//C-NBM)

But during the last 20 years the balance of evidence has gradually and decisively shifted towards global warming. It is now a scientifically accepted fact that global warming is indeed occurring and that it will have long-ranging impacts on the earth’s ecosystems [5–8]. There is no longer any significant disagreement on the existence of global warming; if there is disagreement, it is on the extent of harm global warming will cause. There is also nearcomplete consensus that use of fossil fuels is the principal cause of global warming and unless the emissions to atmosphere of CO2 and other greenhouse gases are drastically reduced, global warming will progressively increase and lead the world to extinction.

Space tourism will stimulate SSP growth

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WX

If orbital travel grows to a scale of millions of passengers/year—as it could by the 2030s, with vigorous investment—it will stimulate the spontaneous growth of numerous businesses in space. These will grow progres- sively from simple activities such as maintenance of orbiting hotels, to in-space manufacturing using asteroi- dal minerals. For example, the development of SSP would enable a range of industrial processes using the advan- tages of space, including high vacuum, weightlessness, low-cost electricity and sources of both minerals and volatile chemicals in shallow gravitational wells.

If SSP grows to supply a significant share of the terrestrial energy market, more and more industry would operate outside the Earth’s ecological system. While most industries cause growing damage to the Earth’s environ- ment as they grow in scale, industrial activities which are outside the Earth’s ecosystem need not cause any such damage. Hence the growth of space-based industry to large scale offers the longer-term possibility of decoupling economic growth from the limits of the terrestrial environment. Indeed, it has been convincingly argued that only the use of space resources, including especially SSP, offers the possibility of protecting the Earth’s environment while enabling sufficient economic growth to preserve civilised society [22,27].

SSP is the only viable option for solving warming because it provides limitless clean energy resources

NSS 11 (National Space Society, 6/3/11, “Space Solar Power Limitless clean energy from space,” 6/21/11 (http://www.nss.org/settlement/ssp/)//C-NBM)

The United States and the world need to find new sources of clean energy. Space Solar Power gathers energy from sunlight in space and transmits it wirelessly to Earth. Space solar power can solve our energy and greenhouse gas emissions problems. Not just help, not just take a step in the right direction, but solve. Space solar power can provide large quantities of energy to each and every person on Earth with very little environmental impact. The solar energy available in space is literally billions of times greater than we use today. The lifetime of the sun is an estimated 4-5 billion years, making space solar power a truly long-term energy solution. As Earth receives only one part in 2.3 billion of the Sun's output, space s**olar** power is by far the largest potential energy source available, dwarfing all others combined. Solar energy is routinely used on nearly all spacecraft today. This technology on a larger scale, combined with already demonstrated wireless power transmission (see 2-minute video of demo), can supply nearly all the electrical needs of our planet. Another need is to move away from fossil fuels for our transportation system. While electricity powers few vehicles today, hybrids will soon evolve into plug-in hybrids which can use electric energy from the grid. As batteries, super-capacitors, and fuel cells improve, the gasoline engine will gradually play a smaller and smaller role in transportation — but only if we can generate the enormous quantities of electrical energy we need. It doesn't help to remove fossil fuels from vehicles if you just turn around and use fossil fuels again to generate the electricity to power those vehicles. Space solar power can provide the needed clean power for any future electric transportation system. While all viable energy options should be pursued with vigor, space solar power has a number of substantial advantages over other energy sources. Advantages of Space Solar Power Unlike oil, gas, ethanol, and coal plants, space solar power does not emit greenhouse gases. Unlike coal and nuclear plants, space solar power does not compete for or depend upon increasingly scarce fresh water resources. Unlike bio-ethanol or bio-diesel, space solar power does not compete for increasingly valuable farm land or depend on natural-gas-derived fertilizer. Food can continue to be a major export instead of a fuel provider. Unlike nuclear power plants, space solar power will not produce hazardous waste, which needs to be stored and guarded for hundreds of years. Unlike terrestrial solar and wind power plants, space solar power is available 24 hours a day, 7 days a week, in huge quantities. It works regardless of cloud cover, daylight, or wind speed. Unlike nuclear power plants, space solar power does not provide easy targets for terrorists. Unlike coal and nuclear fuels, space solar power does not require environmentally problematic mining operations. Space solar power will provide true energy independence for the nations that develop it, eliminating a major source of national competition for limited Earth-based energy resources. Space solar power will not require dependence on unstable or hostile foreign oil providers to meet energy needs, enabling us to expend resources in other ways. Space solar power can be exported to virtually any place in the world, and its energy can be converted for local needs — such as manufacture of methanol for use in places like rural India where there are no electric power grids. Space solar power can also be used for desalination of sea water. Space solar power can take advantage of our current and historic investment in aerospace expertise to expand employment opportunities in solving the difficult problems of energy security and climate change. Space solar power can provide a market large enough to develop the low-cost space transportation system that is required for its deployment. This, in turn, will also bring the resources of the solar system within economic reach.

# Get off the rock

Low cost orbital space tourism will spill over to infrastructure to live on the Moon or Mars – solves world peace

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

Investment in low-cost orbital access and other space infrastructure will facilitate the establishment of settle- ments on the Moon, Mars, asteroids and in man-made space structures. In the first phase, development of new regulatory infrastructure in various Earth orbits, including property/usufruct rights, real estate, mortgage financing and insurance, traffic management, pilotage, policing and other services will enable the population living in Earth orbits to grow very large. Such activities aimed at making near-Earth space habitable are the logical extension of humans’ historical spread over the surface of the Earth. As trade spreads through near-Earth space, settlements are likely to follow, of which the inhabitants will add to the wealth of different cultures which humans have created in the many different environments in which they live.

Success of such extra-terrestrial settlements will have the additional benefit of reducing the danger of human extinction due to planet-wide or cosmic accidents [27]. These horrors include both man-made disasters such as nuclear war, plagues or growing pollution, and natural disasters such as super-volcanoes or asteroid impact.It is hard to think of any objective that is more important than preserving peace. Weapons developed in recent decades are so destructive, and have such horrific, long-term side- effects that their use should be discouraged as strongly as possible by the international community. Hence, reducing the incentive to use these weapons by rapidly developing the ability to use space-based resources on a large scale is surely equally important [11,16]. The achievement of this depends on low space travel costs which, at the present time, appear to be achievable only through the develop- ment of a vigorous space tourism industry.

Time Frame for departure is short – we must begin space travel soon or extinction is inevitable

Harold Hamblet – author for Space Views and guest editorialist for Tandra – Tandra – 200**8** – http://www.tandra.com/Pages/edispace.html.

Most anti-space arguments are broad and general, and somewhat philosophical in nature, as the above. Economics, spin offs, and other such materialistic arguments can't sway someone who believes that money is being wasted in space while people are starving on Earth. Civilization will collapse and the human race will become extinct if we don't expand into space. That bears repeating, so, CIVILIZATION WILL COLLAPSE AND THE HUMAN RACE WILL BECOME EXTINCT IF WE DON'T EXPAND INTO SPACE. Shout it out; a pro-space argument cannot get much more powerful than that, and many anti- space advocates provide us with supporting arguments. To fully delve into this line of reasoning, you first need to be familiar with two related items: Drake's Equation (Greenbank Equation in Britannica) and The Fermi Paradox. Drake's Equation is a scientific way of guessing how many intelligent civilizations might exist in a particular galaxy at any one time. (I use the word "guessing" rather than "estimating", because estimating implies that different groups of people using the same starting point ought come up with answers that are close in magnitude. Such is not the case here.) The Fermi Paradox results from believing that Drake's Equation provides a solution that at any one time for a galaxy is greater then or equal to one. If even one predecessor civilization more than five or so million years older then our own had developed space travel, there would (or should) not only be abundant evidence of them in the skies, but they would (or should) physically be here by now. They are not here. That's the crux of The Fermi Paradox. If you believe that intelligent life is common, then you run into the difficult problem of trying to explain where the extraterrestrials are. Whereas the absence of evidence isn't usually evidence, the absence of evidence in this case where there should be overwhelming presence of evidence is at the least, worrisome. If you head towards the SETI section of your local library and start researching this area, you'll find that scientists of all stripes fall into two general groups regarding ET's- Those who believe that life is common and that intelligence naturally arises from life, and therefore, ET civilizations are common, and those who believe that intelligence is so exceedingly unlikely that there may even be fewer then one intelligent species per galaxy per universe lifetime. There really is no middle ground; life, and intelligent life, is either common, or very, very rare. Those who believe that intelligent life is common concoct all sorts of explanation, ranging from the truly bizarre zoo hypothesis, in which we, the human race, are a nature preserve to be left in its natural wild state, to the only slightly bizarre, where intelligence and technology are decoupled, and intelligence without technology is postulated. In all the readings I have recently done on the subject, both camps failed to mention something that is commonly believed and talked about in the pro-space movement, that I think was first put into print by Robert Heinlein: "A civilization or species that fails to develop space travel becomes extinct." This is a self-evident and easy to prove axiom. What is not so evident, and a thought that I haven't seen before in print is this: a technological civilization on the verge of expanding into space is close to the point where it runs out of resources on its home planet. If it runs out of resources before establishing itself in space, the civilization collapses, never rises to the same heights, and soon thereafter becomes extinct.Civilization is now close to the point of collapse. How close is open to debate. Even if you don't believe this yourself, most national and international leaders believe this, and their actions are shaped by their beliefs. In fact, the coming collapse of civilization is required reading in most school systems. Limits to Growth is the original tract outlining future chaos. The Population Bomb and The Population Explosion outline the same doomsday scenario of the collapse of technological civilization. Anything by the widely-quoted-in-the-press-as-a-scientific-expert Jeremy Rifkin contributes to this belief. Our very own vice-president's book, Earth in the Balance, and all of its 100+ listed references all outline the coming collapse. Not one of these books outlines an optimistic future in which space travel has become routine, In fact, they all offer the same prescription, one which would doom space travel for the human race forever. Reduce the world's population, immediately. Reduce the first world's standard of living, immediately. Create a one world government, even if you call it something else. Deindustrialize, and return to a more balanced way of living with Gaia, the Earth Mother. If you don't believe that these are the universal panaceas, read the books. Most of our political leaders have. They have not read High Frontier, nor are they familiar with terms like single stage to orbit, solar power satellites, or generation ships.The doomsday argument: space travel or extinction. It may sound extreme, but it is really the only choice of futures. Furthermore, we have only a limited amount of time left to achieve space travel. Extinction is the default choice. If the human race does not actively pursue space development in the near future, the choice of extinction has been made. I have run this argument through several dozen people who are not rabid pro-space advocates like me. They have all understood it; it is a simple argument. None have found serious fault in it; there is none.

# Economy

Space tourism has been ignored – government policy is critical to create economic growth and catch up in the industry

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

As discussed above, if space travel services had started during the 1950s, the space industry would be enor- mously more developed than it is today. Hence the failure to develop passenger space travel has seriously distorted the path taken by humans’ technological and economic development since WW2, away from the path which would have been followed if capitalism and democracy operated as intended. Technological know-how which could have been used to supply services which are known to be very popular with a large proportion of the population has not been used for that purpose, while waste and suffering due to the unemployment and

environmental damage caused by the resulting lack of new industrial opportunities have increased.

In response, policies should be implemented urgently to correct this error, and to catch up with the possibilities for industrial and economic growth that have been ignored for so long. This policy renewal is urgent because of the growing dangers of unemployment, economic stagnation, environmental pollution, educational and cultural decline, resource wars and loss of civil liberties which face civilisation today. In order to achieve the necessary progress there is a particular need for colla- boration between those working in the two fields of civil aviation and civil space. Although the word ‘‘aerospace’’ is widely used, it is largely a misnomer since these two fields are in practice quite separate. True ‘‘aerospace’’ collabora- tion to realise passenger space travel will develop the wonderful profusion of possibilities outlined above.

Only government focus on space tourism can jumpstart the industry

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

The continuing heavy dependence of the space in- dustry on taxpayer funding, despite cumulative invest- ment of some 1 trillion Euro-equivalents, is due to the simple fact that those directing the industry have chosen not to supply services which large numbers of the general public wish to buy. Yet it is elementary that only by doing this can the space industry grow into a normal commer- cial activity. Doing so will create an industry which raises private investment to develop new, better and larger facilities in order to sell better services to ever-more customers—in the familiar ‘‘virtuous circle’’ of business growth. Eventually this activity may even reach a scale sufficient for the tax revenues it generates to repay the public investment to date.

In successful companies, investment is skillfully judged so as to produce goods and services for which there will be large commercial (i.e. non-governmental) demand. If this earns sufficient profits, then the activity will continue to grow spontaneously for decades or more, like manu- facturing of cars or airliners. If, instead, funds intended for investment are spent on developing non-commercial products, such as expensive surveillance satellites or a space station for which the only significant customer is government, then clearly the space industry is doomed to remain forever a small, taxpayer-funded activity—a hindrance rather than a help to economic growth.

Economic policy-makers responsible for deciding the public budget for space development must no longer rely exclusively on the advice of the space industry itself, which ever since its origin has had different objectives than the economic benefit of the general public. That is, economic policy-makers, who are responsible for tens of trillions of Euros of activity, must take the initiative to ensure that passenger space travel services are developed as soon as possible. There are many ways in which private investments in this field can be facilitated and supported, without governments themselves either planning or managing the projects.

Among other steps, this will require the important institutional innovation of collaboration between civil aviation and civil space activities. Since, even with today’s knowledge, researchers foresee the possibility of econom- ic development in space growing to a scale similar to terrestrial industry [11]. This field of industry must be considered as having the potential to become a major new axis for economic growth—equivalent in importance to the aviation industry, but with minimal environmental impact, as discussed below—and therefore deserving of the most serious and urgent attention by economic policy- makers.

Their demand defense doesn’t apply – recent studies show commercial spaceflight would generate $600 million in its first year

Ziliotto, 2009

[Véronique, European Space Research and Technology Centre, “Relevance of the futron/zogby survey conclusions to the current space tourism industry,” Acta Astronautica, [http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XC3X36-3-5&\_cdi=5679&\_user=655954&\_pii=S0094576509004378&\_origin=search&\_zone=rslt\_list\_item&\_coverDate=07%2F31%2F2010&\_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V1N-4XC3X36-3-5&_cdi=5679&_user=655954&_pii=S0094576509004378&_origin=search&_zone=rslt_list_item&_coverDate=07%2F31%2F2010&_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/)]WZ

The current definitive market study for space tourism was conducted by the Futron Corporation in 2002 and updated in 2006 for its suborbital part [3]. Given the nature of spaceflight, the choice of the interviewees is the key parameter to select a valid sample that can be extrapolated to a realistic worldwide forecast. Futron therefore conducted 450 phone interviews of a respon- dent pool of US ‘‘millionaires’’, i.e. with a household income of at least US$250,000 annually, or a minimum net worth of US$1 million. The objective was to address the crucial questions about the viability of the space tourism industry (size of the market, growth potential and customer characteristics) in an unbiased way in order to make a realistic prognostic over a 20-year period.

Starting with the base population of ‘‘affluent house- holds’’, Futron narrowed the number of potential custo- mers by applying several filters to take into account the specific constraints of suborbital space travel such as the expense, interest in suborbital spaceflight at the current prices, pioneering reduction (customers whose main motivation is to be a pioneer) and fitness requirements. The full market maturity was believed to be reached over a timeline of 40 years. The market diffusion model is a Fisher-Pry curve (‘‘S’’ curve), which is a standard pattern to describe the absorption of new technological product.

The initial 2002 Futron conclusions were updated in 2006 to take into account the recent achievements in the domain of suborbital flight, and most notably the heavily covered media events surrounding the creation of Virgin Galactic. The updates concerned the start date of the market, shifted from 2002 to 2006; the initial ticket price that was set to US$200,000 by Virgin Galactic, instead of US$100,000 in the initial study; new population wealth statistics that leads to an increase of potential customers; the passengers fitness requirements, believed to be less stringent than expected if we refer to Virgin Galactic’s current medical check-up and pre-flight tests.

The forecasts of the Futron survey are summarized in the two following graphs (Fig. 1). The base service price (US$200,000) would be maintained for the first three years of service, and then would gradually decline over the following decade to US$50,000 by 2021. This forecast does not assume any supply constraints after service launch, as the service capacity and technical details of potential vehicles were not established at the time of the survey. The estimated demand for the year 2021 would be over 13,000 passengers, generating revenues in excess of US$600 million.

Regulations mean purely privatization can’t solve – congress has the ability to expand space tourism

Parsons, 2007

[Catherine E Parsons, Chapman Law Review, 2005-2006, JD Candidate, Chapman University School of Law, BS in Mathematics, “Space Tourism: Regulating Passage to the Happiest Place on Earth,” http://heinonline.org/HOL/Page?handle=hein.journals/chlr9&div=22&g\_sent=1&collection=journals]WZ

Over the past few years, Congress has considered involve- ment in the private space industry. Several House bills have been proposed trying to create investment incentives; however, none have survived.145 In 2003, Representative Ken Calvert pro- posed the Invest in Space Now Act of 2003.146 The Invest in Space Now Act recognized the United States' potential to be the leader in space technology.147 The Act would have granted a tax credit for owners of stock in C-corporations that were qualified space transportation vehicle providers at the time the stock was issued.148

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

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

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

**We’ll Isolate two internal links into the economy**

**First is growth –**

Expansion of space tourism will allow for billions in profit a year and limitless economic growth

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

Reducing the cost of space travel to 1% of existing launch vehicles’ costs, in combination with the growth of a new consumer service market in space, would greatly aid the growth of many commercial space activities, thereby creating numerous new business opportunities both on Earth and in space. This process is already at work on a small scale in relation to sub-orbital flight services: in addition to a large number of travel companies acting as agents for sub-orbital flights (including JTB, the largest travel company in Japan), Zero-G Corporation supplies parabolic flight services, Bigelow Aerospace is developing the first space hotel, Spaceport Associates advises on spaceport design, Orbital Outfitters Inc. supplies custo- mised flight suits, spaceports are being developed in several places, and several support organisations have been established. All of this activity is occurring some years before the first high-priced services even start, so a much wider range of different space travel-related businesses are sure to grow in future.

In the case of orbital services there will be an even wider range of companies with much larger revenues, including companies supplying various services to orbit- ing hotels. These will include services which terrestrial hotels typically purchase today, such as catering, cleaning, accounting, entertainment, plus such additional services as space-based window maintenance, air supply, solar- generated electricity, water supply, waste disposal ser- vices, and others.

As activities in orbit expand progressively, they could grow to include use of materials extracted from the Moon and near-Earth asteroids and cometoids, of which the potential has been researched for several decades [11]. Due to the much higher cost of activities in orbit than on

the surface of the Earth, orbiting hotels seem likely to create the first market for non-terrestrial materials like ice, water, oxygen and hydrogen, as discussed in [12].

Another potentially major space-based industry, which has been held back for 40 years by high launch costs, is the supply of solar power from space to Earth. Although the potential of this system was recognised in studies by the US Department of Energy in the late 1970s, and confirmed in the 1990s [13], total funding has remained minimal. However, progress could be rapid once launch costs fall to a few percent of ELV costs [14]. Hence, as passenger space travel activities expand to large scale, a growing range of manufacturing activities in Earth orbit, on the lunar surface and elsewhere could develop spontaneously, driven by entrepreneurial effort to exploit new business opportunities opened up by the growth of new commer- cial markets in Earth orbit. These will in turn open the door to the large-scale space activities described in [11].

The growth of orbital passenger space travel to several million passengers/year over a few decades would represent a direct commercial turnover of some 100 billion Euros/year. In such a scenario of rapid growth, annual investment in new facilities, research and devel- opment might add the same amount again. Indeed, having reached such a scale, there would be no foreseeable limit to further growth—in particular it need not be limited, like terrestrial activities, by environmental or political constraints. Quite apart from the numerous opportunities which such a scenario offers for growth of the space industry, it also offers great potential benefits for humanity, in several different fields, as discussed in turn in the following.

**Second is jobs –**

Incentivizing space tourism would create millions of jobs – that’s key to the economy

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

In most countries, most of the population do not have economically significant land holdings, and so employ- ment is the economic basis of social life, providing income and enabling people to have stable family lives. The high level of unemployment in most countries today is there- fore not only wasteful, it also causes widespread poverty and unhappiness, and is socially damaging, creating further problems for the future. One reason for investing in the development of passenger space travel, therefore, is that it could create major new fields of employment, capable of growing as far into the future as we can see.

As of 2001, the hotel, catering and tourism sector was estimated to employ 60 million people world-wide, or 3% of the global workforce, and 6% of Europeans [15]. Hence we can estimate that the passenger air travel industry, including airlines, airports, hotels and other tourism- related work, indirectly employs 10–20 times the number of people employed in aircraft manufacturing alone. Likewise, passenger space travel services could presum- ably create employment many times that in launch vehicle manufacturing—in vehicle operations and main- tenance, at spaceports, in orbiting hotels, in many companies supplying these, in services such as staff training, certification and insurance, and in a growing range of related businesses.This possibility is particularly valuable because high unemployment, both in richer and poorer countries, has been the major economic problem throughout the world for decades. Consequently the growth of such a major new market for advanced aero- space technology and services seems highly desirable, as discussed further in [16].

By contrast, in recent years employment in the traditional space industry in USA and Europe has been shrinking fast: a 2003 report by the US Federal Aviation Administration stated that employment in launch vehicle manufacturing and services fell from 28,617 in 1999 to 4828 in 2002, while employment in satellite manufactur- ing fell from 57,372 to 31,262 [17]. Likewise, European space industry employment fell by 20% from 1995 to 2005; the major space engineering company Astrium cut 3300 staff from 2003 through 2006; and in 2005 alone, European prime contractors cut 13.5% of their staff or some 2400 people [18]. Unfortunately, the probability of space industry employment recovering soon is low, because satellite manufacturing and launch services face both low demand and rapidly growing competition from India and China, where costs are significantly lower.

It is therefore positively bizarre that government policy-makers have declined to even discuss the subject of investing in the development of passenger space travel services, and have permitted no significant investment to date out of the nearly 20 billion Euro-equivalents which space agencies spend every year! This is despite the very positive 1998 NASA report ‘‘General Public Space Travel and Tourism’’ [19], and the NASA-funded 2002 ‘‘ASCENT’’ study referred to above [2,3].

In the capitalist system, companies compete to reduce costs since this directly increases their profits. However, reducing the number of employees through improving productivity raises unemployment, except to the extent that new jobs are created in new and growing industries. In an economy with a lack of new industries, increasing so-called ‘‘economic efficiency’’ creates unemployment, which is a social cost. In this situation, governments concerned for public welfare should either increase the rate of creation of new industries, and/or slow the elimination of jobs, at least until the growth of new industries revives, or other desirable counter-measures, such as new social arrangements, are introduced. These may include more leisure time, job-sharing, and other policies designed to prevent the growth of a permanent ‘‘under-class’’ of unemployed and ‘‘working poor’’—a development which would pose a major threat to western civilisation.

One of the many ill effects of high unemployment is that it weakens governments against pressure from corporate interests. For example, increased restrictions on such undesirable activities as arms exports, unfair trade, environmental damage, corporate tax evasion, business concentration, advertising targeted at children, and anti-social corporate-drafted legislation such as the ‘‘codex alimentarus’’, ‘‘tort reform’’ and compulsory arbitration are socially desirable. However, when unem- ployment is high, corporations’ arguments that govern- ment intervention would ‘‘increase unemployment’’ have greater influence on governments.

As outlined above, the opening of near-Earth space to large-scale economic development, based initially on passenger space travel services, promises to create millions of jobs, with no obvious limits to future growth. At a time when high unemployment is the most serious economic problem throughout the world, developing this family of new industries as fast as possible should be a priority for employment policy. To continue economic ‘‘rationalisation’’ and ‘‘globalisation’’ while not developing space travel is self-contradictory, and would be both economically and socially very damaging.

NUCLEAR WAR.

Mead 9. [2/4, Walter Russell, Henry A. Kissinger Senior Fellow in U.S. Foreign Policy at the Council on Foreign Relations, Only Makes You Stronger: Why the recession bolstered America, The New Republic]

None of which means that we can just sit back and enjoy the recession. History may suggest that financial crises actually help capitalist great powers maintain their leads--but it has other, less reassuring messages as well. If financial crises have been a normal part of life during the 300-year rise of the liberal capitalist system under the Anglophone powers, so has war. The wars of the League of Augsburg and the Spanish Succession; the Seven Years War; the American Revolution; the Napoleonic Wars; the two World Wars; the cold war: The list of wars is almost as long as the list of financial crises. **Bad economic times** can **breed wars**. Europe was a pretty peaceful place in 1928, but the Depression poisoned German public opinion and helped bring Adolf Hitler to power. If the current crisis turns into a depression, what rough beasts might start slouching toward Moscow, Karachi, Beijing, or New Delhi to be born? The United States may not, yet, decline, but, if we can't get the world economy back on track, we may still have to fight.

# Education

Commercial space tourism would inspire generations of science-oriented students

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

The educational value of space activities is well known: children and young people find the subject of space and space travel uniquely fascinating. A number of space- based, science-fiction films and television series have achieved extraordinary popularity, extending over dec- ades. As a result, various organisations have created space-related educational programmes involving satellite design, small rockets and simulation of space flights. Unfortunately, while these activities are popular with the participants, it has to be recognised that they are not effective in increasing young people’s scientific education overall, which continues to decline in most countries. That is, children who enjoy science classes find satellite projects inspiring, but these classes do not prevent the ‘‘flight from science’’ seen in rich countries, which is so dangerous for the successful continuation of civilisation.- However, the possibility of being able to travel to space themselves at an affordable price is of much greater interest to young people than watching videos of other people traveling to space, or than simulating traveling to space. Hence the start of low-cost passenger space travel services holds unique promise for education in fields related to space travel. In particular, the expectation that the price of a sub-orbital flight could fall as low as just a few thousand Euros [8,32] as the service grows to millions of passengers/year, offers the possibility of almost all children being able to take a flight sometime. This possibility can be used as a uniquely stimulating teaching tool. In addition, a scenario like that shown in Fig. 1 will employ tens of thousands of staff in orbit within a few decades—a uniquely exciting goal for young people to aim for.

# \*\*\*Aff Extensions\*\*\*

# A2 Squo Budget sovles

NASA’s new budget only provides funding for commercial transport to ISS

Medill Reports, 2/17/11

[“NASA budget flatlines, looks to commercial space industry,” BY CHELSEA WHYTE AND SARA J. MARTINEZ, FEB 17, 2011, Medill Reports is written and produced by graduate journalism students at Northwestern University’s Medill school. http://news.medill.northwestern.edu/chicago/news.aspx?id=178776]

NASA’s proposed 2012 budget lays the Space Shuttle to rest but leaves key robotic missions on target to study Mars and probe the Earth’s radiation belt. NASA’s $18.7 billion budget proposal for fiscal year 2012 holds the agency to the level of funding approved in 2010. “This budget requires us to live within our means so we can invest in our future,” NASA Administrator Charles Bolden said in a NASA statement. The agency has had to embrace this financial holding pattern by proposing to do less in the coming year in line with President Obama's five-year funding freeze. NASA will stop shuttling astronauts to the International Space Station after the Space Shuttle ends its 30-year run with three final missions this year. “NASA has contracted seats on Russian Soyuz capsules,” said Katherine Trinidad, a spokeswoman for NASA. “We will work with our Russian counterparts to ensure the safe transport of our astronauts to and from the International Space station until we have safe, reliable commercial vehicles.” The budget estimates the commercial space vehicles will be available by 2016. NASA is looking to the commercial market to develop low-cost options for crew travel to and from the space station and other future destinations. "It's a welcome change. It's just showing that private industry can do the job of designing and building a rocket faster and for less money," said Rod Burton, an aerospace engineer and professor emeritus at the University of Illinois at Urbana-Champaign. But Burton added that NASA has been lagging behind. "For the last 10 years, they've been short-changing not just university research but basic research and technology development," he said. The 2012 budget makes clear that the human space flight program must now rely on the commercial sector, which will be able to more nimbly provide affordable access to space. Federal grants will be awarded to innovators at U.S. universities and research centers to stimulate the aerospace industry.

# A2 OBSTACLES

Advances make obstacles irrelevant—our evidence assumes their warrants

**O’Neil et al 98** (Daniel, compiler at the Marshal Space Flight Center, February 19, Space News, “General Public Space Travel and Tourism - Volume 1 Executive Summary,” <http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Recommendations>)

Fortunately, critical advances have been made during the past decade in many of the technologies that can enable non-astronaut human space travel to become both technically and economically feasible, and more are foreseen. As a result, the potential exists for the creation, in the next very few decades, of a $10-20 billion... per year "general public space travel and tourism" business. Too, initial steps can be taken at the surface, then in the atmosphere and later in space so that early profitability and experience, and credibility-creating activities, can begin prior to full orbital trips and long-term stays there.

# A2 tech Barriers

No risk of tech failure – all evidence points to success

Collins, 03

[Invited speech to the AIAA/ICAS Symposium "The Next 100 Years" in honour of the Wright Brothers' First Flight, 17 July 2003, Dayton Ohio. “Space Tourism Market Demand and the Transportation Infrastructure” By Patrick Collins, Professor, Azabu University, Sagamihara City, Kanagawa, Japan, and a Collaborating Researcher with the Institute for Space & Astronautical Science, performed the first market research on space tourism in Japan in 1993, and in the USA in 1995 and is the co-founder of Space Future Consulting, in Space Future, <http://www.spacefuture.com/archive/space_tourism_market_demand_and_the_transportation_infrastructure.shtml>]

Very similar to the situation concerning demand, there is strikingly little information on the technical possibilities for passenger space travel, but all the information that does exist is positive. The lack of data is due to government space agencies -- never having commisioned a feasibility study of a dedicated passenger launch vehicle in more than 40 years.

In order to understand the potential it is perhaps useful first to dispel the remains of a very widespread myth -- that in order to provide space travel services a vehicle like the U.S. government's "space shuttle" is needed. From this it is commonly concluded that, since that vehicle costs about $100 million/ passenger/flight, space tourism is therefore a fantasy, or at least conceivable only in the far future after several more decades of government-funded space technology. The most important point to note is that the "space shuttle" was designed to military specifications; its hypothetical cost/passenger is therefore of no more relevance to space tourism than the cost of carrying passengers in a bomber aeroplane would have to commercial air travel. Hence the only relevant data are those relating specifically to dedicated passenger vehicle design studies. Over the past decade or more, a number of such studies have been published based on varying degrees of effort. However, they show consider-able consensus about the cost of developing a fully reusable passenger-carrying launch vehicle capable of repeated flights to and from low Earth orbit, with most estimates clustered around $10 billion.

# A2 Turns: Generic

You’re turns are wrong—the US has little to lose by removing ITAR regs

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

For the reasons set forth above, the U.S. government has little to fear and much to gain from easing the regulatory burdens on the space tourism industry by exempting the “passenger experience” from ITAR. The discretion that the DDTC has been granted in Section 126.3 allows the agency to adjust the application of ITAR in an appropriate manner to achieve the policy goals of maintaining security while also protecting the interest of the Unites States in supporting this new industry of private human spaceflight. The relaxation of ITAR in order to support the innovative and important ventures undertaken by the new space tourism industry is precisely the situation that Section 126.3 was intended to address.

# A2 turns: Prolif

Doesn’t lead to prolif—plan only exempts commercial enterprises

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

Whenever a company exports a spacecraft, a launch vehicle, or a satellite, the company is deemed under U.S. law to be engaged in the trafficking of arms and is therefore subject to the Arms Export Control Act (AECA) and the AECA’s implementing regulations, the International Traffic in Arms Regulations.8 It was not always the case that all space technology was treated as munitions under ITAR. In fact, it was only in 1999 that commercial satellite technology was shifted to the jurisdiction of the Department of State and subjected to ITAR.9 While certain space technology should unquestionably be subject to strict export controls in order to prevent the proliferation of dangerous weapons, such as technology related to ballistic missiles, it is often argued that technologies which have a commercial as well as a potential military application, so-called “dual use” items like communications satellites, should be controlled under the less onerous Export Administration Regulations (EAR) which are administered by the Department of Commerce (DOC).

Plan doesn’t lead to prolif—multiple reasons

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

The DDTC should also be confident that granting a “passenger experience” exemption to the space tourism companies would not result in the proliferation of the dangerous technologies that ITAR is designed to prevent. First of all, the spaceplanes that are currently under development are not in the same class of launch equipment that lofts satellites into orbit and can easily double as ballistic missiles. Although there may be some concern that these spaceplanes could deliver weapons to a target, the current state of spaceplane technology should eliminate any such concerns since the suborbital vehicles are not capable of point-topoint flight to any significant degree but return to their point of departure.65 Moreover, as mentioned above, the tourism equipment is not designed for military use and therefore does not come within the criteria for ITAR control set forth in Section 120.3.66 And not only is technology not of a type that should raise national security concerns, but the transmission of the “technical data” to space tourists is also of a nature that fails to warrant the application of export controls. Even if the Human Space Flight Regulations are interpreted broadly to require disclosure about every aspect of spacecraft safety and potential risks, it is highly unlikely that the information divulged to passengers (or the equipment that is visible to passengers) will entail the level of technological detail that is relevant to the construction and flight operation of the spaceplanes.

# A2 Turns: Safety

Their safety turns are exaggerate – the private sector will hold itself to high standards

Parsons, 2007

[Catherine E Parsons, Chapman Law Review, 2005-2006, JD Candidate, Chapman University School of Law, BS in Mathematics, “Space Tourism: Regulating Passage to the Happiest Place on Earth,” http://heinonline.org/HOL/Page?handle=hein.journals/chlr9&div=22&g\_sent=1&collection=journals]WZ

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

This claim is exaggerated. The industry has every incentive to hold itself to high safety standards in order to generate greater profit, and the Space Launch Act will also prevent any unscrupu- lous companies from overlooking safety entirely. In addition, the Space Launch Act does not mandate a fatality or even a serious injury before the government may step in: "[the FAA] may come in... [when] there is a risk."240 The AST has unlimited author- ity to regulate in order to protect third parties, and the Space Launch Act gave a clear eight year timetable for when that unlimited authority will extend to passengers.2 41

Even if they win it isn’t safe the public doesn’t care

Ryabinkin, 2004

[Charity Trelease, JD Candidate, Georgetown University Law Center, Journal of Air Law and Commerce, “Let there be flight: It’s time to reform the regulation of commercial space travel,” http://heinonline.org/HOL/Page?handle=hein.journals/jalc69&div=8&g\_sent=1&collection=journals]WZ

A recent USA Today/CNN/Gallup Poll captures the mercurial nature of American public perception and reveals an interesting twist. Though each disaster has resulted in vocal crit- icism of the Shuttle program, the poll indicates that American support for increasing NASA's budget actually increased after both Challenger and Columbia.94 Of those people polled in 2003, only 17 percent believed NASA spending should be de- creased, compared with 41 percent in 1993.15 In addition, only 17 percent of people polled said any Shuttle accident was unac- ceptable. 6 While such statistics are encouraging, the poll also suggests that America's support is qualified: when asked about other areas of spending, people overwhelmingly favored other programs over the space program.97

Various measures solve safety issues

Globus, 06

[“Contest-Driven Development of Orbital Tourist Vehicles,” a paper presented to NASA, by Al Globus, Senior Research Associate at San Jose State University Research Foundation and chairs the space settlement committee of the National Space Society, 2007, AIAA Space 2006, San Jose, California, September 2006. http://alglobus.net/NASAwork/papers/AIAASpace2006Contest.pdf]

There is a serious safety problem with the proposed prize system as described. Suppose a competitor hires desparate people to ride in unsafe ships? Some may be killed, but a proﬁt could still be realized on the successful ﬂights. Fortunately, theres a simple solution based on an old French law. Crawford Greenwalt, former President of Dupont, is quoted as saying ”My company has had a safety program for 150 years. The program was instituted as a result of a French law requiring an explosives manufacturer to live on the premises with his family.” In the same vein, we propose requiring at least one major investor, top executive, or senior engineer from the competitor be on each ﬂight. Also, any competitor suﬀering loss of life could be barred from further competition. Extreme measures are necessary since early fatalities could easily destroy the space tourism industry.

VI. Development Flights While awarding companies for ﬂying passengers directly addresses the core of problem, it places ﬁscal pressure on developers to put human beings in ﬂight earlier rather than later, which will tend to increase risky behavior. As noted above, a few early accidents that kill customers is very likely to sink the industry entirely. While other adventure travel, such as climbing Mt. Everest, is extremely dangerous and customers die frequently, the space tourist situation is psychologically quite diﬀerent. When climbing Mt. Everest it’s you against the mountain. The customer is actively engaged in the ﬁght for survival. Orbital tourists are unlikely, in the extreme, to pilot the vehicle. Rather, the customer waits in a small enclosed space to see if they will blow up or not. Thus, it is reasonable to assume that a much higher level of safety will be required. A reasonable target is the safety record of general aviation, which is about one catastrophic failure in 75,000 ﬂights. 15 Note that this is somewhat worse than the Shuttle’s unrealized goal of one loss-of-crew failure in 100,000 ﬂights. A mechanism to reward unmanned test ﬂights would reduce this pressure. One could give partial credit for ﬂying instrumented dummies the size and mass of a typical customer. Simple instrumentation to measure acceleration, pressure, temperature and so for could store data for later analysis to insure that the ’customer’ would have survived the ﬂight without excessive discomfort. It is desirable to limit the fraction of prize money that can be awarded for ﬂying dummies, so we propose that no more than one ﬂight per prize level per competitor be awarded a prize for ﬂying dummies. Furthermore, dummy ﬂight should not be as proﬁtable as ﬂying breathing passengers, so awards for dummy ﬂight may be limited to 1/2 or 1/4 of the amount awarded for human passengers.

# yes Demand

There is a wide demand fort spaceflights

Ziliotto, 2009

[Véronique, European Space Research and Technology Centre, “Relevance of the futron/zogby survey conclusions to the current space tourism industry,” Acta Astronautica, [http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XC3X36-3-5&\_cdi=5679&\_user=655954&\_pii=S0094576509004378&\_origin=search&\_zone=rslt\_list\_item&\_coverDate=07%2F31%2F2010&\_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V1N-4XC3X36-3-5&_cdi=5679&_user=655954&_pii=S0094576509004378&_origin=search&_zone=rslt_list_item&_coverDate=07%2F31%2F2010&_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/)]WZ

In September 2006 a new study using another metho- dology was published by Derek Webber of Spaceport

Associates and Jane Reifert of Incredible Adventures. They specifically researched the market of adventure tourism through an on-line survey on the web site of Incredible Adventures [4]. The 998 responses that were collected are not a representative sample of potential customers. It gives nevertheless useful hints about the perception of space activities among people who are the most likely to be interested in undertaking the experience, if space tourism is ever going to reach the masses: the ‘‘adventurers’’.

Only 14 percent of the respondents were millionaires and the prices of spaceflights were still considered as too high, with only 7 percent registering for suborbital at current price levels (US$100,000–US$200,000). Thirty six percent of the poll was interested in buying a suborbital spaceflight at a price of US$50,000 or below.

This tends to demonstrate the elasticity of the market and attenuates the importance of the ‘‘pioneering effect’’ in the customers’ motivations to buy a spaceflight. A majority of them were not ready to pay a premium price to fly on the inaugural flights and only 14 percent said they were driven by the desire to be pioneers. The majority (47 percent) planned to wait for the price to fall due to technological developments and 15 percent wanted to be assured of the safety of the spacecraft after some years of operation. In total, 62 percent were willing to wait for more affordable prices and safe proven flights.

The study uncovered several other aspects. Quite surprisingly, 70 percent of the respondents were not indifferent to the chosen spacecraft architecture in terms of take-off and landing preferences. The design adopted by Virgin Galactic (taking off with a spacecraft placed under a mother craft) was considered as half as much interesting than vertical or full horizontal take-off. Moreover, 53 percent asked for a horizontal landing on land. The favourite spacecraft configuration seems to be the most familiar one for most of the customers: a unique plane bringing the travellers all the way up to space like a commercial airline.

The choice of the location of the spaceport did not make a big difference to customers: this is coherent with the customer data released by Virgin Galactic that shows that customers come from more than 30 different countries. In the future, the choice of the spaceport will therefore depend less on national criteria than on the advantages of the location (aeronautic traffic manage- ment, landscapes, etc.).

Many would participate in a space lottery

Ziliotto, 2009

[Véronique, European Space Research and Technology Centre, “Relevance of the futron/zogby survey conclusions to the current space tourism industry,” Acta Astronautica, [http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XC3X36-3-5&\_cdi=5679&\_user=655954&\_pii=S0094576509004378&\_origin=search&\_zone=rslt\_list\_item&\_coverDate=07%2F31%2F2010&\_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V1N-4XC3X36-3-5&_cdi=5679&_user=655954&_pii=S0094576509004378&_origin=search&_zone=rslt_list_item&_coverDate=07%2F31%2F2010&_sk=999339988&wchp=dGLzVzb-zSkzk&md5=707c5c4d99c0379d4546b9c5dd3af8fc&ie=/)]WZ

New ways of funding a space trip have been also investigated. Spaceflight is still considered as too hazar- dous to allow corporate sponsorship but some 31 percent would pay US$100 or more for a lottery ticket to win an orbital spaceflight.

The time required for training should not be an issue for suborbital flights, as a two weeks training is acceptable to 69 percent of the population. The actual training time is more likely to be a couple of days.

The study also highlighted the huge gap between customers’ expectations in terms of space destinations, and what the industry currently has to offer. Regardless of price and availability, when asked which destination they favour, a travel around the Moon was the first choice (59 percent), followed by an orbital flight (47 percent).

# ECONOMY

Space travel is key to the economy—generates wealth, reduces cost, and creating demand

**Collins 91’** (Patrick, staff writer for Space News, “Benefits of Commercial Passenger Space Travel for Society,” <http://spacefuture.com/archive/benefits_of_commercial_passenger_space_travel_for_society.shtml>)

Inter-related with these social benefits will be a number of economic benefits. First, if passenger space travel is commercially profitable, it will of course have economic benefits by creating wealth. However, by promising to generate continually growing commercial traffic to orbit, passenger space travel offers something more that other space activities do not, namely to create launch operations on the scale needed to amortize fully reusable launch vehicle development costs and to reduce operating costs sharply. Reduced launch costs would in turn render feasible other socially beneficial activities in space that are currently too expensive and too uncertain to justify commercial investment. Most importantly this includes the SPS project, which is not yet considered a serious energy supply candidate by electricity companies, mainly due to the high cost of launch today. But at a launch cost of $100/kg (13000 �/kg), the "SPS 2000" LEO demonstrator project (13, 14) would be almost competitive on a capital cost basis with Earth-based electricity generation systems (though not in delivered energy cost due to the inevitably low utilization). Thus, creating the demand necessary to justify commercial, low-cost launch vehicle development will be an economically beneficial side-effect of passenger space travel. No other use of space has yet been proposed that offers a comparably realistic possibility of a commercial route to airline-type economies of scale in launch operations and costs.

Space travel is the most viable alternative—reduces costs, increases people in space, and makes other projects more attractive

**Collins 91’** (Patrick, staff writer for Space News, “Benefits of Commercial Passenger Space Travel for Society,” <http://spacefuture.com/archive/benefits_of_commercial_passenger_space_travel_for_society.shtml>)

The space industry suffers from very high launch costs. These were not critical while space activities were an arena for superpower competition. However, as this justification for government involvement in the space industry disappears, the industry's future depends on developing commercially self-supporting activities, which require much lower launch costs. Technically there are design approaches that offer the prospect of reducing launch costs sharply. However, in order to attract commercial investment it is also necessary to identify suitable markets in which demand for launches will grow rapidly as prices fall. Passenger space travel appears to offer the possibility of launch traffic rates several orders of magnitude greater than today. It could therefore lead to launch costs as low as 1% of today's, which would make short visits to low Earth orbit commercially available to a large proportion of the population of developed nations, bringing a range of social benefits. Such low launch costs would also have the benefit of making a range of projects attractive that are not feasible today. Foremost among these is the satellite power station project to supply energy from space to Earth. The consumer services market is different in many ways from the government and telecommunications markets that the space industry has supplied exclusively to date. Thus the initiation of commercial passenger space travel is a major challenge. However this development should be seen not as a threat to the space industry, but as an opportunity to evolve into a more normal commercial industry, independent of government, with a wide popular customer base, and with much wider horizons than today.

Space tourism has a huge demand and would generate 10s of billions per year

Ryabinkin, 2004

[Charity Trelease, JD Candidate, Georgetown University Law Center, Journal of Air Law and Commerce, “Let there be flight: It’s time to reform the regulation of commercial space travel,” http://heinonline.org/HOL/Page?handle=hein.journals/jalc69&div=8&g\_sent=1&collection=journals]WZ

The age of aviation opened up the world and created an in- dustry with huge economic rewards. Space tourism has similar potential. Tourism is arguably the world's largest industry,24 with global spending on travel estimated to have surpassed $4.3 trillion in 2000.25 In the U.S., the travel and tourism industry is a $584 billion business, representing 2.2 percent of the nation's

GDP in 1999.26 Tourism in space is simply the next logical ex- tension of a well-established and profitable industry. As stated by Buzz Aldrin in a recent article, "Space tourism is based upon a firm commercial foundation, being a natural evolutionary out- growth of the booming multi-billion-dollar adventure travel sec- tor of the multitrillion-dollar travel and tourism business. 27

Some estimate that space tourism could eventually generate from $10 billion to $20 billion per year.21 Market research dem- onstrates that space tourism is a popular aspiration of the major- ity of the population in rich countries, 29 and a recent NASA

survey confirms the huge potential market for space tourism.'o The current popularity of other space-related tourist activities heralds this potential. 1 More than ten million people each year visit space museums, space camps, rocket launch-recovery sites, and government space research and development centers, gen- erating approximately $1 billion in revenue per year. 2

# EDUCATION

Space tourism leads to a more educated populace

**Collins 91’** (Patrick, staff writer for Space News, “Benefits of Commercial Passenger Space Travel for Society,” <http://spacefuture.com/archive/benefits_of_commercial_passenger_space_travel_for_society.shtml>)

Another social benefit that can be anticipated will be educational. This arises from the "paradox" that as the world comes to depend increasingly on technology, there is a tendency for children in affluent countries to avoid studying the more difficult technical subjects in favour of easier, more fashionable subjects. Although this phenomenon is perhaps most advanced in Britain and the USA, it is becoming visible even in Japan which has hitherto been particularly successful in motivating people to study technology. The prospect of space travel seems attractive to the public, and particularly to children. Yet in order to understand space flight children need to understand a wide range of subjects in engineering, physics, chemistry, biology and other scientific fields. Thus it can be anticipated that the development of a vigorous space travel industry could help to make modern technological education an interesting and natural process, rather than one that is seen as unnecessary and boring.

# Get off the rock

Space Tourism key to unlock price improvements to access mass colonization and space expansion

Globus, 08

[Space Tourism Leads to Space Settlement,” by Al Globus, Senior Research Associate at San Jose State University Research Foundation and chairs the space settlement committee of the National Space Society, Fri, Aug 1, 2008, National Space Society, http://www.nss.org/tourism/settlement.htm]

Space tourism is a reality. Four tourists have traveled to the International Space Station (ISS) at their own expense and at least four companies are developing sub-orbital tourist vehicles (Virgin Galactic, Space Adventures, Rocketplane Kistler, and Blue Origin). Not only does space tourism extend the freedom to travel into space for those with the means, it promises a profitable market to develop the launch vehicles necessary to expand life throughout the solar system. Space tourism may solve the single most difficult problem holding up space settlement: safe and inexpensive transportation from the surface of the Earth to Low Earth Orbit.

Present launch capabilities, while sufficient for communications, remote sensing, some space science and limited manned operations, are grossly inadequate for large scale space settlement. By space settlement we mean very large numbers of people living in giant orbital spacecraft, on the Moon, on Mars and/or within large asteroids. Space settlement could provides humanity with hundreds of times more living area, thousands of time more physical resources, and millions of times more energy [1, 2] than is presently at our disposal. Such a vast expansion of the resources available to human civilization would eliminate the need, although perhaps not the practice, of resource-driven war. Such warfare kills and maims large numbers of people and destroys their work. Substantially better launch capacity is a necessary precursor to space settlement, but progress over the last 50 years has been disappointing. Space tourism may change that.

Over the last 50 years a wide variety of launchers have been developed, up to and including the U.S. Space Shuttle, the most capable space vehicle to date. However, in spite of decades of development, Earth-to-Orbit transportation costs thousands of dollars per kilogram and suffers a catastrophic failure rate of a one or two percent. Worse, these figures have not improved with time. For example, the Saturn V was developed in the 1960’s to put men on the Moon. This vehicle cost less, measured in man-hours per ton to LEO (Low Earth Orbit), than today’s major launch vehicles [3]. Furthermore, the Saturn never suffered a catastrophic failure, although there were many close calls. By contrast, current shuttle costs run between $500-1,000 million per flight to deliver, at most, a few tens of tons of payload to the International Space Station, and the shuttle has suffered two catastrophic failures in just over a hundred flights.

Aircraft developed much more rapidly in their first 50 years. This may be because hundreds of thousands, if not millions, of flights occurred in that period, but we have only launched a few thousand payloads into space. Substantial launch vehicle improvement may require tens of thousands of launches per year, not the current 50-70 [4]. Unfortunately, current markets for space launch: communications, Earth-observing, science, national prestige, etc. cannot support hundreds of launches per year, let alone tens of thousands. However, a new space market has recently been created: Space Adventures, Ltd. and the Russian space program have flown four tourists to the ISS, reputedly for about $20 million apiece. Although the ISS was originally intended to serve a host of space applications, it has not yet done so for a variety of reasons. Space tourism may be the legacy of the ISS, and it could be a very good one indeed.

The only market for humans-in-space potentially capable of sustaining thousands of flights per year is tourism, if the cost is in the $100,000 range or less. If the price is in the $10,000 range, millions of flights can be supported. Published market research suggests that the space tourism market may become very large if the price is right. In 1994, Patrick Colins, et al. [5] found that the Japanese market could provide about one million customers per year for space flight at about $10,000 per passenger. In 1996, Sven Abitzsch [6] found that approximately 20% of the U.S., Canadian and German populations and nearly 40% of the Japanese population would be will to pay over $10,000 (actually, six months salary) for a trip into space. This represents nearly a hundred million people. In 1999, Oily Barrett [7] found that 12% of United Kingdom residents, representing 3.5 million people, said they were willing to pay over $10,000 for a trip to space. In 2001, Crouch [8] surveyed the literature and found that the global space tourism market is a strong function of price, with an annual demand of five million per year at $10,000 per flight and 170 at $500,00 per flight, representing annual markets of $5 billion and $85 million respectively. Table 1 shows Crouch’s demand vs. price per ticket. If these projections are optimistic by no more than a factor of ten, and the price per ticket can be brought down sufficiently, there is good reason to believe space tourism can support tens of thousands of launches per year or more, a rate comparable to the early decades of aviation. price/ticket (1994 $) passengers/year $1,000 20 million $10,000 5 million $100,000 400 thousand $250,000 1,000 $500,000 170 Table 1. Projected demand for orbital tourism as a function of price [8].

All human-capable orbital vehicles to date have been developed as national projects by the U.S., Russia/USSR, and China. For sub-orbital vehicles the picture is quite different. Spurred by the $10 million Ansari X-Prize, a change in the way launch development was rewarded, Scaled Composites, LLC built and flew SpaceShipOne into space twice in as many weeks in 2004. Interestingly, these were the only U.S. manned space flights that year as the Shuttle was grounded after a fatal accident in 2003. While Scaled Composites reportedly spent considerably more than the purse to win, other commercial deals involving advertising and technology sales netted a small profit [9]. As a direct result, Scaled is now developing SpaceShipTwo for Virgin Galactic. Virgin Galactic is building a space port in New Mexico and intends to fly tourists into space for two hundred thousand dollars per trip within a few years. Furthermore, Virgin has serious competitors.

Space tourism may lead to large numbers of people traveling to space in the next few decades. Burt Rutan, the technical genius behind SpaceShipOne, made a prediction in a 2004 talk in San Jose, CA: Within 5 years 3,000 tourists will have been to space. Within 15 years sub-orbital tourism will be affordable, and 50,000 people will have flown. Within 15 years the first, expensive orbital tourist flights will have happened. Within 25 years orbital tourism will be affordable.

Space settlement has tremendous potential benefits for mankind but requires a much more robust and inexpensive launch capacity than is available today. Traditional approaches to improving launch have failed to deliver a sufficiently capable system over the last few decades and shows little promise of doing so. **To address this issue, we propose orienting launch development towards the tourist market, which, at the right price, is large enough to support tens of thousands of flights per year**. Just as computers once cost millions of dollars and were only available to the few, space tourism today is the province of the wealthy. However, as the cost of computers plunged, they have become part of everyday life for the world’s middle-class. Space tourism promises to do something similar for personal space flight. Just as one day millions of years ago life, for whatever reason, crawled out of the oceans and onto dry land, space tourism may well begin the spread of life throughout our solar system.

# Overview effect

Removing barriers to passenger space travel will allow access to the overview effect

Sherwood, 11

[“Comparing future options for human space ﬂight,” by Brent Sherwood, NASA Jet Propulsion Laboratory, in Acta Astronautics 69, 2011, Elsevier publishers]

The second option is quite different: Space Passenger Travel. This option does not mean governments ﬂying passengers in space; rather it means focusing government HSF investment to develop technologies and remove barriers to accelerate the success and growth of a new, commercial space passenger travel industry. The precedent is NASA’s own predecessor, NACA, the National Advisory Committee for Aeronautics founded in 1915. Formed as an urgent war-time effort, the NACA went on to conduct the fundamental airfoil and other research that still underpins today’s commercial jet industry and modern supersonic ﬁghters. The core purpose of the Space Passenger Travel option would be to open space travel to ordinary people, thereby creating new travel-related industries to conduct and support it. Another expected outcome would be exposing large numbers of people to the Overview Effect: a perceptual shift documented to happen to space travelers, which deepens their appreciation for the unitary, fragile nature of Earth [14]. The Overview Effect is hypothesized to be caused by looking at Earth ‘‘from outside’’ while experiencing the detached sensation of microgravity. It tends to sensitize travelers to the planetary impacts of human territoriality and environmental destruction, and to deepen spiritual convictions. It is conceivable that large numbers of people experiencing this shift could begin to affect societal views through media and other memespreading communications. Such an outcome would be a legacy in the fourth column if unintended, or a ‘‘purpose’’ in the second column if used as a rationale. Increasingly affordable and accessible space travel could be a transformational contribution to humankind’s 21st century, more real than watching astronauts on TV. The core myth for this HSF option is the ‘‘Jet Set,’’ a theme arising in the mid-20th century that connotes the freedom, privilege, and transnational detachment of global travel embodied today by celebrity entrepreneurs like Richard Branson. While triggered by the commercial jet travel enabled by WW-II technology the Jet Set myth has roots as far back as the early-20th century Art Deco and International Style industrial design and architecture movements, which grew in response to early aviation speeds and materials. For a new myth it is remarkably pervasive: The Jetsons, a middle-class American family animated into a world of robots, ﬂying cars, and lunar vacations, and the Orbiter Hilton in 2001: A Space Odyssey depict instantly recognizable, resonant examples from the 1960s. Jet-setters, and the vast populations who admire and emulate them, tend to imagine that ﬂying into Earth orbit, or to the Moon, is something they will be able to do someday, and this aspiration makes the myth. An HSF program focused on accelerating Space Passenger Travel would actively, consciously promote the Jet Set myth. We know this HSF option is real because even without signiﬁcant government attention, sub-orbital tourism and orbital habitat development have attracted private investment. Against all odds, some entrepreneurs—Bigelow, Rutan, Branson, Musk, and others—are creating a ﬂedgling space tourism industry and there probably is a business case. A trip that couples the ride of your life with the unique sensations of weightlessness and the most poignant, ever-changing view in the solar system ﬁts our contemporary ‘‘experience economy.’’ Former B. Sherwood / Acta Astronautica 69 (2011) 346–353 349NASA Administrator Dan Goldin used to pound on the podium and declare, ‘‘Space tourism is not my job!’’ However there is no fundamental reason why it could not be; NASA’s HSF charter could be directed to accelerate Space Passenger Travel. The expected legacy of this HSF option would be as epochal as Explore Mars, but in quite different ways: (1) routine ﬂights between Earth and orbit on

competing spaceship ﬂeets; (2) in-space destinations with accommodations likely ranging from budget-utilitarian to highend resort; (3) in-space service industries, including dining, shopping, recreation and entertainment, medical care, and maintenance; (4) government space professionals would travel into orbit along with private passengers as they do today on commercial jets, and stay at commercial hotels while they work in orbit. A ﬁfth Another orbital passenger travel legacy (or again, it could be a driving purpose) would be half-orbit intercontinental travel, e.g., London-to-Sydney in less than an hour. However to accomplish this, the Space Passenger Travel option needs several breakthroughs exceeding the capacity of private enterprise without government help. (1) Earth-to-orbit transportation would have to be fully reusable for the commercial business case, and be reliable far beyond anything achieved so far by the world’s space programs. Paying passengers are not heroes; risk would be acceptable only in the same way it already is for air travel, e.g., with ‘‘four nines’’ or greater reliability. (2) A variety of unprecedented space-system technologies could become essential: large-volume habitats, very large windows, berthing mechanisms capable of thousands of cycles, fresh food production, air and solid-waste lifesupport loop closure, space surgery, rotating artiﬁcial gravity, sports, and public entertainment. (3) Targeting government research toward accelerating this new industry would require public–private partnerships like research consortia, port authorities, and company towns. (4) Not the least, the long-term radiation health of commercial crew corps and space workers would need to be managed, and they would need certiﬁcation. At a reasonable state of maturity (after 30 years of cumulative public–private investment?) the Space Passenger Travel option could achieve a continuous throughput of hundreds of thousands of citizens ﬂying in space per year, supported by thousands of professional crew and in-space workers (at typical terrestrial ratios, the latter would reach tens of thousands). Its historical signiﬁcance would be more subtle than the Explore Mars option: rather than historical headlines, an imperceptible but irreversible societal evolution.

# \*\*\*DA\*\*\*

# Politics Linkout

DDTC shields the link—ensures no political backlash

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

The highly factionalized political environment in the age of terror make it virtually impossible for a politician to propose a relaxation of regulations on arms trade – even if there are legitimate reasons for easing burdens on commercial space companies.70 Any politician that recommends relaxing controls on the arms trafficking regulations (even if they are really only talking about the exemption of purely commercial technology) would likely open themselves to immediate political attacks for being soft on national defense.71 In this political climate, the legislature and the President are paralyzed. Unable to propose the changes to ITAR that are necessary, the only hope lies with the DDTC which has the discretion to suspend the regulations when necessary. The use of administrative discretion to solve the problem of political paralysis in the age of terror, party factionalism, and divided government strikes a chord that is similar to the “public choice” theory in administrative law which, as enunciated in Richard Pierce’s treatise on administrative law, states that politicians prefer to allow administrative agencies to make controversial policy decisions rather than make a decision that may alienate a segment of voters and thus place the politicians political career in jeopardy.72 Although the reality of political paralysis is an unfortunate development that signals a failure of our democracy, it has illustrated how, when the traditional constitutional organs of government are paralyzed by politics or are otherwise dysfunctional, administrative agencies can step in and shape the law in a reasonable manner in accordance with their discretionary powers.

# Politics Link Turn

Plan is popular—improving the spaceflight industry is not politically contentious

**Sundahl 2010** (Mark J., professor of International Business Transactions, Commercial Law, and Space Law at Cleveland State University, March, "Space Tourism and Export Controls: A Prayer for Relief,” <http://works.bepress.com/mark_sundahl/1>) JR

This reliance on the authority and discretion of the DDTC to ease the ITAR regulations in a reasonable manner to permit for the successful operation of the new human spaceflight industry seems, given the current political climate, to be a more realistic alternative to the revision of the USML at the President’s direction to exclude commercial space technology. By giving the DDTC officers an opportunity to tailor the application of the existing regulations in a reasonable manner, the burden of ITAR on commercial space enterprises could be reduced significantly. However, since a CJ request only affects the operations of the requesting company, broad relief across the industry would require each of the space companies to file their own request. This task could be made easier if companies would share their CJ requests in order to enable other to submit similar requests. This would obviously require the sharing of valuable information with competitors – but would be done in order to achieve the greater goal of improving the competitiveness and viability of the spaceflight industry as a whole. If the DDTC did issued a series of ruling suspending the application of ITAR with respect to the “passenger experience,” it would pave the way for a formal revision of the USML to exempt this aspect of the spaceflight company operations. For once the Section 126.3 exemptions are granted and the spaceflight industry proves itself to be an important and viable industry, the suggestion to formalize the exemption in a revision of the USML should entail less political controversy.

# A2 Tradeoff

No Internal Link and Link Turn - Plan requires less than 5% of the budget, and generates revenue over the long term

Collins, 03

[Invited speech to the AIAA/ICAS Symposium "The Next 100 Years" in honour of the Wright Brothers' First Flight, 17 July 2003, Dayton Ohio. “Space Tourism Market Demand and the Transportation Infrastructure” By Patrick Collins, Professor, Azabu University, Sagamihara City, Kanagawa, Japan, and a Collaborating Researcher with the Institute for Space & Astronautical Science, performed the first market research on space tourism in Japan in 1993, and in the USA in 1995 and is the co-founder of Space Future Consulting, in Space Future, <http://www.spacefuture.com/archive/space_tourism_market_demand_and_the_transportation_infrastructure.shtml>]

What is perhaps most striking about these figures is that even the largest is less than one year of G7 space agencies' current spending on non-science activities -- which have little economic value in terms of generating commercial space revenues. Thus such an investment could be funded by using about 5% of space agencies' annual budgets over a decade, which would clearly not be a significant burden to taxpayers. Indeed, if planned government space projects' funding were reduced by 5%, and their timetables extended a little, the vast majority of the general public would not even be aware of the change -- but at the end of the period, space activities would enter a new era with the start of low-cost, reliable access to orbit.

If the actual cost of developing the transportation infrastructure required for passenger space travel was even ten times higher, this would be only of the same order of magnitude as the international space station ( ISS), which has little measurable economic value (particularly since its future depends on an unreliable transportation system). Consequently developing a passenger vehicle would be greatly preferable. How best to achieve the desired result organisationally is a different issue discussed further below. The estimated time-table to reach initial passenger service is about 10 years, if the resources were provided without interruptions. In that case the transportation infrastructure in 2030 might look like Figure 3. First published in 1999 [28], this scenario has lost 4 years at time of writing, but it could probably still be achieved if sufficient investment was started in the near future. Its value would be some $1 trillion greater than continuing government space activities as they are today, as discussed further in [3].

The range of on-orbit infrastructure would be determined primarily by the requirements of daily life of members of the general public living in a zero-gravity environment [29]. This would have great economic value through the flowering of new business opportunities in every sector of economic activity, in contrast to the minimal effect of traditional space agency activities.

Hence Figure 3 can be seen as a step on the way towards the $1 trillion/year scale of activity which might be expected from the scale of public investment made to date. In the present depressed state of the world economy, including particularly the aerospace industry, such activity is economically very desirable. Furthermore, it is the only way of achieving commensurate economic benefit for taxpayers from the public investment in developing space capabilities to date.

Only a risk of the turn – plan trades off with wasteful and undemocratic space policies, which solves the root cause of economic decline

Collins, 03

[Invited speech to the AIAA/ICAS Symposium "The Next 100 Years" in honour of the Wright Brothers' First Flight, 17 July 2003, Dayton Ohio. “Space Tourism Market Demand and the Transportation Infrastructure” By Patrick Collins, Professor, Azabu University, Sagamihara City, Kanagawa, Japan, and a Collaborating Researcher with the Institute for Space & Astronautical Science, performed the first market research on space tourism in Japan in 1993, and in the USA in 1995 and is the co-founder of Space Future Consulting, in Space Future, <http://www.spacefuture.com/archive/space_tourism_market_demand_and_the_transportation_infrastructure.shtml>]

As described in Section 3.1 above, the development of passenger space travel services is economically very desirable. As a corollary, delaying this development represents a very large economic cost to taxpayers, which can be considered as comprising four components, namely the direct cost of $1 trillion to date plus $20 billion/year spent on non-science space activities with little economic value, and the economic, social and macro-economic costs of the lost potential value of new economic activities, as discussed further in [40]. In the following we consider the economic cost of not benefiting from the commercial space activities that could have been generated. In addition to space agencies' investment of $1 trillion over recent decades, G7 governments have spent some $2 trillion on nuclear power and ten times this on economically unproductive military activities. Using these funds for political purposes instead of for taxpayers' economic benefit hinders the innovation which is vital for the continuation of economic growth. These three fields also employ a very significant fraction of all engineers; employing these highly skilled people in economically unprofitable work greatly reduces the economic value of technological progress -- to the point that it becomes a threat to the stability of the economic system. Each individual decision to use taxpayers' money for purposes other than to create wealth by developing services for which there is potential demand, is made in the belief that there will always be another year's budget from the "golden goose" of government. Collectively, however, these economically damaging decisions have nearly killed the golden goose, by gradually choking off the possibilities for growth. These cumulative wasteful actions have contributed greatly to the present situation of spiralling government debts, collapsing corporate profits, and ever-rising unemployment -- in the USA as well as in Japan, and elsewhere. Indeed, this cost has now reached such a scale that it is causing serious dislocation of not only the US economy but the world economy as a whole, which is in serious distress due to excess capacity in many older industries and lack of new industries, leading to the highest level of unemployment for decades in almost every country today [3]. G7 space agencies have contributed their share to this problem, by adding to taxpayers' debt burden by $20 billion/year while refusing, year after year after year, even to study the possibility of developing a new service that the public are known to want to buy. The potential being wasted in this way is illustrated in the following fictional analogy: "After the invention of the camera, government established the National Camera Science & Applications Administration (NACSAA) which grew rapidly to employ many thousands of researchers developing camera technology. Highly trained "cameranauts" used the resulting government cameras, which cost many millions each, to take photographs of specially chosen subjects "for the benefit of the people". NACSAA prepared voluminous educational materials describing NACSAA's history and activities, and urged members of the general public to take more interest in camera technology. The possibility of developing cheaper cameras as consumer products was said by the leaders of NACSAA and the "camera industry" to require decades more government-funded technology development. Surveys showing a widespread wish among ordinary people to use cameras and own photographs themselves were publicly criticised as "unpatriotic", and said to show lack of respect for NACSAA history and for NACSAA's "cameranaut heroes". However, in response, NACSAA started a Photographic Commercialisation Initiative (PCI) which provided a range of new services to the public, including discount sales of government photographs, rental of government cameras to selected members of the public who underwent training at NACSAA in "non-cameranautic photography", and a traveling exhibition to widen access to NACSAA photographs and NACSAA history....." It is clear that, in such a hypothetical situation, the existence of NACSAA and its political and economic interest group would have created enormous resistance to the development of a genuinely commercial, consumer-oriented camera and photographic industry. This would have imposed a very large economic cost on the public due to not having the benefits of the innovations that have in reality arisen in the absence of NACSAA's repressive influence. In order to appreciate the scale of this "invisible cost", we need only consider the century-long, true "gale of creative destruction" that has in fact been brought about successively by the invention, development and commercialisation of cinematography, colour photography, instant photography, photo-copiers, fax systems, television, video, high-speed photography, Schlieren photography, X-ray photography, holography, IMAX, cineplexes, laser discs, laser printing, disposable cameras, video-conferencing, digital cameras, digital film standards, Internet graphic protocols, computer graphics, data compression algorithms, DVDs, colour faxes, mobile-phone cameras, video e-mail, and many other actual developments in imaging technology, many of which have already gone through several generations of technology. All of this astounding creativity, which has had enormous economic value and created millions of well-paid jobs, is driven by demand from the general public, from the "mere consumers" whom NACSAA -- and government space agencies -- spurn. The growth of passenger space travel, which is finally being grudgingly recognised as the only activity which can energise the stagnating space industry, through the power of consumer demand, can surely be expected to generate at least as great a profusion of innovative and profitable new activities as photography. That is, Figure 3 barely scratches the surface of what will be done by private citizens once they have access to space. It is important to recognise also that the cost of not benefiting from innovation would have been invisible to those living in the world of NACSAA, and the existence of such a cost would have been vociferously denied by the leaders and political supporters of NACSAA, who would have been eloquent in their praise of its wealth of accumulated experience, the excellence of its staff, the importance of its historic achievement, and so on. Like the hypothetical NACSAA, G7 space agencies' use of US$1 trillion over 45 years -- without having improved on the access to space provided by the Soyuz launch vehicle -- represents an extreme misallocation of taxpayers' money. The fact that, during the first four decades of their history, the agencies never even investigated whether the taxpayers for whom they supposedly work would like to visit space, further illustrates how far space agencies are from being "servants of the people": They do not even want to know what the public wants -- precisely as Niskanen describes [2] In the Wright brothers' centenary year it is time to face the fact that, as presently constituted, government space agencies are not only not capable of developing space economically, they are actively preventing it from happening. They do this by spending hugely on activities that have minimal economic value, while confusing the public about what is worth doing in space, and obscuring the truth about the enormous economic potential of developing passenger space travel [3]. Unlike government expenditure on nuclear power and military activities, the development of space technology has created capabilities which have the potential to contribute greatly to economic growth by supplying a wealth of popular new consumer services. It is therefore economically very desirable to redirect government space activities so as to achieve greater economic benefit from the technological capabilities developed to date by supplying passenger space travel services.

# \*\*\*K\*\*\*

# Cap K Linkouts

Passenger space travel avoids the impacts of capitalist consumerism by enriching customers and opening a future “open world” economy

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

Passenger space travel and its numerous spinoff activities have the important potential to escape the limitations of the ‘‘consumerism’’ which governments in the rich countries have encouraged in recent decades in order to stimulate economic growth, defined as GDP.

Researchers now understand that this is resulting in ‘‘excess consumption’’ which causes unnecessary environ- mental damage [30], while reducing rather than increas- ing popular satisfaction [31]. That is, ‘‘first world’’ citizens are increasingly trapped in a culturally impoverished ‘‘consumer’’ lifestyle which reduces social capital, social cohesion and happiness, while damaging the environ- ment. By contrast, expenditure on the unique experience of space travel promises to play a more positive role in the economy and society, enriching customers culturally without requiring mass production of consumer goods and corresponding pollution. As such it could be a harbinger of a future ‘‘open world’’ economy [27].

Commercial space tourism would generate a new renaissance to eliminate the most negative effects of the capitalist system

Collins and Autino, 2009

[Patrick Collins, economics professor at Azabu University in Japan specialist in space economics, tourism, reusable launch vehicles, and SSP, co founder of Space Future Consulting. Adriano Autino, founder of Andromeda Inc., Italy. Acta Astronautica, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture, and world peace,” http://www.sciencedirect.com/science?\_ob=MImg&\_imagekey=B6V1N-4XG3D5J-1-3&\_cdi=5679&\_user=655954&\_pii=S0094576509004512&\_origin=&\_coverDate=07%2F31%2F2010&\_sk=999339988&view=c&wchp=dGLzVlz-zSkzS&\_valck=1&md5=626854edf87d271fcb65ca489e551f30&ie=/sdarticle.pdf]WZ

6.1. The need for a new world-wide renaissance

By contrast, as societies became richer over the following centuries, they were increasingly disfigured by becoming more materialistic, a trend accompanied by more and more destructive and barbarous wars, including the horrific ‘‘world wars’’ and communist revolutions. This trend has continued with the recent shocking decline in ethics of the US and UK governments openly flouting national and international law—and even the Geneva Conventions, once seen as a bulwark of European civilisa- tion by making war less inhumane through banning torture and the killing of civilians, inter alia.

The way of thinking of Renaissance leaders was strikingly different from today when the wealthy are encouraged to follow the rubric: ‘‘If you’ve got it, flaunt it’’, or appear to follow the frankly psychopathic: ‘‘Everything for us—and nothing for anyone else.’’ In the USA since 2000, ‘‘yall of the real gains in national income, total net worth and overall growth in financial worth have gone to the top 1%’’ [34]. The result of this is that the gap between rich and poor has widened sharply so that the top 1% of the US population now holds more than twice as much wealth as the bottom 80% of the population [34].

The futility of such behaviour is well-known through- out the ages, as expressed in such sayings as: ‘‘You cannot take it with you when you die,’’ or ‘‘There are no pockets in a shroud’’. The great universalist religions of Buddhism, Christianity and Islam are in agreement that material wealth is transient and acquisitiveness is not the path to happiness: to the contrary, having gratitude for good fortune, and making efforts to help others less fortunate than oneself are extolled. The reason why these teachings have lasted for millenia is because they help people to live satisfying lives, to raise healthy children, and to maintain stable, resilient societies. They are the basis of true civilisation.

Thus, while societies have grown far richer since the Renaissance, the way of thinking of the rich today seems far poorer. Despite almost unlimited opportunities for creativity and cultural contribution, most of the rich today leave behind little or nothing that will be remembered. They typically use their money to buy large numbers of

possessions, which are redistributed on their death. Of course many people, including the wealthy, give gener- ously to charitable organisations, many of which do very valuable work for numerous socially beneficial causes. However, much of this work does little more than offset some of the worst effects of the policies followed by the rich countries which are in fact rapidly widening the gap between rich and poor.

We can judge this behaviour. The great universalist religions as well as secular humanism would agree: the great benefactors of the Renaissance were more admirable human beings. Unless corrected soon, this futile materi- alism of ‘‘modern’’ societies seems likely to destroy civilisation. Yet under ‘‘neo-liberal’’ or ‘‘neo-con’’ dogma, instead of using the opportunity provided by wealth to contribute culturally to society, the already rich nowadays exert pressure on governments to reduce their taxes further, to remove remaining restraints on monopolies and illegal surveillance of the general public, while falsely blaming already deteriorating welfare systems for govern- ments’ fiscal crisis. The lack of new industries described above weakens governments against such pressures via the threat of increased unemployment, which is electo- rally unpopular. Such psychopathic greed and dishonesty among the upper levels of a society are surely the prelude to its destruction, and represent the most serious challenge to western civilisation. A new world-wide ‘‘Renaissance’’ is urgently needed, especially among the rich of the world.

6.2. ‘‘The Earth is not sick—she’s pregnant’’

Healthy societies can revitalise themselves. An inter- esting explanation of the potential of space travel and its offshoots to revitalise human civilisation is expressed in the idea that ‘‘The Earth is not sick: she’s pregnant’’ [35]. Although this idea may seem strange at first sight, it is a surprisingly useful analogy for understanding humans’ current predicament. According to the ‘‘Pregnant Earth’’ analogy, the darkening prospect before humanity is due to humans’ terrestrial civilisation being ‘‘pregnant’’—and indeed dangerously overdue—with an extra-terrestrial offspring. Once humans’ space civilisation is safely born, the current stresses on the mother civilisation will be cured, and the new life may eventually even surpass it’s parent. This idea not only illuminates many aspects of humans’ present problems described above, it also provides detailed directions for how to solve these problems, and explains convincingly how successfully aiding this birth will lead to a far better condition than before the pregnancy. A young couple may be happy in each other’s company, but their joy is increased by the birth of children and life with them, from which many new possibilities arise.

Likewise, the birth of humans’ coming extra-terrestrial civilisation will lead to a wide range of activities outside our planet’s precious ecosystem. This evolution will solve not just our material problems, by making the vast resources of near-Earth space accessible, but it will also help to cure the emptiness of so-called ‘‘modern’’

commercial culture—including the ‘‘dumbing down’’ by monopolistic media, the falling educational standards, passification by television, obesity, ever-growing con- sumption of alcohol, decline in public morality, porno- graphy, narcotics, falling social capital, rising divorce rates, and youths’ lack of challenge and lack of ‘‘dreams’’. It will do this by raising humans’ sights to the stars, and showing that the door to them is unlocked, and has been for decades—we have only to make a small effort to push it open forever.

In addition, re-opening a true geographical frontier, with all its challenges, will in itself be of inestimable value for the cultural growth of modern civilisation. The wide- spread sense that we live in a closed world which is getting more and more crowded will be replaced by an open-ended, optimistic vision of an unlimited future. Access to the cornucopia of space resources that await humans’ exploitation can clearly make a unique contribu- tion to this. To the extent that leaders of major industries are motivated by ambition in business competition, they will welcome this opportunity to extend their activities to new fields in the far wider arena of space. However, to the extent that they are motivated by the attempt to achieve monopolistic control and profits, they may try to hinder development in space, even at the cost of preventing its wide benefits, since this could be more profitable to them. Implementing the ‘‘Pregnant Earth’’ agenda can prevent this cultural regression and start a true world-wide Renaissance, an unprecedented flowering of civilisation of which human culture has been in need ever since the inspiration of the Italian Renaissance was followed by a decline into progressive materialism and war-mongering [35].

In pursuit of this goal, a growing number of space- related organisations are joining the Space Renaissance Initiative’’ [36] started by the authors in June 2008. This has a programme to accelerate the expansion of human activities into space by advocating investment to specifi- cally reduce the cost of space travel. That is, supporters recognise that space activities could contribute far more to economic growth than they have to date if even a small fraction of annual funding of space activities was targeted at making access to space much cheaper. At a time when the world economy is in the worst state it has been for more than half a century, the possibility of creating large numbers of jobs in commercially profitable, space-related work is very attractive, and should receive the attention of policy-makers world-wide.

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Private companies can’t solve—govt funding is key

**O’Neil et al 98** (Daniel, compiler at the Marshal Space Flight Center, February 19, Space News, “General Public Space Travel and Tourism - Volume 1 Executive Summary,” <http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Recommendations>)

U.S. private sector business revenues in the space information area now approximate $10 billion per year, and are increasing rapidly. Not so in the human spaceflight area. After spending $100s of billions (1998 dollars) in public funds thereon, and continuing to spend over $5 billion per year, the government is still the only customer for human spaceflight goods and services.

US is key—technology and Intel

**O’Neil et al 98** (Daniel, compiler at the Marshal Space Flight Center, February 19, Space News, “General Public Space Travel and Tourism - Volume 1 Executive Summary,” <http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Recommendations>)

In recent years professional space tourism studies have been conducted in the United Kingdom, Germany and, especially, Japan. In the U.S., technological progress has been pronounced; we have had nearly a decade's experience in seeing our astronauts travel to-from low Earth orbit safely, and we expect to commence assembly of a LEO space station housing a half-dozen people this year. Too, NASA and our space industry now have new and promising space transportation development programs underway, especially the X-33 and X-34 programs, and some related, further generation, basic technology development programs. And five private companies are also working on the design of new surface - LEO vehicles. The first professional space tourism market studies have been conducted in several countries in the past few years, especially in Japan and here. The U.S. study makes it clear that, conceptually, tens of millions of us would like to take a trip to space if we could do so with reasonable safety, comfort and reliability, and at an acceptable price. Initial businesses will address the desires of those willing to pay a greater price and accept a greater risk.

Perm solves for privatization—cooperation is key

**O’Neil et al 98** (Daniel, compiler at the Marshal Space Flight Center, February 19, Space News, “General Public Space Travel and Tourism - Volume 1 Executive Summary,” <http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Recommendations>)

The study also makes specific suggestions about how our Federal government, particularly the Departments of Commerce and Transportation, and the National Aeronautics and Space Administration, should cooperate with each other and with private sector aerospace and travel and tourism business interests to hasten the creation of a sound and potentially very large space-related business. They could do so by supporting both terrestrial and space tourism merchandising; by developing early and appropriately beneficial vehicle, hotel and space trip regulation; by seeing the best use made of our human spaceflight assets -- our professional astronaut corps, the Shuttle fleet and the International Space Station; by seeing our space leaders consider taking trips to space themselves; and by supporting research and development activities designed to increase the safety, reliability and comfort of general public passenger-carrying space trips -- both in vehicles and orbiting hotels -- and to reduce the cost per passenger -- all by several factors of ten.

Perm solves spending—NASA and the private sector working together decreases costs

**O’Neil et al 98** (Daniel, compiler at the Marshal Space Flight Center, February 19, Space News, “General Public Space Travel and Tourism - Volume 1 Executive Summary,” <http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Recommendations>)

The U.S. government is committed to working cooperatively with private space transportation interests to drive down today's Shuttle costs of hundreds of millions each trip with the anticipation that, with new kinds of vehicles, this cost could be lowered to tens of millions. This translates into lowering the per person trip cost from hundreds of thousands of dollars using today's technology to tens of thousands of dollars when next generation technology becomes available, airline-like operations are adopted and very large markets are served. In parallel, safety and reliability will increase by several factors of ten. And we will begin to learn how to acquire and operate safe permanent housing for people in space with the International Space Station program.

# \*\*\*Other Potential mechanisms\*\*\*

# Nasa Funding

NASA funding empirically key to spur private innovation

Space Review, 10

[“Space tourism and space policy,” by Jeff Foust, editor and publisher of The Space Review, Monday, September 20, 2010, The Space Review, http://www.thespacereview.com/article/1698/1]

While Boeing and Space Adventures worked out its agreement to market CST-100 seats or flights, Boeing has been busy working on the early development of the crew capsule. Boeing is one of five companies that received NASA Commercial Crew Development (CCDev) awards earlier this year, and has been working on elements of the design in cooperation with Bigelow Aerospace (see “Building a foundation for commercial crew”, The Space Review, September 7, 2010).

Elbon said that under its CCDev work the company has built a pressure test article, testing of which was slated to begin as soon as last weekend at Bigelow’s facilities in Las Vegas. The company also started drop tests of the capsule last week, while a simulator was testing rendezvous and docking operations with the space station. Elbon said Boeing planned a system design review for early next month.

Those efforts, he said, “demonstrate the progress we’re making with a relatively small amount of funding on CCDev.” As of last week the company had achieved about two-thirds of the 36 milestones on its CCDev award, and thus had received about two-thirds of the $18 million under its Space Act agreement.

Should NASA fund future development of the CST-100, Elbon said that the company planned four tests flights of the vehicle requiring three launches. The first, and the one not requiring a launch vehicle, would be a pad abort test. That would be followed by a suborbital “max Q” test of the abort system, and then an orbital uncrewed flight test, before a final crewed orbit test flight. That last flight, he said, might use Boeing test pilots instead of NASA astronauts.

“If we had to do this with Boeing investment only,” Elbon said, “we wouldn’t be able to close the business case.”

CST-100 is designed for relatively short free-flight operations: Elbon said that the capsule would be able to support a crew for only about 48 hours. The capsule would dock with the ISS or another facility likely the same day as launch, and reenter shortly after undocking. It is designed to remain docked to a station for up to six months. The capsule will land on airbags on land, as opposed to splashing down; Elbon said White Sands in New Mexico is currently baselined as the landing site.

Once in operations, each CST-100 is designed to fly at least ten times. Turnaround time between flights, Elbon estimated, would be about six months, with replacement of the capsule’s heat shield the biggest aspect of the servicing between flights. He added that right now Boeing hasn’t determined how many capsules it anticipates building. “How many we build will be a function of the traffic model,” he said. Two capsules would be built during development that would be refurbished for operations.

Closing the business case with NASA

No capsules will be built, though, unless Boeing can secure funding. The company made it clear that it was looking to NASA to provide such funding through a follow-on to CCDev. “If we had to do this with Boeing investment only,” Elbon said, “we wouldn’t be able to close the business case.” The space agency, he said, closes the business case by providing not just development funding but a customer base upon which Boeing can add other, commercial customers, such as Bigelow Aerospace and Space Adventures.

That thrusts Boeing into the heart of a debate about commercial crew development in Washington. Some opponents of the administration’s original budget proposal, which called for $6 billion in investment in commercial crew development over the next five years, state that they are not opposed to NASA purchasing commercial crew transportation services per se, but are skeptical of using government funding to develop those systems, particularly when there’s uncertainty about whether there are other markets beyond ISS crew transfer that could be served by such vehicles.

However, both Elbon and Anderson rejected the argument that, because Boeing’s business plan required government funding, the program was thus somehow not commercial. “It becomes a very good deal for the US taxpayer” by having multiple customer bases that spread out the development and operational costs of such a system, Anderson said, later citing historical examples such as airmail supporting the early aviation industry. “I think the argument that if it’s not purely funded and purely financed by private industry that there’s no market, I think that is, with all due respect, hogwash.”

Interestingly, NASA may need Boeing’s participation to win funding for commercial crew development as much as Boeing needs NASA funding to develop the CST-100. The participation of Boeing and another CCDev awardee, United Launch Alliance, which manufactures the Atlas and Delta launch vehicles, blunts another line of criticism about the program, that it relies on relatively untried companies, especially SpaceX. The Washington Post reported Sunday that the Senate agreed to provide some funding for commercial crew, albeit at a lower level than the administration’s request, “only after Boeing gave congressional staffers a detailed presentation about its own space plans”, according to unnamed participants in the discussions.

NASA Funding is critical for aerospace development

Flight International, 04/05/11

[“NASA funding crucial to commercial spaceflight,” By Zach Rosenberg, http://www.flightglobal.com/articles/2011/05/04/356207/nasa-funding-crucial-to-commercial-spaceflight.html]

NASA's role as the provider of pump priming funding for the commercial spaceflight industry is set to come under further scrutiny despite the recent award of the latest Commercial Crew Development (CCDev) contracts. The latest beneficiaries of NASA's largesse are SpaceX, Blue Origin, Sierra Nevada and Boeing in the CCDev 2 competition. It is no surprise that many potential competitors are reliant on NASA funding to put their products into orbit; experienced spacefarers Orbital Science are rumoured to have dropped building plans after losing both CCDev awards. Despite what is billed to be the strongly corporate nature of the programme - in that the aerospace industry provides the bulk of the capital - some companies are reliant on government funding. If CCDev's third round is cancelled, what programmes will survive? Government funding has traditionally been a strong stimulus for aerospace programmes, from classified technology development to pre-launch loan funding for commercial aircraft. Private spaceflight is a nascent and potentially very lucrative industry - however, the massive upfront development costs required may not be met by similar revenue streams: only a few people on Earth can afford to pay their way. Space tourists to date have launched on Soyuz for $20 million per flight; only seven tourists have flown, with a single repeat customer. Therefore, outside NASA, interest has come from countries seeking a way to launch their own missions without needing to develop the resources. Bigelow Aerospace, which is developing a space station of sorts, has signed agreements with organisations in six countries: Japan, Singapore, UK, Sweden, Australia and the Netherlands. Bigelow has also signed an agreement with Boeing - Bigelow will provide the destination and Boeing will provide transport in the form of its CST-100 capsule. But Boeing maintains that NASA funding is crucial; the aerospace behemoth won two rounds of CCDev money, including the largest single award of CCDev 2 with $92.3 million. "If for some reason we weren't selected to continue in the next phase then it would be a very difficult decision for us to continue on our own," said John Elbon, CST-100 programme manager, "and most likely we would not." "The foundation of our business case is transporting NASA astronauts to the space station, and if that's the only part of the business that comes to be, that would be ok," said Elbon. "Certainly our business case is much more attractive if there's additional business beyond that." NASA's direct support through CCDev is not the only avenue. CCDev remains wholly disconnected from a widely anticipated request for proposals for resupply flights to the International Space Station - or wherever else NASA decides to fly (manned landings on Mars or an asteroid are frequently discussed). Yet CCDev money gives the recipients a massive head start against non-funded rivals, and while few companies have given up completely after failing to win a CCDev award, the near future almost certainly belongs to the winners. Publicly traded Boeing is the exception among CCDev awardees. Blue Origin, Sierra Nevada and SpaceX are privately owned companies and thus under no particular obligation to earn profit to translate into shareholder dividends. SpaceX founder Elon Musk has maintained that, while profit would be nice, his primary goal is to hurl things into orbit as cheaply as possible. Late in April, Blue Origin programme manager Rob Myerson made it clear that he expects its spacecraft to fly, NASA or no. Sierra Nevada programme manager Mark Sirangelo could not confirm continued development without CCDev, but said: "NASA's a co-investor in the project, we're putting up a significant amount of our capital, and at the end of the day it's one of many markets we hope to service." Additional NASA funding is sure to be at stake in future budget negotiations as the 2012 US presidential election nears. NASA employees breathed a sign of relief when only a small portion of its budget was cut in the contentious continuing resolution that funds the government, over which a dramatic stand-off ensued. But as the budget tightens and political battles loom, competitors for CCDev3 money will need to examine just how stable NASA is as an anchor customer and plan for the worst.