# \*\*\*AT: LUNAR BASE ADVANTAGE\*\*\*

## Lunar Base Adv – 1NC

### No resources on the moon

Beattie former NASA manager also managed programs at the NSF Energy R&D Administration, and DoE 2007 Donald The Space Review <http://www.thespacereview.com/article/804/1>

There are no lunar resources that, when processed, would have any economic value if utilized on the Moon or returned to Earth. Lunar in situ resource utilization has been shown by several analyses to not have a positive cost benefit. Enthusiasts who have made claims to the contrary have done so by using questionable and very optimistic projections of what would be required. They would be well advised to reopen their chemistry and physics textbooks and spend some time with real-world mining and drilling operations.

A case in point is the assumption that water ice will be found at the lunar poles and could be mined to supply a base and other activities. (See “Ice on the Moon”, The Space Review, November 6, 2006) Based on measurements of the Moon’s polar regions made during the Lunar Prospector mission, some believe that large quantities of water ice will be found in permanently shadowed lunar craters. It should be remembered that Lunar Prospector did not record the presence of water ice, only an indication of “excess” hydrogen that some infer means water ice. If water ice exists, large amounts of lunar soil would have to be processed in the shadow of rock-strewn crater walls in order to recover sufficient quantities of oxygen and hydrogen to be used for either fuel or life support. Recent studies (Campbell et al., Nature, October 19. 2006) using the Arecibo radar to examine the Moon’s south polar region at much higher resolution than Lunar Prospector (20 meters per pixel vs. 40 kilometers), cast doubt on the probability that large amounts of water ice exist in such craters. Also, analyses have been made of what would happen if a comet, traveling at high speed, hit the Moon. They indicate that it is unlikely that much, if any, water released by the impact of a comet at low lunar latitudes would be transported and trapped in polar locations; it would instead evaporate into space. Only impacts of water-rich comets at high lunar latitudes would provide a chance to deposit water ice in the lunar regolith of permanently shadowed polar craters. In view of the above, the presence of water ice and the amount that might be found as a percentage of the lunar soil in permanently shadowed craters remains highly speculative. To base a program to build a settlement at the Moon’s south pole on such scanty evidence, and the requirement to employ highly questionable resource recovery, should not be considered.

**Lunar base is entirely unnecessary – Antarctica solves life boat**  
**Easterbrook, 2006** [Gregg. Friday, Dec. 8, Moon Baseless NASA can't explain why we need a lunar colony. <http://www.slate.com/id/2155164/>, editor of The Atlantic Monthly, The New Republic and The Washington Monthly an editor of The Washington Monthly, a contributing editor to Newsweek and to U.S. News & World Report, a columnist for the ecumenical website BeliefNet.com, a distinguished fellow of the Fulbright Foundation, a visiting fellow of the Brookings Institution]

The United States will have a permanent base on the moon by the year 2024, NASA officials said on Monday. What does the space agency hope to discover on the moon? The reason it built the base.

Coming under a presidency whose slogan might be "No Price Too High To Accomplish Nothing," the idea of a permanent, crewed moon base nevertheless takes the cake for preposterousness. Although, of course, the base could yield a great discovery, its scientific value is likely to be small while its price is extremely high. Worse, moon-base nonsense may for decades divert NASA resources from the agency's legitimate missions, draining funding from real needs in order to construct human history's silliest white elephant.

NASA itself can't really offer an answer, though it does offer a free, downloadable "Why the Moon?" poster. According to the poster, a moon base would "enable eventual settlement" of Earth's satellite—which might happen someday, but represents an absurd waste of tax money in the current generation. (No one has any interest in settling Antarctica, which is much more amenable to life than the moon and can be reached at far less than 1 percent of the cost.) NASA also says there might be commercial opportunities on the moon. Ha! The agency justified the space station partly with the claim that commercial enterprises would pay hefty fees to use the it for microgravity manufacturing; instead, there's been no revenue-generating activity on the space station, other than a golf ball commercial and the space-tourist fees paid to the Russian space agency. If businesses have no profit use for low-Earth orbit, how would they make money on the moon, with at least double the launch expense? Hilariously, NASA says another purpose of the moon base would be to "create international lunar heritage sites." We'll preserve that dust for future generations! And the moon base would be the risk to the "lunar heritage" in the first place.

### A Lunar Base will be susceptible to highly destructive meteor impacts that are virtually impossible to predict

Donahue 2010 [“Lunar Meteor Strikes May Obstruct Moon Colonization”, James Donahue, Newspaper reporter, editor and columnist with more than 40 years of experience in professional writing, http://perdurabo10.tripod.com/storagej/id59.html]

With all the talk of someday colonizing the Moon and with nations like China, Japan, the United States and the European Union all planning to send astronauts back to that desolate place few appear to be considering the effect a constant bombardment of meteor showers might have on a permanent Moon base. The American Apollo Space adventure to the Moon from 1969 to 1975 brought astronauts to the Moon for brief visits and safely back home again. Now with problems of global warming, an overpopulated Earth, and a growing shortage of natural resources, there is renewed interest in space exploration. This time there is talk of colonizing the Moon and then going on to Mars . . . we suspect as a wild last-ditch effort to find a place in our solar system to relocate if things get too unbearable on Earth. There was great excitement at NASA late in 2009 when three lunar probes found evidence that water exists at the polar caps on the Moon. This was a key component necessary, researchers said, before serious consideration of colonization could begin. In all of their excitement, we wonder if NASA engineers and other workers have noticed all of the blasted pock marks that scar the surface of that Moon. Similar impact markings are found on Mars, Jupiter and the moons circling the other planets in our solar system. It doesn’t take a rocket scientist to figure out that these holes were created by large objects from space that collided with the moons and planets. We have a few of them on Earth, but not many. The question is, how often to meteors collide with the other bodies in our solar system? That such events are so rare on Earth has led us to believe they may also be extremely rare on the Moon, on Mars and other planets. But that may not be the case. As recently as November 7, 2005, NASA scientists observed a meteor strike on the Moon. It happened at the same time Earth was experiencing a brilliant display of meteor showers that continued from late October to early November. The meteors were coming at the Moon during that same period, but unlike the Earth, where most meteors burn a fiery death before they can strike the ground, the Moon has no atmosphere. Consequently the surface of the Moon may have been peppered by meteorites that slammed into the ground and exploded. The meteor explosion that was captured on film on November 7 occurred near the edge of Mare Imbrium. Researchers have calculated that it was a piece of rock measuring about 12-centimeters in width, traveling 27 kilometers a second when it struck. The blast was equal to the explosive force of about 70 kg of TNT. NASA researchers say that meteor strikes on the Moon are not easy to spot because there is no fiery entrance through the atmosphere, like we can see almost any clear night on Earth. Even the Hubble Space Telescope is not sensitive enough to catch the smaller Moon collisions. The burning question in all of this is: How frequently is the Moon hit by flying rocks and meteors from space, and how dangerous a place would it be for a permanent moon colony? It is true that the International Space Station also is circling the outer parameters of the Earth, in an area where it also could be struck a deadly and unexpected blow by a meteor raining down out of nowhere. In the 12 years the station has been in orbit, and under construction, it has had to be moved several times to avoid a possible collision with man-made space debris. And the astronauts within have had to deal with radiation from extreme solar flares. But we do not recall a single threat from a meteor strike even though the Earth is visited by meteor showers at least once each year. Erecting a similar facility on the Moon could be relatively safe if water and the technology to convert it into breathable oxygen and hydrogen fuel can be utilized. But the danger of a strike will always be present.

### The environment of the moon makes moon landings dangerous.

David 6 (Leonard David is a staff writer for MSNBC. November 7, 2006. MSNBC. http://www.msnbc.msn.com/id/15607792/)

Although the lunar environment is often considered to be essentially static, Halekas and his fellow researchers reported at the workshop that, in fact, it is very electrically active. The surface of the Moon charges in response to currents incident on its surface, and is exposed to a variety of different charging environments during its orbit around the Earth. Those charging currents span several orders of magnitude, he said. Dust adhesion is likely increased by the angular barbed shapes of lunar dust, found to quickly and effectively coat all surfaces it comes into contact with. Additionally, that clinging is possibly due to electrostatic charging, Halekas explained.  "I think it would behoove us to understand the lunar dust plasma environment as well as possible before we try to come up with detailed dust mitigation strategies," Halekas told SPACE.com. "This would mean characterizing the dust, electric fields and plasma around the Moon and understanding how they interact." Halekas said that he advocates science experiments either in lunar orbit or on the Moon's surface — preferably both — in order to gauge the problem. "At this point, we know so little about the near-surface electrodynamic environment and its effect on dust that we can't do much more than conjecture and try to predict the most likely scenario," Halekas said. Just knowing that the dust is there, Halekas added, tells us that we need to deal with it. "But without more detailed knowledge than we currently have, I think we're handicapped in coming up with effective mitigation strategies."

### **Moon landings are dangerous for human health – small dust particles.**

David 6 (Leonard David is a staff writer for MSNBC. November 7, 2006. MSNBC. http://www.msnbc.msn.com/id/15607792/)

It is imperative that today's return-to-the-Moon planners recall experiences from the Apollo era, said Larry Taylor, Director of the Planetary Geosciences Institute at the Department of Earth and Planetary Sciences at the University of Tennessee in Knoxville. One problem that was not well anticipated was the ubiquitous, adherent, abrasive, and floating dust problem, he advised. Taylor emphasized that the most critical effect of lunar dust, however, may be on astronaut health. [Advertise](http://www.msnbc.msn.com/id/31066137/media-kit/) | [AdChoices](http://g.msn.com/AIPRIV/en-us) With each Apollo mission to the Moon, Taylor said that astronauts remarked about the "gun powder" smell when they took off their helmets inside their lunar lander after climbing back in from a moonwalk. Several astronauts reported respiratory or eye irritation. It was evident that there was something unusual about the lunar dust, Taylor pointed out. "We've got one hell of a lot of it that's going to be dangerous on the Moon." Taylor flagged the possibility that ultra-small particles of the lunar dust are capable of moving from human lungs directly into the blood stream. Moreover, these fine particles consist almost entirely of glass containing myriads of nanophase metallic iron—a constituent that might interact with a person's hemoglobin and spur oxygen-depravation effects. One of the most essential tests to be performed with a first lunar lander in the near-term, Taylor observed, is the chemical reactivity of pristine lunar dust in the size range that can be inhaled by lunar visitors.

### The robots for the VSE fail - this would terminates the mission

Stancliff & Dolan 2005Carnegie Mellon University Research Showcase Robotics Institute School of Computer Science1-1-2005Planning To Fail: Mission Design For Modular Repairable Robot Teams

Stephen B. Stancliff Carnegie Mellon University John M. Dolan Carnegie Mellon University, jmd@cs.cmu.eduAshiteyTrebi-ellennu<http://repository.cmu.edu/cgi/viewcontent.cgi?article=1195&context=robotics&sei-redir=1#search=%22vision%20space%20exploration%20fail%22>

NASA The NASA Exploration Systems, Human & Robotic Technology (H&RT) Formulation Plan identifies Strategic Technical Challenges which “must be surmounted to enable sustainable future human and robotic exploration” of our solar system [1]. These include robotic networks, modularity, reconfigurability, reusability, and redundancy. The plan further identifies the need for Intelligent Modular Systems enablingsafe, affordable, effective, multifunctional robotic technologies for sustainable human and robotic exploration to meet the U.S. National Vision for Space Exploration. Modularity, reconfigurability, reusability, and redundancy add new complexity to the mission design process for robotic exploration. Decisions must be made about how to divide tasks among robots, how many robots to use, and how to configure individual robots in order to accomplish individual tasks and overall mission goals. A significant factor in making these decisions is the impact of robot failures on mission completion. The literature (e.g., [2]) indicates that terrestrial field robots have poor reliability, with robots being unavailable approximately half of the time. In contrast, the planetary rovers built by NASA have very high reliability, but this reliability is achieved at very high cost. Since planetary robots operate in a poorly modelled and unstructured environment the operating lifetime of components is uncertain. To accommodate this uncertainty most planetary robotic systems are designed and tested to performance standards far beyond the mission requirements. This approach can be cost prohibitive for robotic systems operating for long periods on remote planets. In order to send teams of robots to Mars for extended missions cost-effectively, we must consider alternate robot and robot team design paradigms. Redundancy (of robot components and of robots within teams) and repairability are two options which have been proposed to reduce the impact of component and robot failures on mission success. A common assumption behind these proposals is that redundancy and repairability will reduce mission costs by allowing the use of lowercost components. In order to evaluate this assumption, it is necessary to quantify the impact of reliability on mission success. The existing mission planning literature deals with robot failure primarily in terms of recovery after failure occurs (e.g., [3], [4]). Our work differs in that we are developing methods to predict failure rather than to respond to it. Our methods can be used to augment existing mission planning systems by providing estimates of failure rates in the early stages of mission design, allowing one to "plan to fail" instead of dealing with failure reactively. A mission designer will, for instance, be able to evaluate the increased probability of mission failure when lower-cost components are used and will be able to compare the relative cost of using a larger number of low-reliability robots and spares versus using a smaller number of high-reliability robots and spares. The only known previous work studying how cooperative repair impacts the reliability of robot team missions is [5]. That paper's methods are similar to ours in being based in the reliability engineering literature, but significantly different in assuming that repair incurs no cost in terms of time and reliability. We contend that in most cases this cost of repair is significant—the robots executing the repair must delay their assigned tasks in order to perform a repair, and the act of repair increases their own chance of failure. Additionally, [5] considers only cannibalistic repair, where all replacement parts are scavenged from failed robots, and all spares are carried by the surviving robots. Our method has been designed to be flexible with respect to repair method. While in this paper we consider only repair where spare modules are available at a central location, we intend to compare other repair options in future work. This paper follows our previous work in [6] and [7]. In [6] we presented a method for quantifying the reliability of robot modules and individual robots given component reliabilities. In [7] we demonstrated how module and robot reliabilities can be used to evaluate mission design alternatives for a simple mission. The method in [7] is labor-intensive and is therefore suitable for evaluating only very simple missions. In this paper we present a more automated method which is suitable for evaluating more complex missions. In the remainder of this paper we first lay out an example mission scenario, then describe our method and assumptions, and finally present a comparison of repairable and nonrepairable team performance for the example mission. 2. MISSION SCENARIO A team of robots is tasked to install a solar panel array for a measurement and observation outpost. The installation task consists of carrying the solar panels from the drop zone to the outpost and then assembling them. The size of the solar panels is such that two robots are needed to carry and assemble one panel. Once the robots reach the outpost with the solar panels they follow a carefully sequenced and choreographed set of deployment steps. We consider first a pair of nonrepairable robots that are constructed to very high levels of robustness using heritage-based design, i.e., heuristics extrapolated from previous missions. These robots are composed of highly reliable components, are designed with operating limits well beyond the expected operating conditions, and incorporate redundancy and selfdiagnostic capabilities. The nonrepairable robots can recover from certain pathological faults on their own. Other such faults require the intervention of ground operators. Catastrophicfailure of components may lead to early termination of the mission. In the case of the robotic arm, an actuator failure would compromise safe deployment of the solar panels.

### Space colonization is impossible – multiple reasons

O'NEILL 2008 (Building a Moon Base: Part 1 – Challenges and Hazards by Ian O'Neill, the [Space Science Producer for Discovery News](http://news.discovery.com/space/),[you can find hundreds of articles of mine over there too](http://news.discovery.com/contributors/ian-oneill/). Although I work for the Discovery Channel’s sci-tech news website, working for the media [PhD](http://www.astroengine.com/about/) in Solar Physics (at the [University of Wales, Aberystwyth](http://www.aber.ac.uk)), on February 7, 2008, http://www.universetoday.com/12726/building-a-base-on-the-moon-challenges-and-hazards/)

The debate still rages as to whether man should settle on the Moon or Mars first. Mars is often considered to be the ultimate challenge for mankind: to live on a [planet](http://www.universetoday.com/35923/planet/) other than Earth. But looking down on us during cloudless nights is the bright and attainable Moon. From here we can see the details of the lunar landscape with the naked eye, it is so close astronomically when compared with the planets, that many believe that the Moon should be our first port of call before we begin the six month (at best) voyage to the Red Planet. It also helps as we’ve already been there… Opinion has shifted somewhat in recent years from the “Mars Direct” plan (in the mid-1990s) to the “Moon First” idea, and this shift has recently been highlighted by US President George W. Bush when in 2004 he set out plans for re-establishing a presence on the Moon *before* we can begin planning for Mars. It makes sense; many human physiological issues remain to be identified, plus the technology for colonization can only be tested to its full extent when… well… colonizing. Understanding how the human body will adapt to life in low-G and how new technologies will perform in a location close enough to home will be not only be assuring to lunar colonists and astronauts, it will also be sensible. Exploring space is dangerous enough, minimizing the risk of mission failure will be critical to the future of manned exploration of the [Solar System](http://www.universetoday.com/15908/3d-solar-system/). So where do you [start](http://www.universetoday.com/12726/building-a-base-on-the-moon-challenges-and-hazards/) when designing a moon base? High up on the structural engineers “to do” list would be the damage building materials may face when exposed to a vacuum. Damage from severe temperature variations, high velocity micrometeorite impacts, high outward forces from pressurized habitats, material brittleness at very low temperatures and cumulative abrasion by high [energy](http://www.universetoday.com/43740/wind-energy/) cosmic rays and solar wind particles will all factor highly in the planning phase. Once all the hazards are outlined, work can begin on the structures themselves. The Moon exerts a gravitational pull 1/6th that of the Earth, so engineers will be allowed to build less gravity-restricted structures. Also, local materials should be used where and when possible. The launch costs from Earth for building supplies would be astronomical, so building materials should be mined rather than imported. Lunar regolith (fine grains of pulverized Moon rock) for example can be used to cover parts of habitats to protect settlers from cancer-causing cosmic rays and provide insulation. According to studies, a regolith thickness of least 2.5 meters is required to protect the human body to a “safe” background level of radiation. High energy efficiency will also be required, so the designs must incorporate highly insulating materials to insure minimum loss of heat. Additional protection from meteorite impacts must be considered as the Moon has a near-zero atmosphere necessary to burn up incoming space debris. Perhaps underground dwellings would be a good idea? The actual construction of a base will be very difficult in itself. Obviously, the low-G environment poses some difficulty to construction workers to get around, but the lack of an atmosphere would prove very damaging. Without the buffering of [air](http://www.universetoday.com/74366/air-mass/) around drilling tools, dynamic friction will be amplified during drilling tasks, generating huge amounts of heat. Drill bits and rock will fuse, hindering progress. Should demolition tasks need to be carried out, explosions in a vacuum would create countless high velocity missiles tearing through anything in their path, with no atmosphere to slow them down. (You wouldn’t want to be eating dinner in an inflatable habitat during mining activities should a rock fragment be flying your way…) Also, the ejected [dust](http://www.universetoday.com/83065/dust-bowl/) would obscure everything and settle, statically, on machinery and contaminate everything. Decontamination via air locks will not be efficient enough to remove all the dust from spacesuits, Moon dust would be ingested and breathed in – a health risk we will not fully comprehend until we are there.

### Space colonies will make space militarization inevitable and put the entire planet at risk of annihilation

Gagnon ’02 [Bruce, coordinator of the Global Network Against Weapons & Nuclear Power in Space, “Space Exploration and Exploitation What kind of seed will we take from Earth?”, http://www.space4peace.org/articles/scandm.htm]

Just as Queen Isabella sent in the Spanish Armada to protect the new found territory and resources of the New World, so too is the U.S. moving in a similar way. The Pentagon, through the U.S. Space Command, is working hard to ensure that the space corridor will remain open and free for private corporate interests. Weapon systems such as nuclear powered lasers and anti-satellite (ASAT) weapons are now being funded, researched, and tested in the U.S. It will only be a matter of time until deployment of space based weapons will follow. In the Space Command’s document, Vision for 2020, they state that "Historically, military forces have evolved to protect national interests and investments – both military and economic. During the rise of sea commerce, nations built navies to protect and enhance their commercial interests. …The control of space will encompass protecting U.S. military, civil and commercial investments in space…. Control of space is the ability to assure access to space, freedom of operations within the space medium, and an ability to deny others the use of space, if required." A parallel, military highway will be created between the Earth and the planets beyond. Documents commissioned by the U.S. Congress suggest that U.S. military bases on the Moon will enable the U.S. to control access to and from the planet Earth. The logo of the U.S. Space Command is "Master of Space." We are now poised to take the bad seed of greed, environmental exploitation and war into space. Having shown such enormous disregard for our own planet Earth, the so-called "visionaries" and "explorers" are now ready to rape and pillage the heavens. Countless launches of nuclear materials, using rockets that regularly blow up on the launch pad, will seriously jeopardize life on Earth. Returning potentially bacteria-laden space materials back to Earth, without any real plans for containment and monitoring, could create new epidemics for us. The possibility of an expanding nuclear-powered arms race in space will certainly have serious ecological and political ramifications as well. The effort to deny years of consensus around international space law will create new global conflicts and confrontations. Now is the time for all who care about peaceful and scientific space exploration to learn more about these issues and to begin organizing to prevent this insanity before it happens. An international debate must be created about the kind of seed we from Earth will carry with us as we explore space. Let this historic debate begin now.

### Long timeline means the VSE doesn’t motivate the bureaucracy

**Zubrin 2005**

[Robert Zubrin, an astronautical engineer, is president of Pioneer Astronautics, a research and development firm, and president of the Mars Society, a space advocacy group, “Getting Space Exploration Right," The New Atlantis, Number 8, Spring 2005, http://www.thenewatlantis.com/publications/getting-space-exploration-right Acc. 6/29/11 // JDI bjk]

The most obvious problem with the Bush plan is its long, slow timeline. The only activities that the Vision for Space Exploration actually mandates before the end of the Bush administration’s second term are the return of the shuttle to flight, the use of the shuttle to complete the International Space Station, the flight of one lunar robotic probe, and the initiation of a development program for the Crew Exploration Vehicle. The ten-year schedule for the development of the Crew Exploration Vehicle is especially absurd. Technically, it makes no sense: starting from a much lower technology base, it only took five years to develop the Apollo command module, which served the same functions. Politically, it is unwise: the delay makes the development of the Crew Exploration Vehicle reversible by the next administration. And fiscally, it is foolish: the long timeline only serves to gratify the major aerospace industry contractors, which desire a new long-term, high-cost activity to replace the recently cancelled Orbital Space Plane. Stranger still is the decision to set the next manned Moon landing as late as sixteen years into the future—twice as long as it took the United States to reach the Moon back in the 1960s—and to place the Mars mission at some nebulous time in the future. Such a drawn-out timeline is unlikely to serve as a driving force on the activities of this slow-moving bureaucracy.

## Lunar Base Adv– No Resources - Ext

### Studies suggesting water pockets at the poles are deeply flawed – highest resolution studies show there are no concentrated deposits

Campbell et al, 2006 [19 October, “No evidence for thick deposits of ice at the lunar south pole”, http://www.nature.com/nature/journal/v443/n7113/abs/nature05167.html#a1, Donald B. Campbell (Professor of Astronomy at Cornell), Bruce A. Campbell, Lynn M. Carter, Jean-Luc Margot & Nicholas J. S. Stacy (all PhD)]

Shackleton crater at the Moon's south pole has been suggested as a possible site of concentrated deposits of water ice, on the basis of modelling of bi-static radar polarization properties and interpretations of earlier Earth-based radar images1, 2. This suggestion, and parallel assumptions about other topographic cold traps, is a significant element in planning for future lunar landings. Hydrogen enhancements have been identified in the polar regions3, but these data do not identify the host species or its local distribution. The earlier Earth-based radar data lack the resolution and coverage for detailed studies of the relationship between radar scattering properties, cold traps in permanently shadowed areas, and local terrain features such as the walls and ejecta of small craters. Here we present new 20-m resolution, 13-cm-wavelength radar images that show no evidence for concentrated deposits of water ice in Shackleton crater or elsewhere at the southpole. The polarization properties normally associated with reflections from icy surfaces in the Solar System4, 5, 6 were found at all the observed latitudes and are strongly correlated with the rock-strewn walls and ejecta of young craters, including the inner wall of Shackleton. There is no correlation between the polarization properties and the degree of solar illumination. If the hydrogen enhancement observed by the Lunar Prospector orbiter3 indicates the presence of water ice, then our data are consistent with the ice being present only as disseminated grains in the lunar regolith.

### Not enough water on the moon for colonization.

Poiner, 2009 [Kristen, “Does ice exist at the Lunar South Pole?” Formation of Snow and Ice Masses, Works with polar science center and the applied physics laboratory university of Washington]

The three missions that did detect a presence of water-ice (Clementine, Lunar Prospector, and SELENE) agree that a low concentration (0-7%) of water-ice may exist, mixed with the lunar regolith to a depth of several tens of centimeters. This allows a calculation of the total amount of water-ice on the moon: Mass of ice on moon =(Shadowed area)×(Ice mix-in depth) (divided by)(Density of ice) ×(Weight percent ice) which is between 5.5×106 g (using mean values) and 1.2×109 g (using maximum values). This is a factor of 10-8 to 10-11 lower than the estimated 10 (to the) 17th g thought to exist on the moon from comets and meteorites, the solar wind, and degassing as discussed above. Further, given the human water need (for consumption alone) of 2100 g per day, the lunar ice supply would not be capable of supporting a colony for any significant amount of time: the maximum estimate 1.2×109 g would last a 100-person colony just 1.5 years.

### No guarantee there is water on the moon

Seife, 2004 [Charles; March 12, space exploration, sciencemag.org, Moon’s ‘Abundant Resources’ Largely an Unknown Quantity, He is a member of [PEN](http://en.wikipedia.org/wiki/International_PEN), the [National Association of Science Writers](http://en.wikipedia.org/wiki/National_Association_of_Science_Writers), and the D.C. Science Writers Association]

More valuable than gold to a lunar base, water can be used for drinking or it can be split to create oxygen to breathe – or oxygen and hydrogen for rocket fuel. A few tons of hydrogen-oxygen fuel could send a rocket off the surface of the moon and into space. That’s why moon buffs such as Paul Spudis, a planetary scientist at John Hopkins University’s Applied Physics Laboratory in Laurel, Maryland, think the most important lunar resource is likely to be water from ice.

In theory, ice from crashed comets may linger in cold, dark niches at the lunar poles, from which it could relatively easily be extracted and distilled but scientists disagree about how much of it is trapped there. In 1996, a Department of Defense satellite called Clementine bounced radar waves off the moon’s surface and back to radar telescopes on Earth. Spudis and colleagues noticed that reflections from shadowy nooks near the lunar south pole could be interpreted as signatures of multiple scattering within crystals of water – an indication that about 1.5% of the lunar soil in those regions is water ice.

Similar results came when the Lunar Prospector satellite, launched in 1998, used a spectrometer to count neutrons bouncing off the moon in energy ranges known to interact with hydrogen – presumably in water ice. The answer: Patches of polar lunar soil were about 0.5% to 1% ice by weight – less water than Clementine found, but still enough to make a polar base attractive.

On the other hand, Donald Campbell, a physicist at Cornell University, and colleagues twice bounced radio waves off the moon from the Arecibo telescope in Puerto Rico but saw no signs of water ice. “We don’t believe that the radar data supports” the large amounts of ice that the Clementine analysis would imply, Campbell says. And when the Lunar Prospector crashed into the moon’s south pole at the end of its mission, scientists didn’t see water in the resulting plume of debris Spudis thinks a more energetic crash would have splashed up water vapor, but for now, lunar water remains an open question.

## Lunar Base Adv – No Need to Colonize Ext

### Earth has time to prepare for non-imminent danger

Lynda Williams, science fiction author, Administrator at New College of Caledonia, 2010, “The Irrational Dreams of Space Colonization” (<http://www.scientainment.com/lwilliams_peacereview.pdf>)

According to scientific theory, the destruction of Earth is a certainty. About five billion years from now, when our sun exhausts its nuclear fuel, it will expand in size and envelope the inner planets, including the Earth, and burn them into oblivion. So yes, we are doomed, but we have 5 billion years, plus or minus a few hund red million, to plan our extraterrestrial escape. The need to colonize the Moon or Mars to guarantee our survival based on this fact is not pressing. There are also real risks due to collisions with asteroids and comets, though none are of immediate threat and do not necessitate extraterrestrial colonization. There are many Earth-based technological strategies that can be developed in time to mediate such astronomical threats such as gravitational tugboats that drag the objects out of range. The solar system could also potentially be exposed to galactic sources of high-energy gamma ray bursts that could fry all life on Earth, but any Moon or Mars base would face a similar fate. Thus, Moon or Mars human based colonies would not protect us from any of these astronomical threats in the near future.

### The affirmative doomsaying abandons earth to its fate – we should stay and fix the problems with earth, not just abandon it

Lynda Williams, science fiction author, Administrator at New College of Caledonia, 2010, “The Irrational Dreams of Space Colonization” (<http://www.scientainment.com/lwilliams_peacereview.pdf>)

Life on Earth is more urgently threatened by the destruction of the biosphere and its life sustaining habitat due environmental catastrophes such as climate change, ocean acidification, disruption of the food chain, bio-warfare, nuclear war, nuclear winter, and myriads of other man-made doomsday prophesies. If we accept these threats as inevitabilities on par with real astronomical dangers and divert our natural, intellectual, political and technological resources from solving these problems into escaping them, will we playing into a self- fulfilling prophesy of our own planetary doom? Seeking space based solutions to our Earthly problems may indeed exacerbate the planetary threats we face. This is the core of the ethical dilemma posed by space colonization: should we put our recourses and bets on developing human colonies on other worlds to survive natural and man-made catastrophes or should we focus all of our energies on solving the problems that create these threats on Earth?

### Space doesn’t prevent extinction – space only embraces a regressive mindset that stops reforms to prevent extinction level events

Jozef ’01 [Jozef Hand-Boniakowski, Ph.D, “THE STATE OF HUMANITY”, November, http://www.metaphoria.org/ac4t0111.html]

Human optimism is tempered by minds such as Stephen Hawking's who states, "I am afraid the atmosphere might get hotter and hotter until it will be like Venus with boiling sulfuric acid...I am worried about the greenhouse effect." Hawking's projection optimistically foresees the extinction of humanity within a millennium. I give it much less time than that. As a solution, Hawking suggests human transplantation into space where "at least it would ensure that people don't become extinct." Hawking does not offer how to prevent extinction, rather how to circumvent or cheat it. In my mind, this is analogous to the regressive mindset that ignores the pursuit of difficult solutions in favor of quick, short-sighted and often self-fulfilling prophetic courses of action. No need, for example, to eliminate the causes of war when bigger wars and bigger weapons of war (as the thinking goes) can lead to victory in those wars. No need to resolve the issues that lead to the terror of September 11, when reciprocal and bigger terror (under any name but) can be used in victorious vengeance.

## Lunar Base Adv – No Colonization Ext

### **Space colonization is impossible – radiation, shielding, and travel time make staying on Earth the only option**

Stross 10 [Charles Stross: The High Frontier, Redux WrittenBy: [LPRENT](http://thestandard.org.nz/author/admin/) - Date published:9:04 am, December 28th, 2010 http://thestandard.org.nz/charles-stross-the-high-frontier-redux/]

We’re human beings. We evolved to flourish in a very specific environment that covers perhaps 10% of our home planet’s surface area. (Earth is 70% ocean, and while we can survive, with assistance, in extremely inhospitable terrain, be it arctic or desert or mountain, we aren’t well-adapted to thriving there.) Space itself is a very poor environment for humans to live in. A simple pressure failure can [kill a spaceship crew in minutes](http://en.wikipedia.org/wiki/Soyuz_11" \t "_blank). And that’s not the only threat. [Cosmic radiation](http://en.wikipedia.org/wiki/Cosmic_radiation" \l "Significance_to_Space_Travel" \t "_blank) poses a serious risk to long duration interplanetary missions, and unlike solar radiation and radiation from [coronal mass ejections](http://en.wikipedia.org/wiki/Coronal_mass_ejection" \t "_blank) the energies of the particles responsible make [shielding astronauts extremely difficult](http://www.lbl.gov/abc/cosmic/more/spacetravel.html" \t "_blank). And finally, there’s the travel time. Two and a half years to Jupiter system; six months to Mars. Now, these problems are subject to a variety of approaches — including medical ones: does it matter if cosmic radiation causes long-term cumulative radiation exposure leading to cancers if we have advanced side-effect-free cancer treatments? Better still, if [hydrogen sulphide-induced hibernation](http://en.wikipedia.org/wiki/Hydrogen_sulfide" \t "_blank) turns out to be a practical technique in human beings, we may be able to sleep through the trip. But even so, when you get down to it, there’s not really any economically viable activity on the horizon for people to engage in that would require them to settle on a planet or asteroid and live there for the rest of their lives. In general, when we need to extract resources from a hostile environment we tend to build infrastructure to exploit them (such as [oil platforms](http://en.wikipedia.org/wiki/Oil_platform" \t "_blank)) but we don’t exactly scurry to move our families there. Rather, crews go out to work a long shift, then return home to take their leave. After all, there’s no *there* there — just a howling wilderness of north Atlantic gales and frigid water that will kill you within five minutes of exposure. And that, I submit, is the closest metaphor we’ll find for interplanetary colonization. Most of the heavy lifting more than a million kilometres from Earth will be done by robots, overseen by human supervisors who will be itching to get home and spend their hardship pay. And closer to home, the [commercialization of space](http://en.wikipedia.org/wiki/Commercialization_of_space" \t "_blank) will be incremental and slow, driven by our increasing dependence on near-earth space for communications, positioning, weather forecasting, and (still in its embryonic stages) tourism. But the domed city on Mars is going to have to wait for a magic wand or two to do something about the climate, or reinvent a kind of human being who can thrive in an airless, inhospitable environment. Colonize the Gobi desert, colonise the North Atlantic in winter — then get back to me about the rest of the solar system!

Radiation makes space colonization impossible – leads to infertility  
Walker 11 [Infertility Concerns May Leave Space Colonization Hopes Barren Posted by [James Walker](http://www.gearfuse.com/author/james/) on February 14, 2011, 5:02 PM <http://www.gearfuse.com/infertility-concerns-may-leave-space-colonization-hopes-barren/>]

It’s almost become a type of cliché in science fiction: colonizing Mars and other celestial bodies so that the human race can propagate and populate the galaxy. Unfortunately, according to NASA scientists, reproduction while in space will hamper future colonization and population efforts. According to NASA Ames Chief Life Scientist Tore Straume (seen left with a villainous goatee), the radiation generated by cosmic rays and solar flares will make it difficult to conceive during interplanetary travel. Moreover, any child conceived during spaceflight could become sterilized due to the radiation. This conclusion is based on multiple studies conducted on **“**non-human primates” (read: “monkeys”) that were given doses of radiation and saw that the eggs of female fetuses began to die off during the second half of pregnancy, resulting in a sterile female when the fetus is finally birthed. [Straume says](http://www.msnbc.msn.com/id/41537193), “One would have to be very protective of those cells during gestation, during pregnancy, to make sure that the female didn’t become sterile so they could continue the colony.” Similar problems could be seen in men, with the radiation damaging the male’s sperm. It’s also believed that in addition to the sterilization issues, other mental and physical defects could result from the radiation’s effects on a fetus.

### No colonization – radiation and erratic space weather

**Baker 6**

Daniel N. Baker, professor at the University of Colorado and the director for the university’s Laboratory for Atmospheric and Space Physics, Space Radiation Hazards and the Vision for Space Exploration: Report of a Workshop, 2006, pg 1, http://www.nap.edu/openbook.php?record\_id=11760&page=84#p2000fbcf9970084001

The President’s Vision for Space Exploration (VSE) specifies that the United States should carry out a human lunar mission no later than 2020 and eventually conduct human expeditions to Mars. NASA has already been restructured to achieve these ambitious goals. This new policy creates many challenges, but not all of them are immediately obvious. Among these, the hazards of space radiation to crews traveling to the Moon and Mars will pose unique questions and challenges, not only to the spacecraft engineering community but to the space science community as well. Between the Apollo 16 and 17 missions in August 1972, for example, a powerful solar event occurred that would have seriously endangered astronauts on the lunar surface. Now that the United States has adopted a civilian space policy that refocuses many NASA research and engineering missions toward the human and robotic exploration of the Moon, Mars, and eventually other solar system bodies, events such as the powerful solar storms between Apollo missions over three decades ago must be interpreted in a new context. Astronauts and spacecraft participating in the VSE will be exposed to a hazardous radiation environment, made up of galactic cosmic radiation and driven by solar energetic particle events and “space weather” changes. Accurate and timely information about this environment is required in order to plan, design, and execute human exploration missions. The information required consists of estimates or measurements of the time of occurrence, duration, and spatial distribution of the radiation, as well as the type, maximum intensity, and maximum energy of the constituent particles. Unfortunately, the prediction and forecasting of solar activity and space weather are severely hampered by a lack of understanding of how the Sun affects the heliosphere and planetary environments of Earth, the Moon, and Mars. Scientific progress in this field, leading to accurate long-term and short-term predictions of the space radiation environment, is required if solar and space physics scientists are to make the significant contribution required of them by human exploration missions.

## Lunar Base Adv – Colonization Bad – Militarism Impacts

### Space based weapons reduce our heg – they hurt our conventional dominance

Hardesty ‘5

Captain David C. Hardesty, U.S. Navy, a member of the faculty of the Naval War College’s Strategy and Policy Department. “Space-Based Weapons: Long-Term Strategic Implications and Alternatives”. Naval War College Review, Spring 2005, Vol. 58, No. 2

In the event, this analysis indicates that space-based weapons, though in the short term increasing military capabilities, are in the long term very likely to have a negative effect on the national security of the United States. Specifically, I will argue, the vulnerabilities of space-based systems would largely negate their projected advantages. Further, potential enemies would react to U.S. deployments, either avoiding their effects or, more ominously, space-basing weapons of their own. These deployments would fundamentally reduce the current relative advantages the United States enjoys in conventional forces and strategic depth—reducing the time and distance in which effective defenses must be created. Arguments for the necessity of space-basing weapons are politically untenable, based on false assumptions, or narrowly focused on space-centric concepts that fail to integrate and take full advantage of capabilities of terrestrially based forces. Finally, I will propose a balanced policy and strategy that should optimize maintenance of relative advantages while hedging against uncooperative adversaries.

### Space weapons would massively increase space debris – collapses the global economy and set society back decades and destroy the possibility of further space exploration.

Su ‘10

Jinyuan Su, The Silk Road Institute of International and Comparative Law, School of Law, Xi'an Jiaotong University. “Towards an effective and adequately verifiable PPWT”. Space Policy Volume 26, Issue 3, August 2010. ScienceDirect.

With regard to space weaponization, many more debates have taken place over inter-state strategic trade-offs than over the cooperative interest of avoiding a disaster arising from orbital debris. Today around 21,000 orbiting debris larger than 10 cm in diameter are tracked; and it is estimated there are over 100,000 pieces larger than a marble. Debris in orbits higher than about 800 km above the Earth’s surface will be up there for decades, above 1000 km for centuries, and above 1500 km effectively forever.32 Therefore, the amount of orbital debris is unlikely to decrease by natural degradation unless technology development enables us to dispose of it. Space debris moves at an extremely high speed of 27,000 km per hour; even tiny pieces can cause destruction to a satellite.33 This danger will be exacerbated as the Earth orbits become increasingly crowded. In addition, there is also a high risk of a chain reaction of destruction, the so-called “Kessler Syndrome”,34 in which, if a collision does occur, the resulting fragments become an additional collision risk. The deployment of space-based weapons would generate great quantities of space debris just during the initial deployment and far more if they are used.35 Testing of ASATs would further increase the amount. In the event of a real “space war”, the Earth orbits could be veiled by debris clouds, making them no-go areas and jeopardizing the possibility of space exploitation. A conservative estimate shows that a modest space war involving destruction of 30 satellites would increase the level of space debris by almost a factor of four, while a larger one involving destruction of 100 satellites would increase it by 1250%, excluding Kessler Syndrome effects.36 The space industry was projected to exceed $150 billion per year in revenues by 2010,37 yet even this figure may not fully display humanity’s heavy reliance on space technologies for daily life. If the Earth orbits were to become too inhospitable for satellites, the global economy would collapse and human society would step back in time several decades. Meanwhile, although it is possible to distinguish enemy satellites from neutral ones, collateral damage may be caused to the in-orbit or on-Earth properties of neutral states. The belligerent states would be liable, jointly or severally, to the third state.38

### U.S. space weapons would spark an arms race – causes first use of ASATs – deterrence would not apply.

Su ‘10

Jinyuan Su, The Silk Road Institute of International and Comparative Law, School of Law, Xi'an Jiaotong University. “Towards an effective and adequately verifiable PPWT”. Space Policy Volume 26, Issue 3, August 2010. ScienceDirect.

First, deployment of space-based weapons by a state would be highly likely to set off a space arms race. Other states in the “space club” may not be willing to accept the USA as the sole country possessing space-based weapons, and choose to follow suit. But since developing space-based weapons is an extremely expensive task, exacerbated by the huge sums of money needed for maintenance and modernization of the large number of space-based assets required in order to be effective,19 the more appealing scenario would be to develop ground-based ASATs, an effective, cheaper and less high-tech countermeasure. China is more likely to limit its number and quality of space weapons, if necessary, to the capacity of acting as an effective defence mechanism.20 This balance is a more credible option because, on the one hand, China does not have the ambition or ability to enter into a drawn-out space weapons race; on the other hand, neither does it want to place its national security at the mercy of others. The primary concern when such a space race happens is that both conventional weapons in outer space and ground-based ASATs could become real-use weapons and there is an incentive to strike first, because, unlike nuclear weapons these can be applied selectively and discriminately. The situation would worsen as more states acquired an ASAT capability.

### An arms race in space would be destabilizing ensuring conflict – countries would launch pre-emptive attacks.

Hitchens ‘8

Theresa Hitchens, directs the Center for Defense Information in Washington, D.C., and leads its Space Security Project, in cooperation with the Secure World Foundation. She is author of Future Security in Space: Charting a Cooperative Course (2004) and was editor of Defense News from 1998 until 2000. “Space Wars”. Scientific American, Mar2008, Vol. 298, Issue 3. EbscoHost

Yet any arms race in space would almost inevitably destabilize the balance of power and thereby multiply the risks of global conflict. In such headlong competition--whether in space or elsewhere--equilibrium among the adversaries would be virtually impossible to maintain. Even if the major powers did achieve stability, that reality would still provide no guarantee that both sides would perceive it to be so. The moment one side saw itself to be slipping behind the other, the first side would be strongly tempted to launch a preemptive strike, before things got even worse. Ironically, . Again, there would be strong temptation to strike first, before the adversary could catch up. Finally, a space weapons race would ratchet up the chances that a mere technological mistake could trigger a battle. After all, in the distant void, reliably distinguishing an intentional act from an accidental one would be highly problematic.

## Lunar Base Adv – Motivation Ext

### The Vision for Space Exploration lacks any strategies to fulfill its goals.

**Hsu 9**

Feng Hsu, Ph.D. and Sr. Fellow, Aerospace Technology Working Group, February 27, 2009, Sustainable Space Exploration and Space Development - A Unified Strategic Vision, Space Ref, http://www.spaceref.com/news/viewsr.html?pid=30702

There have been heated debates in the public as well as within the space-science, industry and technology communities regarding the wisdom of the current Vision for Space Exploration (VSE), and its proposed implementation, as crafted and set out by the previous administration. More than 5 years have now gone by since its announcement in early 2004. It has become increasingly apparent that the thoughts and rationale that went into the formulation of the existing VSE and its implementation were quite problematic, and perhaps even lacked a strong strategic merit, to say the least. In fact, many of us in the space and intellectual communities find the VSE's lack of strategic vigor not much of a surprise, especially considering the rudimentary decision-making apparatus and processes of the previous administration, which led to many other lackluster major decisions on national and international imperatives. In our view, there were several fundamental problems with the Bush Vision and its implementation for Space Exploration inherited from the get-go: (1) Due to the lack of well-informed debate, engaging a broad range of the space and science community, policymakers, and the general public, the Bush VSE was crafted without the thorough reviews and studies necessary at the strategic space policy level. And in particular, such an almost-Apollo-style, huge national program of long-lasting impacts on national resources and sustainable space development was imposed to the American people, without learning the lessons of major program failures, successes, and key performance history of NASA since the Apollo era. (2) The VSE lacks strategic merit, which can only be built upon a sufficiently vetted decision-making process of logic and analytic rigor. Especially, such process should have been scrutinized through hearings to engage the American public and politicians. Instead, the Bush VSE was a product of a blind and near-childish emotional response to a series of domestic and international geopolitical events that occurred in 2003, such as the launch of China's Shenzou-5 manned spacecraft on the 15th of October and the STS-107 (Columbia) Space Shuttle disaster in early February. (3) Most notably, the political motives behind the sudden announcement of VSE by the Bush White House were severely undermined by the fact that the American public and politicians alike were largely distressed by the then chaotic situation of the war in Iraq, in which our nation and the executive branch were confronted with huge financial and political burdens from the two ongoing and costly wars in the Middle East. (4). The budget necessary to fulfill Bush's VSE and the planned implementation for Space Exploration has far exceeded any financial resources available to this nation, as indicated by a recent GAO report. Therefore, many escalated budget cuts to earth monitoring, space science and robotic exploration programs may be inevitable in order to compensate for the extremely costly Constellation program, which was sold to congress in a hurry, with such unbelievable timing. (5) The VSE falls short of addressing the national and international needs of human endeavors for space development objectives. Especially, the Bush VSE missed (or lacked) almost entirely any strategic vision and goals for supporting and enabling space-based human economic expansion or industrialization in space. Such critical aspects of human space activities are fundamentally unique, and are quite different kinds of challenges from the space exploration activities undertaken by NASA.

### The goal of the VSE doesn’t remedy motivation problems – we need a specific strategy to expand space exploration

**Zubrin 2005**

[Robert Zubrin, an astronautical engineer, is president of Pioneer Astronautics, a research and development firm, and president of the Mars Society, a space advocacy group, “Getting Space Exploration Right," The New Atlantis, Number 8, Spring 2005, http://www.thenewatlantis.com/publications/getting-space-exploration-right Acc. 6/29/11 // JDI bjk]

It is not enough that NASA’s human exploration efforts “have a goal.” The goal selected needs to be the right goal, chosen not because various people are comfortable with it, but because there is a real reason to do it. We don’t need a nebulous, futuristic “vision” that can be used to justify random expenditures on various fascinating technologies that might plausibly prove of interest at some time in the future when NASA actually has a plan. Nor do we need strategic plans that are generated for the purpose of making use of such constituency-based technology programs. Rather, the program needs to be organized so that it is the goal that actually drives the efforts of the space agency. In such a destination-driven operation, NASA is forced to develop the most practical plan to reach the objective, and on that basis, select for development those technologies required to implement the plan. Reason chooses the goal. The goal compels the plan. The plan selects the technologies. So what should the goal of human exploration be? In my view, the answer is straightforward: Humans to Mars within a decade. Why Mars? Because of all the planetary destinations currently within reach, Mars offers the most—scientifically, socially, and in terms of what it portends for the human future.

## AT: Satellites Scenario – 1NC

SPACE DEBRIS SOLVED NOW -

- Japanese fishing nets   
The Telegraph 2011 [http://www.telegraph.co.uk/science/space/8296288/Fishing-net-to-collect-space-debris.html](http://www.telegraph.co.uk/science/space/8296288/Fishing-net-to-collect-space-debris.html" \t "_blank)   
A giant net several kilometres in size has been built as part of a collaboration between Japan’s space agency and a 100-year-old fishing net company to collect debris from space. The Japan Aerospace Exploration Agency (JAXA) and Nitto Seimo Co aim to tackle the increasingly hazardous problem of rubbish in orbit around the Earth damaging space shuttles and satellites once and for all. Last year, a US report concluded that space was so littered with debris that a collision between satellites could set off an “uncontrolled chain reaction” capable of destroying the communications network on Earth. It is estimated there are 370,000 pieces of space junk. The Japanese plan will see a satellite attached to a thin metal net spanning several kilometres launched into space. The net is then detached, and begins to orbit earth, sweeping up space waste in its path. During its rubbish collecting journey, the net will become charged with electricity and eventually be drawn back towards earth by magnetic fields – before both the net and its contents burn upon entering the atmosphere. It is likely the nets will target the orbital paths of space shuttles which are constantly monitored for debris. It is thought that the net will remain in orbit for several weeks, collecting enough rubbish to make the trip financially worthwhile, before sending another net into space. Inspired by a basic fishing net concept, the super-strong space nets have been the subject of extensive research by Nitto Seimo for the past six years and consist of three layered metal threads, each measuring 1mm diameter and intertwined with fibres as thin as human hair. The company, which became famous for inventing the world’s first machine to make strong knotless fishing nets in 1925, is aiming for the fuel-free system to be completed within two years. As many as ten million pieces of human-made debris are estimated to be circulating in space at any one time and the issue has long been a cause for concern, because of the potential for collisions with satellites and shuttles. The majority of the debris in space is believed to consist of small particles but some objects are larger, including spent rocket stages, defunct satellites and collision fragments. The US Defence Department’s interim Space Posture Review 2010 found that the volume of abandoned rockets, shattered satellites and missile shrapnel in the Earth’s orbit is threatening the £174 billion space services industry. Scientists said that a single collision between two satellites or large pieces of “space junk” could send thousands of piece of debris spinning into orbit, each capable of destroying further satellites. Global positioning systems, international phone connections, television signals and weather forecasts were among the services at risk of being disrupted, according to the report. In 2006 the Atlantis shuttle was hit by a small fragment of a circuit board which created a small hole through the radiator panels in the cargo bay. British scientists welcomed the plans yesterday but voiced concern. Dr Maggie Aderin-Pocock, a space scientist, said: “I’m glad someone is doing something about it because space debris is extremely dangerous. This sounds like a fairly straight forward solution and I think it could work if used properly. “However, I am slightly apprehensive as the net will have to be used carefully because we wouldn’t want a real satellite getting caught up in the net.”

**-** Russian push out Nancy Atkinson Professor at North Alabama and Maryland, department of history 2010 [http://www.universetoday.com/80643/russia-wants-to-build-sweeper-to-clean-up-space-debris/ November 29, 2010 Russia is using sweepers and sweeper pods to push debris out of orbit  
Energia Russia is looking to build a $2 billion orbital “pod” that would sweep up satellite debris from space around the Earth. According to a post on the Russian Federal Space Agency, Roscosmos’ Facebook site, (which seems to confirm an earlier article by the Interfax news agency) the cleaning satellite would work on nuclear power and be operational for about 15 years. The Russian rocket company, Energia proposes that they would complete the cleaning satellite assembly by 2020 and test the device no later than in 2023. “The corporation promises to clean up the space in 10 years by collecting about 600 defunct satellites on the same geosynchronous orbit and sinking them into the oceans subsequently,” Victor Sinyavsky from the company was quoted as saying. Sinyavsky said Energia was also in the process of designing a space interceptor that would to destroy dangerous space objects heading towards the Earth. No word on exactly how the space debris cleaner would work, of how it would push dead satellites and other debris into a decaying orbit so that objects would burn up in the atmosphere, or if it might somehow gather up or “vacuum” debris. But at least someone is thinking about space debris and asteroid deflection and putting more than just a few rubles (60 billion of ‘em) towards these concepts

### - Space Lasers **The Week ‘11**

The Week, NASA’s Plan to Clean up Space Junk: Lasers. 3/17/11. <http://theweek.com/article/index/213197/nasas-plan-to-clean-up-space-junk-lasers>.

Actually, it wouldn't destroy it. Instead,NASA's plan is to move the garbage out of the path of satellites and spacecraft. The laser would ideally be mounted on one of the Earth's poles, where the atmosphere is thinner, and would send pulses of photon pressure to "nudge" objects out of the way.

NO ATTACKS AGAINST OUR SATELLITES -

- Deterrence

Morgan Defense Policy Analyst @ RAND 2010 Forrest Deterrence and First-Strike Stability in Space A Preliminary Assessment www.rand.org/pubs/monographs/2010/RAND\_MG916.pdf

Conversely, since commercial satellite communication (SATCOM) platforms typically support a host of international users as well as U.S. forces, the political costs and escalatory risks of mounting destructive attacks on those assets would likely deter the opponent from attempting to do so until the conflict escalated to a higher level. Satellites supplying PNT data—i.e., GPS—would probably be relatively safe from destructive attack until very high levels of conflict, because the distributed nature of that system would make it difficult for an opponent to realize much benefit from individual attacks.

### - Space weapons are vulnerable to accidents and failure

Hitchens ‘8

Theresa Hitchens, directs the Center for Defense Information in Washington, D.C., and leads its Space Security Project, in cooperation with the Secure World Foundation. She is author of Future Security in Space: Charting a Cooperative Course (2004) and was editor of Defense News from 1998 until 2000. “Space Wars”. Scientific American, Mar2008, Vol. 298, Issue 3. EbscoHost

They would be just as vulnerable as satellites are to all kinds of outside agents: space debris, projectiles, electromagnetic signals, even natural micrometeoroids. Shielding space weapons against such threats would also be impractical, mostly because shielding is bulky and adds mass, thereby greatly increasing launch costs. Orbital weapons would be mostly autonomous mechanisms, which would make operational errors and failures likely. The paths of objects in orbit are relatively easy to predict, which would make hiding large weapons problematic. And because satellites in low Earth orbit are overhead for only a few, minutes at a time, keeping one of them constantly in range would require many weapons.

### - Key satellites are not targets for attack

Christy ‘6

Lieutenant Colonel Donald P. Christy, United States Air Force. “United States Policy on Weapons in Space”. March 15, 2006. www.strategicstudiesinstitute.army.mil/pdffiles/ksil307.pdf

The third argument for weapons in space is that there is a threat to the ever-growing United States economic dependence on space. This presumably makes space assets a target for a potential enemy and requires we defend those assets with space weapons. The questions to consider here are many. How great is the cost to defend those assets with space weapons verses the cost of the assets themselves? Most military space systems are many times more expensive than the civilian satellites they would presumably protect. How likely are civilian space assets to be targeted by an adversary in any case? Most civilian systems or systems with significant economic value operate in very high earth orbit (11,000 nm to 24,000 nm) making them more difficult to target than a military reconnaissance satellite in low earth orbit (350 nm). Finally, why would an enemy want to threaten such systems? Presumably, the reason would be to hurt the United States economically or coerce behavior.38 Since most economic space assets have terrestrial alternatives like fiber optic communications or terrestrial navigation aids, it would seem space assets would be an unlikely target given the technical capabilities necessary to damage them decisively. Precision would be difficult to achieve. In a highly globalized world economy, damaging space infrastructure would very likely affect more than just the United States economy. Finally, numerous earthbound targets exist that would cause comparable or greater impact at significantly less cost and effort to an adversary.

## AT: Satellites Scenario – Fishing Net ext

### **Fishing net solves space debris**

Normile ‘11

Science Insider: Space Age Fish Tale Gets Lost in Translation. Dennis Normile 2/4/11. <http://news.sciencemag.org/scienceinsider/2011/02/space-age-fish-tale-gets-lost-in.html>

TOKYO—'Fishing net' to collect space debris," blared a headline in Wednesday's edition of London's The Telegraph newspaper. The article described how the Japan Aerospace Exploration Agency (JAXA) and a Japanese fishing net maker had teamed up to make "a giant net several kilometers in size" that would sweep up abandoned satellites and drag them into the atmosphere to burn up. The Telegraph quoted Maggie Aderin-Pocock, a space scientist, as praising the plan but soberly urging care, "because we wouldn't want a real satellite getting caught up in the net." This satellite fishing system could be completed "within 2 years," the paper claimed.

## AT: Satellites Scenario – Russian Push Out ext

### Russian investments solve space debris now – they’re pushing it out of orbit.

Beck ‘10

(Julie Beck 11.29.2010 at 6:40 pm http://www.popsci.com/technology/article/2010-11/russia-invests-2-billion-clean-space-debris)

Hare-brained schemes for cleaning up space debris have been batted around for some time, but Russia has finally put some money down on a real project. Russia’s space corporation, Energia, is going to invest $2 billion to build a space pod to fly around and knock the junk out of orbit and out of our way. Hopefully it will burn up in the atmosphere, or land in the ocean, and notrain down on Chinese villagers. This pod could help reopen orbits that are currently inaccessible to future spacecraft due to the amount of shredded metal and empty hulls of dead satellites floating around. Using an ion drive, it will gently nudge these useless scraps out of orbit. Energia plans to have completed testing on the pod, which will have a nuclear power core, by 2020, and have it in service no later than three years after. It will have a lifespan of about 15 years, enough time to make a significant dent in our space debris problem. Energia is also working on developing an “interceptor” spacecraft using similar technology. This craft would be able to derail any incoming comets or other outer-space projectiles that might be hurtling towards Earth, and change their trajectory just enough that they miss us.

### Russia and other countries are building garbage collectors, nets, and lasers to clean up debris

Voice of Russia 11, (The Russian Government’s radio broadcasting service, By: Boris Pavlishchev, “Garbage collector to go into space,” The Voice of Russia, July 14, 2011 http://english.ruvr.ru/2011/07/14/53235625.html)

Russia’s Energia Space Corporation is developing a manned spacecraft to repair satellites in the orbit and sweep up satellite debris from space around the Earth. The spacecraft will be launched from the Vostochny cosmodrome in 2015. The spacecraft will take a two-man crew who will make space walks and replace blocks of the satellites or use a mechanical hand to do so. The cosmonauts will fly for two weeks, says a consultant to the president of the Energia Corporation, Victor Sinyavsky. The defunct satellites pose great danger. They should be collected into a special vehicle and drowned them in the ocean on earth. This method will help to clean up the space from debris. Some 600 thousand fragments of satellites and rockets measuring from one centimeter and more are flying around the Earth. Specialists are monitoring the trajectories of 19 thousand large fragments weighing several kilograms. However, a tiny piece might pierce a space suit of a cosmonaut. The growing amount of space debris is becoming more acute every year. Consequently, the International Space Station has consistently been monitoring them. It declares an emergency situation almost each week. The new spacecraft can gather several large fragments that may pose a threat to the ISS. It’s difficult to say how many pieces of debris it can collect because they fly at various orbits and the spacecraft has a limited amount of fuel for manoeuvres. According to Victor Sinyavsky, such a ship is capable of cleaning the geo-stationary orbit, which is over populated with functioning and defunct satellites. When the defunct satellites are removed, the price of free space for one satellite is estimated at 20-50 million U.S. dollars and the telecommunication companies will willingly buy these places. The western countries are also developing projects to fight against space debris. They suggest taking defunct satellites to a higher orbit than the geo-stationary one or gather debris using a super-light net released by satellites. Another one is to direct a laser to a fragment and with the release of vapour, the fragment shifts to a lower orbit and will fall to the Earth due to gravitational pull. For one, when the ISS crew lost their bags with instruments during space walks, their burned particles fell on the Earth after a few months. The American Vnaguard-1 launched in 1958 is the first defunct satellite. It will pose a threat in orbit for another 200 years. The first ever collision of debris and a satellite was reported in 1996. A fragment of a French satellite broke away from it and hit another French satellite. The ISS is still carrying out manoeuvres to escape a blow from a fragment of an old Chinese satellite, which is left after China tested its anti-missile defence system in 2007. In 2009, An American satellite collided with a defunct Russian satellite. This was the first ever collision of two satellites. Although this has not happened again, it’s high time to develop a system to clean up outer space from debris.

## AT: Satellites Scenario – AT: Heg

### No impact to military satellites – they are protected **MSNBC ‘11**

MSNBC. 4/17/2011. <http://www.msnbc.msn.com/id/42634299/ns/technology\_and\_science-space/t/darpa-wants-telescopes-protect-military-satellites-space-junk/>.

Satellites that support U.S. military missions around the world can fall prey to collisions with space junk, tiny meteoroids and even enemy microsatellites. Now the Pentagon's DARPA division has begun deploying new ground-based telescopes that can take wide-angle views of small deep-space objects and keep the space sentinels safe.The innovative design of DARPA's telescope can provide the same space surveillance data "in a matter of nights" that existing telescopes require weeks or months to provide, according to Lt. Col. Travis Blake, DARPA’s Space Surveillance Telescope (SST) program manager and an Air Force officer. "Currently we have a 'soda straw' view of deep space, where we can only see one narrow segment of space at a time," Blake said. "The Space Surveillance Telescope should give us a much wider 'windshield' view of deep space objects, significantly enhancing our space situational awareness."

## AT: Satellites Scenario – Econ Impact Defense

### Economy resilient – we’ve survived worse

**Le Masurier ‘10**

September, Scoop du Jour: Americans will adapt to economic woes, Peninsula Gateway, Lexis

The global economy is shrinking for the first time since WWII, causing subsequent financial disasters for countries like Greece, which then undermines whatever weak recovery was underway. It’s clear this recession has run deeper than most people expected. And, yet, as bad as it is today, Americans have survived worse. During the Great Depression, unemployment hit 24.9 percent, and it never dropped below 16 percent between 1932 and 1936, staying in the teens until WWII. Add in a dust bowl that was created by the severe drought at the time, soup kitchens and long bread lines, and it starts to give us some perspective on current affairs. Things have been worse in the world as well as America. The Dark Ages aren’t likely to make a return. We no longer force children to work full-time jobs in factories, at least in this country. The chances of a new Civil War breaking out seem slim. We’re making progress on civil rights. New challenges have arisen, of course, because, as people, we collectively continue to fall short of perfection. But the quality of life in America has generally gotten better over time. To most of the world, 92 percent of us still live a luxurious life, worrying about whether to cut some cable channels rather than where to find a scrap of food. That doesn’t ease the pain of those among us who are struggling to keep their homes, or who have visited the food bank for the first time in their lives. That suffering is real, right now. But it will eventually pass. The economy will get better. New jobs will emerge that never existed before. Home values will stabilize. Slowly, over time, America will get healthy again. The quality of life will continue to improve at home and abroad, as it has done throughout the history of man. Looking back at historical patterns tells us that it will. But there’s an even more convincing reason to take an optimistic view of the future: the resilient human capacity for change. Mankind has continually adapted to many dynamic changes in the environment since before the time we had fire and lived in caves. We are a resourceful and inventive species, and we will use our creativity and ingenuity to lift ourselves out of this current problem. We can do it because we have always done it.

### **No causality – economic decline doesn’t cause war**

Ferguson in ‘6

Niall Ferguson, MA, D.Phil., is the Laurence A. Tisch Professor of History at Harvard University and William Ziegler Professor at Harvard Business School, “The Next War of the World”, Foreign Affairs 85.5, Proquest

There are many unsatisfactory explanations for why the twentieth century was so destructive. One is the assertion that the availability of more powerful weapons caused bloodier conflicts. But there is no correlation between the sophistication of military technology and the lethality of conflict. Some of the worst violence of the century -- the genocides in Cambodia in the 1970s and central Africa in the 1990s, for instance -- was perpetrated with the crudest of weapons: rifles, axes, machetes, and knives. Nor can economic crises explain the bloodshed. What may be the most familiar causal chain in modern historiography links the Great Depression to the rise of fascism and the outbreak of World War II. But that simple story leaves too much out. Nazi Germany started the war in Europe only after its economy had recovered. Not all the countries affected by the Great Depression were taken over by fascist regimes, nor did all such regimes start wars of aggression. In fact, no general relationship between economics and conflict is discernible for the century as a whole. Some wars came after periods of growth, others were the causes rather than the consequences of economic catastrophe, and some severe economic crises were not followed by wars.

### **Empirical studies show no causal relationship between economic decline and war – democratic regimes don’t collapse and authoritarian governments increase repression as a response.**

Miller in ‘1

Morris Miller, adjunct economics professor at the University of Ottawa. “Poverty: A Cause of War?”. Peace Magazine Jan-Mar 2001, page 8 http://archive.peacemagazine.org/v17n1p08.htm

Library shelves are heavy with studies focused on the correlates and causes of war. Some of the leading scholars in that field suggest that we drop the concept of causality, since it can rarely be demonstrated. Nevertheless, it may be helpful to look at the motives of war-prone political leaders and the ways they have gained and maintained power, even to the point of leading their nations to war. Poverty: The Prime Causal Factor? Poverty is most often named as the prime causal factor. Therefore we approach the question by asking whether poverty is characteristic of the nations or groups that have engaged in wars. As we shall see, poverty has never been as significant a factor as one would imagine. Largely this is because of the traits of the poor as a group - particularly their tendency to tolerate their suffering in silence and/or be deterred by the force of repressive regimes. Their voicelessness and powerlessness translate into passivity. Also, because of their illiteracy and ignorance of worldly affairs, the poor become susceptible to the messages of war-bent demagogues and often willing to become cannon fodder. The situations conductive to war involve political repression of dissidents, tight control over media that stir up chauvinism and ethnic prejudices, religious fervor, and sentiments of revenge. The poor succumb to leaders who have the power to create such conditions for their own self-serving purposes. Desperately poor people in poor nations cannot organize wars, which are exceptionally costly. The statistics speak eloquently on this point. In the last 40 years the global arms trade has been about $1500 billion, of which two-thirds were the purchases of developing countries. That is an amount roughly equal to the foreign capital they obtained through official development aid (ODA). Since ODA does not finance arms purchases (except insofar as money that is not spent by a government on aid-financed roads is available for other purposes such as military procurement) financing is also required to control the media and communicate with the populace to convince them to support the war. Large-scale armed conflict is so expensive that governments must resort to exceptional sources, such as drug dealing, diamond smuggling, brigandry, or deal-making with other countries. The reliance on illicit operations is well documented in a recent World Bank report that studied 47 civil wars that took place between 1960 and 1999, the main conclusion of which is that the key factor is the availability of commodities to plunder. For greed to yield war, there must be financial opportunities. Only affluent political leaders and elites can amass such weaponry, diverting funds to the military even when this runs contrary to the interests of the population. In most inter-state wars the antagonists were wealthy enough to build up their armaments and propagandize or repress to gain acceptance for their policies. Economic Crises? Some scholars have argued that it is not poverty, as such, that contributes to the support for armed conflict, but rather some catalyst, such as an economic crisis. However, a study by Minxin Pei and Ariel Adesnik shows that this hypothesis lacks merit. After studying 93 episodes of economic crisis in 22 countries in Latin American and Asia since World War II, they concluded that much of the conventional thinking about the political impact of economic crisis is wrong: "The severity of economic crisis - as measured in terms of inflation and negative growth - bore no relationship to the collapse of regimes ... or (in democratic states, rarely) to an outbreak of violence... In the cases of dictatorships and semi-democracies, the ruling elites responded to crises by increasing repression (thereby using one form of violence to abort another)."

### There is no evidence that low levels of economic growth leads to diversionary conflicts.

**Oneal and Tir in ‘6**

John R. Oneal is Associate Professor and Director of International Studies at the University of Alabama, and Jaroslav Tir is Assistant Professor in Political Science at the University of Georgia. “Does the Diversionary Use of Force Threaten the Democratic Peace? Assessing the Effect of Economic Growth on Interstate Conflict, 1921–2001”. International Studies Quarterly (2006) 50, 755–779. Ebsco.

In this article, we assess whether diversionary incentives increase the likelihood of interstate conflict and threaten the democratic peace, focusing on the influence of hard economic times. We use the method adopted in previous research on the democratic peace: directed and nondirected dyadic analyses of pooled time-series data regarding militarized interstate disputes. This allows us to confront the evidence for the democratic peace directly with tests of diversionary theory. Our dyadic approach is an important departure from most previous research on the diversionary thesis, which has used a monadic framework. Smith (1996) has shown that the strategic interaction of statesFobservable only in directed dyadsFmust be considered in testing for diversionary conflict because domestic problems may simultaneously make a state a likely initiator and a forbidding target. Thus, we examine the influence of slow economic growth on states’ initiation of and their involvement in militarized disputes, 1921–2001. We also test the effect of the timing of legislative elections on interstate conflict. Our results indicate that diversionary incentives pose little threat to Kant’s vision. Slow economic growth increases the incidence with which democracies initiate militarized disputes against autocracies, states with mixed political regimes, and even other democracies; but only a small minority of democracies experience such slow growth that the greater peacefulness of democratic dyads is eliminated. There is little evidence that poor economic performance increases the initiation of disputes by the leaders of powerful democracies, including the United States, which are thought to be most prone to using force for partisan purposes. Of five prominent democracies examined, only Israel seems to respond to diversionary incentives. We also show that military conflict is unaffected by the timing of legislative elections. Kant’s hope for a dramatically more peaceful world does not seem misplaced.

## AT: Space Leadership

### Obama’s plan replaces VSE with a more effective space strategy – key to leadership

Mace 11 (Frank, “In Defense of the Obama Space Exploration Plan”, Harvard Political Review, 4-7, http://hpronline.org/united-states/in-defense-of-the-obama-space-exploration-plan/)

Armstrong, Lovell, and Cernon assert that the Obama plan will sacrifice American leadership in space. Worthy recipients of the status of national hero, these astronauts nonetheless hail from the space race era. Obama, however, points out that “what was once a global competition has long since become a global collaboration.” I agree with the president that the ambitious nature of his plan will do nothing but “ensure that our leadership in space is even stronger in this new century than it was in the last” as well as “strengthen America’s leadership here on earth.”

Obama’s space exploration plan will create jobs, advance science, and inspire a nation, and it will do so not by sacrificing American dominance in space, but by extending that dominance into new areas of research and exploration.

### Space leadership is high

Klotz, 7/6/11, (Irene) (Irene Klotz is a Florida-based freelance writer who has covered the space program for 24 years. Many companies, including Discovery Communications have kindly and generously commissioned Klotz's work. One of those companies was SPACE.com, a startup headed by CNN's Lou Dobbs) (Shuttles' end stirs doubts about U.S. space program) (http://www.msnbc.msn.com/id/41767029/ns/technology\_and\_science-space/t/shuttles-end-stirs-doubts-about-us-space-program/)

As the clock ticks down to this week's final space shuttle launch, there is a mounting sense of uncertainty about future U.S. dominance in space. If all goes according to plan, Friday morning's launch of shuttle Atlantis on a 12-day mission to the International Space Station will mark the end of an era in the U.S. manned spaceflight program. But veteran former astronauts say the space program is in "disarray" and fear the end of the shuttles could mean a permanent decline in U.S. space leadership as well. Even one senior NASA official voiced pointed criticism recently about what he described as "poor policy" and the lack of any coherent leadership from Washington. The White House and NASA's leaders have insisted, however, that America still has a bright future in space. NASA is just retooling, officials have said, while adding that the U.S. space agency now plans to use some of the shuttle's budget to develop spaceships that can travel beyond the space station's 220-mile-high orbit, where the shuttles cannot go. "When I hear people say or listen to media reports that the final shuttle flight marks the end of U.S. human space flight, I have to say ... these folks must be living on another planet," NASA administrator Charlie Bolden said last week at a National Press Club luncheon. Scraping the shuttle also enables NASA to maintain the space station through at least 2020 -- five years beyond original budget projections, officials say. But what is most troubling to space enthusiasts is the gap between the shuttle's end and the start of a new program, with the roll-out of a new generation of spacecraft. "We're all victims of poor policy out of Washington D.C., both at the NASA level and the executive branch of the government and it affects all of us," NASA's launch director Mike Leinbach told his team after a final shuttle training run last week. "I'm embarrassed that we don't have better guidance. Throughout the history of the manned spaceflight program we've always had another program to transition into," he said.

### Commercial industry is filling in now – they solve better

Pelton 10 (Joseph N., Research Professor – Institute for Applied Space Research at the George Washington University, “A New Space Vision for NASA—and for Space Entrepreneurs Too?”, Space Policy, 26(2), May, p. 78)

NASA--now past 50--is well into middle age and seemingly experiencing a mid-life crisis. Any honest assessment of its performance over the past two decades leads to the inexorable conclusion that it is time for some serious review and even more serious reform. National U.S. Space Study Commissions have been recommending major reform for some years and ﬁnally someone has listened. President Obama has had the political and programmatic courage to make some serious shifts in how NASA does its business. It is no longer sufﬁcient to move some boxes around and declare this is the new and improved NASA. One of the key messages from the 2004 Aldridge Commission report, which was quickly buried by NASA, was words to this effect: “Let enterprising space entrepreneurs do what they can do better than NASA and leave a more focused NASA do what it does bestdnamely space science and truly long range innovation” [1]. If one goes back almost 25 years to the Rogers Commission [2] and the Paine Commission [3] one can find deep dissatisfaction with NASA productivity, with its handling of its various space transportation systems, and with its ability to adapt to current circumstances as well as its ability to embark on truly visionary space goals for the future. Anyone who rereads the Paine Commission report today almost aches for the vision set forth as a roadmap to the future in this amazing document. True there have been outstanding scientiﬁc success stories, such as the Hubble Telescope, but these have been the exception and not the rule. The first step, of course, would be to retool and restructure NASA from top to bottom and not just tweak it a little around the edges. The ﬁrst step would be to explore what space activities can truly be commercialized and see where NASA could be most effective by stimulating innovation in the private sector rather than undertaking the full mission itself. XPrize Founder Peter Diamandis has noted that we don't have governments operating taxi companies, building computers, or running airlines, and this is for a very good reason. Commercial organizations are, on balance, better managed, more agile, more innovative, and more market responsive than government agencies. People as diverse as movie maker James Cameron and Peter Diamandis feel that the best way forward is to let space entrepreneurs play a greater role in space development and innovation. Cameron strongly endorsed a greater role for commercial creativity in U.S. space programs in a February 2010 Washington Post article and explained why he felt this was the best way forward in humanity's greatest adventure: “I applaud President Obama's bold decision for NASA to focus on building a space exploration program that can drive innovation and provide inspiration to the world. This is the path that can make our dreams in space a reality” [4].

### U.S. doesn’t face competition—Russia and China are lagging

AP, 6/12/11, (AP) (China's space program shoots for moon, Mars, Venus) (http://ns.gazettenet.com/2011/07/12/china039s-space-program-shoots-for-moon-mars-venus)

Its space laboratory module, due to be launched later this year, will test docking techniques for the space station. China's version will be smaller than the International Space Station, which is the size of a football field and jointly operated by the U.S., Russia, Canada, Japan and 11 European countries. "China has lagged 20 to 40 years behind the U.S. in developing space programs and China has no intention of challenging U.S. dominance in space," said He Qisong, a professor at Shanghai University of Political Science and Law. "But it is a sign of the national spirit for China to develop a space program and therefore it is of great significance for China." Some elements of China's program, notably the firing of a ground-based missile into one of its dead satellites four years ago, have alarmed American officials and others who say such moves could set off a race to militarize space. That the program is run by the military has made the U.S. reluctant to cooperate with China in space, even though the latter insists its program is purely for peaceful ends. "Space technology can be applied for both civilian and military use, but China doesn't stress the military purpose," said Li Longchen, retired editor-in-chief of Chinese magazine "Space Probe." "It has been always hard for humankind to march into space and China must learn the lessons from the U.S." China is not the only country aiming high in space. Russia has talked about building a base on the moon and a possible mission to Mars but hasn't set a time frame. There may also be economic reasons to explore the moon: It contains minerals and helium-3, a potential rich source of energy through nuclear fusion. "But that's way ahead," said Bond, the Jane's editor. "A lot of it would be prestige, the fact that every time we went out and looked at the moon in the night sky we would say the Chinese flag is on there."

## AT: Space Leadership – Leadership Up

### New space policy increases U.S. leadership and credibility

Foust, 6/28/11, (Jeff Foust is an editor and publisher of The Space Review, operates the Spacetoday.net web site and the Space Politics and NewSpace Journal weblogs, bachelor's degree in geophysics from the California Institute of Technology and a Ph.D in planetary sciences from the Massachusetts Institute of Technology, Space Politics) (The national space policy turns one) (<http://www.spacepolitics.com/2011/06/28/the-national-space-policy-turns-one/>)

The new policy placed a greater emphasis on space sustainability, responsible use of space, and international cooperation, while also supporting commercial space efforts, improved space system procurement, and other initiatives. So, one year later, how is the government doing to implement that policy? In this week’s issue of The Space Review, I report on one assessment of the policy from a panel discussion earlier this month in Washington. Peter Marquez, who coordinated the development of the policy last year as the director of space policy for the National Security Council (and is now working in the private sector), said in general government is doing a “good job” carrying out the policy. He cited in particular efforts by government agencies, working with industry and other governments, to battle the “existential threat” to GPS posed by LightSquared. However, the government is lagging in other areas, such as support for space situational awareness and progress on export control reform, he said. Another panelist, Andrew Palowitch, the director of the Space Protection Program, suggested that, for now, the impact of the new policy has been relatively limited. “Everything that happened in this last year, and everything that’s going to happen in the next year, is completely independent of that national space policy,” he said, citing the long lead times of space initiatives. He did, though, call the new space policy “fantastic” that will start having more of an impact in 18 to 24 months. Marquez disagreed with this assessment to some degree, arguing that what the US has been doing “on the international front” has been strong affected by the new policy. The policy, argued Ben Baseley-Walker of the Secure World Foundation, has helped improve the US’s reputation internationally: “What the national space policy has done is to start to rebuild trust, start to rebuild consistency, and start to rebuild the reliability of the US as an internationally-engaged partner.” However, panelists agreed that while the new policy is consistent in its general themes with the European Union’s proposed code of conduct for outer space activities, it does not mean the US will, or should, sign on to that code.

### NASA resilient

Berger and Tolson, 6/9/11, (Ric Berger, and Mike Tolson are writers for the Houston Chronicle) ('Like saying goodbye to an old friend'

Uncertainty starts to set in as roar of rocket fades) (<http://www.chron.com/disp/story.mpl/chronicle/7645662.html>)

Texas politicians, like their counterparts in Florida, were in nonpartisan agreement in expressing hope that Atlantis' emotional launch would help rekindle enthusiasm for an important American enterprise. U.S. Sen. Kay Bailey Hutchison, a Republican, said the U.S. "cannot afford to abdicate" its leadership in space matters. Few really argue that the shuttle needed to keep flying. All argue for something next. "It wasn't so much sadness that the shuttle's ending," said Ed Goetz, 52, a systems engineer for KSC engineering contractor SGT. "It's more sadness that we don't have anything to replace it." Their prayer, buoyed by a half-century of American ambition in space, is that the lull will be more short-lived than Griffin fears - that the absence of days like this one will be felt around the country. However valid may be the various criticisms of the space agency, to a person they believe in its mission. "Change is always hard and there are a lot of people that are going to be pretty affected - families displaced, new jobs to find," said Roselle Hanson, 58, said an engineering and technology deputy director for NASA. "**But we're an agency that's very resilient, very flexible in adapting to change**." In its own tiny way, Friday's launch was some evidence of that. The weather was iffy, with meteorologists forecasting only a 30 percent chance of the launch coming off. But the showers were more scattered than anticipated and there was a possibility. NASA's weather people watched every cloud. "We just worked the weather all day long," said Mike Moses, chairman of Atlantis' mission management team. "It ended up coming right down to the wire." Conditions were mostly "no go" until the last hour or so. Mission managers didn't clear the shuttle to go until about 10 minutes before its launch window opened, with the main concern being low clouds and showers in the vicinity of the landing strip where Atlantis would have to return if there were a problem during its ascent. After meteorologists in Houston finally became comfortable with the landing facility weather, launch director Mike Leinbach cleared commander Chris Ferguson and his crew of Doug Hurley, Sandy Magnus and Rex Walheim to go and fly. "The shuttle is always going to be a reflection of what a great nation can do," Ferguson replied.

## AT: Space Leadership – Heg Impact

### Hegemony fails at resolving conflicts and decline is inevitable

Maher 10 PhD candidate in Political Science @ Brown

Richard, Ph.D. candidate in the Political Science department at Brown University, The Paradox of American Unipolarity: Why the United States Will Be Better Off in a Post-Unipolar World, 11/12/2010 Orbis, ScienceDirect

And yet, despite this material preeminence, the United States sees its political and strategic influence diminishing around the world. It is involved in two costly and destructive wars, in Iraq and Afghanistan, where success has been elusive and the end remains out of sight. China has adopted a new assertiveness recently, on everything from U.S. arms sales to Taiwan, currency convertibility, and America's growing debt (which China largely finances). Pakistan, one of America's closest strategic allies, is facing the threat of social and political collapse. Russia is using its vast energy resources to reassert its dominance in what it views as its historical sphere of influence. Negotiations with North Korea and Iran have gone nowhere in dismantling their nuclear programs. Brazil's growing economic and political influence offer another option for partnership and investment for countries in the Western Hemisphere. And relations with Japan, following the election that brought the opposition Democratic Party into power, are at their frostiest in decades. To many observers, it seems that America's vast power is not translating into America's preferred outcomes. As the United States has come to learn, raw power does not automatically translate into the realization of one's preferences, nor is it necessarily easy to maintain one's predominant position in world politics. There are many costs that come with predominance – material, political, and reputational. Vast imbalances of power create apprehension and anxiety in others, in one's friends just as much as in one's rivals. In this view, it is not necessarily *American* predominance that produces unease but rather American *predominance*. Predominance also makes one a tempting target, and a scapegoat for other countries’ own problems and unrealized ambitions. Many a Third World autocrat has blamed his country's economic and social woes on an ostensible U.S. conspiracy to keep the country fractured, underdeveloped, and subservient to America's own interests. Predominant power likewise breeds envy, resentment, and alienation. How is it possible for one country to be so rich and powerful when so many others are weak, divided, and poor? Legitimacy—the perception that one's role and purpose is acceptable and one's power is used justly—is indispensable for maintaining power and influence in world politics. As we witness the emergence (or re-emergence) of great powers in other parts of the world, we realize that American predominance cannot last forever. It is inevitable that the distribution of power and influence will become more balanced in the future, and that the United States will necessarily see its relative power decline. While the United States naturally should avoid hastening the end of this current period of American predominance, it should not look upon the next period of global politics and international history with dread or foreboding. It certainly should not seek to maintain its predominance at any cost, devoting unlimited ambition, resources, and prestige to the cause. In fact, contrary to what many have argued about the importance of maintaining its predominance, America's position in the world—both at home and internationally—could very well be strengthened once its era of preeminence is over. It is, therefore, necessary for the United States to start thinking about how best to position itself in the “post-unipolar” world.

### Empirically, heg doesn’t solve conflict

Hachigan and Sutphen 2008

(Nina and Monica, Stanford Center for International Security, The Next American Century, p. 168-9, ldg)

In practice, the strategy of primacy failed to deliver. While the fact of being the world’s only superpower has substantial benefits, a national security strategy based on suing and retaining primacy has not made America more secure. America’s military might has not been the answer to terrorism, disease, climate change, or proliferation. Iraq, Iran, and North Korea have become more dangerous in the last seven years, not less. Worse than being ineffective with transnational threats and smaller powers, a strategy of maintaining primacy is counterproductive when it comes to pivotal powers. If America makes primacy the main goal of its national security strategy, then why shouldn’t the pivotal powers do the same? A goal of primacy signals that sheer strength is most critical to security. American cannot trumpet its desire to dominate the world military and then question why China is modernizing its military.

### U.S. hegemonic decline does not cause conflict or result in a power vacuum – empirically proven.

Fettweis 10- assistant professor of political science @ Tulane

Christopher, Survival, Volume 52, Issue 2, April

One potential explanation for the growth of global peace can be dismissed fairly quickly: US actions do not seem to have contributed much. The limited evidence suggests that there is little reason to believe in the stabilising power of the US hegemon, and that there is no relation between the relative level of American activism and international stability. During the 1990s, the United States cut back on its defence spending fairly substantially. By 1998, the United States was spending $100 billion less on defence in real terms than it had in 1990, a 25% reduction.[29](http://www.informaworld.com.www2.lib.ku.edu:2048/smpp/section?content=a920295991&fulltext=713240928#EN0029) To internationalists, defence hawks and other believers in hegemonic stability, this irresponsible 'peace dividend' endangered both national and global security. 'No serious analyst of American military capabilities', argued neo-conservatives William Kristol and Robert Kagan in 1996, 'doubts that the defense budget has been cut much too far to meet America's responsibilities to itself and to world peace'.[30](http://www.informaworld.com.www2.lib.ku.edu:2048/smpp/section?content=a920295991&fulltext=713240928#EN0030) And yet the verdict from the 1990s is fairly plain: the world grew more peaceful while the United States cut its forces. No state seemed to believe that its security was endangered by a less-capable US military, or at least none took any action that would suggest such a belief. No militaries were enhanced to address power vacuums; no security dilemmas drove insecurity or arms races; no regional balancing occurred once the stabilising presence of the US military was diminished. The rest of the world acted as if the threat of international war was not a pressing concern, despite the reduction in US military capabilities. Most of all, the United States was no less safe. The incidence and magnitude of global conflict declined while the United States cut its military spending under President Bill Clinton, and kept declining as the George W. Bush administration ramped the spending back up. Complex statistical analysis is unnecessary to reach the conclusion that world peace and US military expenditure are unrelated.

## AT: Space Leadership – Terrorism Impact

### Terrorists have had limited incentive to go nuclear – no ability to build their own couldn’t steal fissile material, or buy from corrupt insiders.

Mueller ‘10

John Mueller, professor of political science at Ohio State University. “Calming Our Nuclear Jitters”. Issues in Science and Technology. 1/1/2010. Vol.26,Iss.2;p.58-66. Academic Search Premiere.

In contrast to these predictions, terrorist groups seem to have exhibited only limited desire and even less progress in going atomic. This may be because, after brief exploration of the possible routes, they, unlike generations of alarmists, have discovered that the tremendous effort required is scarcely likely to be successful. The most plausible route for terrorists, according to most experts, would be to manufacture an atomic device themselves from purloined fissile material (plutonium or, more likely, highly enriched uranium). This task, however, remains a daunting one, requiring that a considerable series of difficult hurdles be conquered and in sequence. Outright armed theft of fissile material is exceedingly unlikely not only because of the resistance of guards, but because chase would be immediate. A more promising approach would be to corrupt insiders to smuggle out the required substances. However, this requires the terrorists to pay off a host of greedy confederates, including brokers and money-transmitters, any one of whom could turn on them or, either out of guile or incompetence, furnish them with stuff that is useless. Insiders might also consider the possibility that once the heist was accomplished, the terrorists would, as analyst Brian Jenkins none too delicately puts it, “have every incentive to cover their trail, beginning with eliminating their confederates.”

### No risk of nuclear terror- too many hurdles

Chapman ‘8

Steve Chapman, The Implausibility of Nuclear Terror, The Baltimore Sun, Feb. 11, 2008, LN

But remember: After 9/11, we all thought more attacks were a certainty. Yet al-Qaida and its ideological kin have proved unable to mount a second strike. Given their inability to do something simple - say, shoot up a shopping mall or set off a truck bomb - it's reasonable to ask whether they have a chance at something much more ambitious. Far from being plausible, argued Ohio State University professor John Mueller in a recent presentation at the University of Chicago, "the likelihood that a terrorist group will come up with an atomic bomb seems to be vanishingly small." The events required to make that happen consist of a multitude of Herculean tasks. First, a terrorist group has to get a bomb or fissile material, perhaps from Russia's inventory of decommissioned warheads. If that were easy, one would have already gone missing. Besides, those devices are probably no longer a danger, because weapons that are not scrupulously maintained (as those have not been) quickly become what one expert calls "radioactive scrap metal." If terrorists were able to steal a Pakistani bomb, they would still have to defeat the arming codes and other safeguards designed to prevent unauthorized use. As for Iran, no nuclear state has ever given a bomb to an ally - for reasons even the Iranians can grasp. Stealing some 100 pounds of bomb fuel would require help from rogue individuals inside some government who are prepared to jeopardize their lives. The terrorists, notes Mr. Mueller, would then have to spirit it "hundreds of miles out of the country over unfamiliar terrain, and probably while being pursued by security forces." Then comes the task of building a bomb. It's not something you can gin up with spare parts and power tools in your garage. It requires millions of dollars, a haven and advanced equipment - plus people with specialized skills, lots of time and a willingness to die for the cause. And if al-Qaida could make a prototype, another obstacle would emerge: There is no guarantee it would work, and there is no way to test it. Assuming the jihadists vault over those Himalayas, they would have to deliver the weapon onto American soil. Sure, drug smugglers bring in contraband all the time - but seeking their help would confront the plotters with possible exposure or extortion. This, like every other step in the entire process, means expanding the circle of people who know what's going on, multiplying the chance someone will blab, back out or screw up. Mr. Mueller recalls that after the Irish Republican Army failed in an attempt to blow up British Prime Minister Margaret Thatcher, it said, "We only have to be lucky once. You will have to be lucky always." Al-Qaida, he says, faces a very different challenge: For it to carry out a nuclear attack, everything has to go right. For us to escape, only one thing has to go wrong. That has heartening implications. If Osama bin Laden embarks on the project, he has only a minuscule chance of seeing it bear fruit. Given the formidable odds, he probably won't bother. None of this means we should stop trying to minimize the risk by securing nuclear stockpiles, monitoring terrorist communications and improving port screening. But it offers good reason to think that in this war, it appears, the worst eventuality is one that will never happen.

### Terrorism doesn’t pose an existential risk

Fettweis, Professor of Political Science, ‘10

Chris, Professor of Political Science @ Tulane,Threat and Anxiety in US Foreign Policy, Survival, 52:2

Even terrorists equipped with nuclear, biological or chemical weapons would be **incapable** of causing damage so cataclysmic that it would prove fatal to modern states. Though the prospect of terrorists obtaining and using such weapons is one of the most consistently terrifying scenarios of the new era, it is also highly unlikely and not nearly as dangerous as sometimes portrayed. As the well-funded, well-staffed Aum Shinrikyo cult found out in the 1990s, workable forms of weapons of mass destruction are hard to purchase, harder still to synthesise without state help, and challenging to use effectively. The Japanese group managed to kill a dozen people on the Tokyo subway system at rush hour. While tragic, the attack was hardly the stuff of apocalyptic nightmares. Super-weapons are simply not easy for even the most sophisticated non-state actors to use.31 If terror- ists were able to overcome the substantial obstacles and use the most destructive weapons in a densely populated area, the outcome would of course be terrible for those unfortunate enough to be nearby. But we should not operate under the illusion that doomsday would arrive. Modern industrialised countries can **cope with disasters**, both natural and man-made. As unpleasant as such events would be, they **do not represent existential threats**.

### Newest evidence – no nuclear retaliation

Kimball ‘9

Daryl. President of the ACA. Change U.S. Nuclear Policy? Yes, We Can. September 2009. http://www.armscontrol.org/act/2009\_09/focus.

Given the United States’ conventional military edge, no plausible circumstance requires or could justify the use of nuclear weapons to deal with a non-nuclear threat. They are useless in deterring or responding to nuclear terrorism. Gen. Colin Powell put it well in his 1995 autobiography: “No matter how small these nuclear payloads were, we would be crossing a threshold. Using nukes at this point would mark one of the most significant political decisions since Hiroshima.”

## AT: Space Exploration

### Lunar base isn’t necessary for going to Mars or deeper space exploration

Easterbrook, 2006 [Gregg. Friday, Dec. 8, Moon Baseless NASA can't explain why we need a lunar colony. http://www.slate.com/id/2155164/, editor of The Atlantic Monthly, The New Republic and The Washington Monthly an editor of The Washington Monthly, a contributing editor to Newsweek and to U.S. News & World Report, a columnist for the ecumenical website BeliefNet.com, a distinguished fellow of the Fulbright Foundation, a visiting fellow of the Brookings Institution]

Don't we need a moon base to go to Mars? No! When George W. Bush made his Mars-trip speech almost three years ago, he said a moon base should be built to support such a mission. This is gibberish. All concept studies of Mars flight involve an expedition departing from low-Earth orbit and traveling directly to the red planet. Stopping at the moon would require fuel to descend to the lunar surface, then blast off again, which would make any Mars mission hugely more expensive. The launch cost of fuel—that is, the cost of placing fuel into orbit—is the No. 1 expense for any manned flight beyond Earth. The Lunar Excursion Module, the part of the Apollo spacecraft that touched down, was two-thirds fuel—all exhausted landing and taking off again from the moon. Rocket technology hasn't changed substantially since the 1960s, so a large portion of the weight of any Earth-to-Moon-to-Mars expedition would be dedicated to the fuel needed for just the layover. This makes absolutely no sense, and the fact that administration officials get away with telling gullible journalists that a Mars mission would use a moon base shows how science illiteracy dominates the big media. (It is imaginable that a moon facility could support Mars exploration by refining supplies from the lunar surface and then using automated vessels to send the supplies to the red planet, or to rendezvous with an expedition en route. But that's pretty speculative, and at any rate, the cost of building a moon base would far exceed that of simply launching the supplies from Earth.)

**MARS TRADE-OFF – Lunar base trades off with mission to mars – that’s key to further space exploration**   
**O’Neill 8** [Ian O’Neill is a astrophysicist who studies space and writers for Aviation Week. August 1, 2008. “John Glenn Speaks Out Against Future Moon Base”; Aviation Week. http://www.optcorp.com/edu/articleDetailEDU.aspx?aid=57]

NASA's first man to orbit the [Earth](http://www.universetoday.com/guide-to-space/earth/" \t "blank), John Glenn has said a plan to set up a Moon base to facilitate the manned exploration of interplanetary space is a very bad idea. Under the current US government direction, NASA hopes to (eventually) establish the manned outpost for future launches to [Mars](http://www.universetoday.com/guide-to-space/mars/" \t "blank) and beyond, thus avoiding the huge gravity well of the Earth. But Glenn has cited the plan as "questionable," pointing out that to pack the huge amount of equipment on board the future Ares V rocket will be "enormously expensive." So what's the alternative? Build a vehicle in Earth orbit and accelerate it to the Red Planet… Legendary astronaut and former senator John Glenn isn't one to keep his opinions to himself, especially when the future of the US space agency is on the line. Back in May, Glenn sent a strong message to Washington: Extend the life of the Shuttle and re-commit to long-term investment in the International Space Station (after all, extending the Shuttle's lifetime is a bit better than some of the alternatives). His warnings come at a time when there is increased concern about NASA's "five-year gap" in its ability to ferry astronauts into space from Shuttle decommissioning in 2010 and first scheduled Orion module/Ares rocket launch in 2015. Glenn is not the only ex-astronaut speaking out about NASA's future. Buzz Aldrin, second man on the Moon and Apollo 11 lunar module pilot, also came forward in June with his worries that NASA will be overtaken by the space efforts of the international community. So why is John Glenn against the establishment of a lunar base? He was addressing US President George Bush's vision to set up a Moon base so it can be prepared as a launch pad to further explore space. "It seems to me the moon is questionable as a way station [to Mars]," Glenn said when addressing a congressional committee on July 30th. The hearing was held for a House Science and Technology Committee, in light of [NASA's 50 years of operation](http://www.universetoday.com/2008/08/01/50-years-of-nasa/" \t "blank) and future direction of the agency. "If that's what we're doing - which I don't believe it is - but if that's what we're thinking about doing, that is enormously expensive," he continued. From a financial standpoint, such a lunar outpost will be prohibitively expensive as thousands of tonnes of equipment will need to be launched to the Earth's only natural satellite. The alternative would be to build a large space vehicle in Earth orbit and then accelerate it toward Mars, bypassing the need for a lunar outpost. "That to me would be the cheapest way to go," he added.

**The environment in space is not good for telescopic operations to further advance space exploration**  
**Lester 6** [Dan Lester is a research scientist at the University of Texas Austin. November 2006. Physics Today. http://web.archive.org/web/20071107102620/http://www.physicstoday.org/vol-59/iss-11/p50.html]

But then there's the science question: Can we get science of higher quality by putting telescopes on the Moon rather than in other places? In general, I believe the answer to that question is no, and astronomy should not be a strategic driver for planning lunar-surface operations. Experience gained over 40 years has left us no lack of places to put telescopes in space. We have a large flotilla in Earth orbit and several telescopes in heliocentric orbit. Future major telescope facilities are almost all intended to be located at Earth–Sun Lagrange points. We can't dig holes and pour concrete at those places, but we don't need to. Free-space stabilization, telescope tracking, and flight operations are done with proven technology, much of which is off-the-shelf. Although low Earth orbit is a thermally challenging place—spacecraft there pass quickly through Earth's shadow—the 30-year-old technology on the Hubble Space Telescope (HST) provides continuous tracking to within 2 milliarcseconds, an accuracy superior to that achieved on the ground. Residual torques and forces at more distant places in space are vastly lower. Astronomers have touted the Moon's seismic quietness as an advantage for telescope pointing, but it doesn't come close to that of free space. For sky-background-limited IR telescopes, which must be cold, the quasi-stable second Earth–Sun Lagrange point (Earth–Sun L2, about 4 lunar distances beyond Earth) is a remarkable place and advantageous compared with lunar polar craters. With Earth, the Moon, and the Sun all in roughly the same direction, lightweight and easily deployable shields at L2 provide passive cooling to temperatures of a few tens of kelvin. The James Webb Space Telescope (JWST), now under construction and destined for Earth–Sun L2, will operate in this way below 40 K. Moreover, facilities there have abundant solar power and continuous line-of-sight communication with Earth. Moon-based astronomy used to be a broadly compelling idea, advanced by visionaries and strategic thinkers such as the late Harlan Smith, with whom I had the privilege to work closely. But it is precisely because our technology has advanced so dramatically that Moon-based astronomy is no longer that compelling. Dust may be a major limiting factor for lunar-surface operations because it poses a daunting challenge to the performance of precision optical, electrical, and mechanical systems. The razor-sharp lunar grains are highly abrasive and adhere electrostatically. Apollo astronauts were surprised at the dust's clinginess and the difficulty of keeping anything clean. Dust can be expected to cause problems on all mechanical interfaces, especially seals and bearings. Our astronauts struggled with those problems after just a day on the lunar surface. Although it was originally assumed that meteoritic impacts would distribute dust gradually and sporadically, the situation is more perilous. Lunar-surface operations, such as ascent and descent propulsion, surface transport, and the excavation of dust, rock, and grit, would disperse grains on broad ballistic trajectories. Even undisturbed, the natural lunar environment harbors a tenuous atmosphere of submicron dust that is lofted electrostatically as a result of photoelectric charging from UV light. The grain density in these "dust fountains" is not yet well known, but the phenomenon is not subtle. Apollo command-module astronauts saw with their own eyes the scattered sunlight from dust plumes at heights well above their orbital altitude. Even primitive cameras on the Surveyor and Lunokhod landers detected what was termed horizon glow from the levitated dust, as did the Clementine orbiter later. Deposited on optics, the dust would compromise the imaging performance and increase the emissivity of telescopes looking for extrasolar planets. That emissivity would add background noise to thermal IR measurements. No such pollutant is found in free space. Some people counter that we're going to the Moon anyway. We're going to have people based there, and we can use them! But this is not a humans-versus-robots issue. With due respect to critics, many scientists and engineers believe that human spaceflight may actually offer some important opportunities for astronomy, and it would be premature to dismiss those opportunities outright. The continuing astonishing performance of theHST has depended, for example, on maintenance and upgrades from astronaut visits. As we look ahead to very large space telescopes that cannot fit in a single launch vehicle, "some assembly required"—perhaps by gloved human hands or by sophisticated robots—is likely to become a common theme. Given almost two decades of servicing missions to the HST, the engineering successes of the continuously occupied International Space Station, and the fact that astronauts must travel through free space to reach the Moon in the first place, it is surprising that accessibility by humans is often cited as an advantage somehow unique to the lunar surface. Placing telescopes near lunar bases is particularly risky, even beyond the problem of dust contamination. Permanently shadowed lunar polar craters have been proposed as homes for passively cooled IR telescopes, but any large-scale development will depend on resources that are found there. For example, discovering water-ice deposits would drive lunar polar development strongly. And such deposits would be found in the same permanently shadowed craters used to host telescopes. Mining activity would not only kick up debris, but likely boil off significant amounts of condensed gases, for which a nearby passively cooled telescope becomes a cold trap. Free-space telescopes offer advantages over lunar-based ones in design and deployment. Although lunar gravity is only a sixth of that on Earth, pointable telescopes on the Moon will still have to contend with gravitational deformation and the resulting optical misalignment. To be sufficiently stiff, surface telescopes must therefore always be heavier than free-space telescopes. Furthermore, lunar gravity requires substantial propulsion for spacecraft to land softly. That adds significant cost and risk. Moreover, although the lunar surface is seismically quiet, it is not particularly flat, and surface irregularities would complicate deployment and alignment of precision optical systems. The management of an in-space assembly depot, in contrast, would require careful navigation and special tools, but the zero-gravity environment would offer telescope builders some convenience in manipulating massive parts.

## Mars Trade Off Turn – Link Ext

VSE trades off with mission to mars

Aviation Week & Space Technology 1/21/2008 http://33011.activeboard.com/forum.spark?aBID=33011&p=3&topicID=15141338

Numerous planetary managers told Aviation Week & Space Technology they now fear a manned Moon base and even shorter sorties to the Moon will bog down the space program for decades and inhibit, rather than facilitate, manned Mars operations--the ultimate goal of both the Bush and alternative visions. The first lunar sortie would be flown by about 2020 under the Bush plan.

## Mars Trade Off Turn – Impact Ext

### Mars outweighs the moon – its critical to scientific exploration

**Zubrin 2005**

[Robert Zubrin, an astronautical engineer, is president of Pioneer Astronautics, a research and development firm, and president of the Mars Society, a space advocacy group, “Getting Space Exploration Right," The New Atlantis, Number 8, Spring 2005, http://www.thenewatlantis.com/publications/getting-space-exploration-right Acc. 6/29/11 // JDI bjk]

In scientific terms, Mars is critical, because it is the Rosetta Stone for helping us understand the position of life in the universe. Images of Mars taken from orbit show that the planet had liquid water flowing on its surface for a period of a billion years during its early history, a duration five times as long as it took life to appear on Earth after there was liquid water here. So if the theory is correct that life is a naturally occurring phenomenon, emergent from chemical complexification wherever there is liquid water, a temperate climate, sufficient minerals, and enough time, then life should have appeared on Mars. If we go to Mars and find fossils of past life on its surface, we will have good reason to believe that we are not alone in the universe. If we send human explorers, who can erect drilling rigs which can reach underground water where Martian life may yet persist, we will be able to examine it. By doing so, we can determine whether life on Earth is the pattern for all life everywhere, or alternatively, whether we are simply one esoteric example of a far vaster and more interesting tapestry. These things are truly worth finding out.

### A Mars mission motivates youth to go into science in a way that a moon mission doesn’t, resulting in a massive increase in innovation, medicine, defense, and national income

**Zubrin 2005**

[Robert Zubrin, an astronautical engineer, is president of Pioneer Astronautics, a research and development firm, and president of the Mars Society, a space advocacy group, “Getting Space Exploration Right," The New Atlantis, Number 8, Spring 2005, http://www.thenewatlantis.com/publications/getting-space-exploration-right Acc. 6/29/11 // JDI bjk]

In terms of its social value, Mars is the bracing positive challenge that our society needs. Nations, like people, thrive on challenge and decay without it. The challenge of a humans-to-Mars program would be an invitation to adventure to every young person in the country, sending out the powerful clarion call: “Learn your science and you can become part of pioneering a new world.” This effect cannot be matched by just returning to the Moon, both because a Moon program offers no comparable potential discoveries and also because today’s youth cannot be inspired in anything like the same degree by the challenge to duplicate feats accomplished by their grandparents’ generation. There will be over a hundred million kids in our nation’s schools over the next ten years. If a Mars program were to inspire just an extra one percent of them to pursue a scientific education, the net result would be one million more scientists, engineers, inventors, and medical researchers, making technological innovations that create new industries, find new cures, strengthen national defense, and generally increase national income to an extent that utterly dwarfs the expenditures of the Mars program.

### Mars is the best hope of getting off the rock

**Zubrin 2005**

[Robert Zubrin, an astronautical engineer, is president of Pioneer Astronautics, a research and development firm, and president of the Mars Society, a space advocacy group, “Getting Space Exploration Right," The New Atlantis, Number 8, Spring 2005, http://www.thenewatlantis.com/publications/getting-space-exploration-right Acc. 6/29/11 // JDI bjk]

But the most important reason to go to Mars is the doorway it opens to the future. Uniquely among the extraterrestrial bodies of the inner solar system, Mars is endowed with all the resources needed to support not only life but the development of a technological civilization. In contrast to the comparative desert of the Moon, Mars possesses oceans of water frozen into its soil as ice and permafrost, as well as vast quantities of carbon, nitrogen, hydrogen, and oxygen, all in forms readily accessible to those clever enough to use them. These four elements are the basic stuff not only of food and water, but of plastics, wood, paper, clothing—and most importantly, rocket fuel. In addition, Mars has experienced the same sorts of volcanic and hydrologic processes that produced a multitude of mineral ores on Earth. Virtually every element of significant interest to industry is known to exist on the Red Planet. While no liquid water exists on the surface, below ground is a different matter, and there is every reason to believe that underground heat sources could be maintaining hot liquid reservoirs beneath the Martian surface today. Such hydrothermal reservoirs may be refuges in which survivors of ancient Martian life continue to persist; they would also represent oases providing abundant water supplies and geothermal power to future human settlers. With its 24-hour day-night cycle and an atmosphere thick enough to shield its surface against solar flares, Mars is the only extraterrestrial planet that will readily allow large scale greenhouses lit by natural sunlight. In other words: Mars can be settled. In establishing our first foothold on Mars, we will begin humanity’s career as a multi-planet species. Mars is where the science is, Mars is where the challenge is, and Mars is where the future is. That’s why Mars must be our goal.

## AT: Cooperation Scenario – 1NC

### No cooperation

Beattie former NASA manager also managed programs at the NSF Energy R&D Administration, and DoE 2007 Donald The Space Review <http://www.thespacereview.com/article/804/1>

Recent press releases seem to indicate that international interest in cooperating with NASA on returning humans to the Moon does not exist. Some, such as the British, have clearly indicated they have other plans. Based on statements made by NASA it would appear that in order for the initiative to return to the Moon to be successful, international cooperation will be required. A meeting has been announced in the spring to explore the interests of the international space community in joining the Vision. How many nations may sign up is problematic, with good reason, considering how the ISS international partners have been treated in the past. Meanwhile, some are leapfrogging ahead to send missions to Mars, the indisputable scientific prize. ESA’s ExoMars rover will be able to drill two meters into the Martian soil to look for signs of life and Russia is planning sample return from the moons of Mars. Some nations will undoubtedly send robotic missions to the Moon in the future. That will allow them to catch up, technologically, with the programs we successfully ran some forty years ago. However, it will be surprising if such missions will add significantly toward understanding our closest planetary neighbor.

### Bans on high-tech exports prevent Chinese coop

Richburg ‘11[Washington Post Staff Writer. Saturday, January 22, 20; 9:26 PM Mistrust stalls U.S.-China space cooperation

http://www.washingtonpost.com/wp-dyn/content/article/2011/01/21/AR2011012104480.html By Keith B.]

BEIJING - China's grand ambitions extend literally to the moon, with the country now embarked on a multi-pronged program to establish its own global navigational system, launch a space laboratory and put a Chinese astronaut on the moon within the next decade. The Obama administration views space as ripe territory for cooperation with China. **Defense Secretary Robert M.** Gates has called it one of four potential areas of "strategic dialogue," along with cybersecurity, missile defense and nuclear weapons. And President Obama and Chinese President Hu Jintao vowed after their White House summit last week to "deepen dialogue and exchanges" in the field. But as China ramps up its space initiatives, the diplomatic talk of cooperation has so far found little traction. The Chinese leadership has shown scant interest in opening up the most sensitive details of its program, much of which is controlled by the People's Liberation Army (PLA). At the same time, Chinese scientists and space officials say that Washington's wariness of China's intentions in space, as well as U.S. bans on some high-technology exports, makes cooperation problematic. For now, the U.S.-China relationship in space appears to mirror the one on Earth - a still-dominant but fading superpower facing a new and ambitious rival, with suspicion on both sides. "What you have are two major powers, both of whom use space for military, civilian and commercial purposes," said Dean Cheng, a researcher with the Washington-based Heritage Foundation and an expert on the Chinese military and space program. NASA's human spaceflight program has been in flux in recent years, fueling particular concern among some U.S. observers about the challenge posed by China's initiatives in that area. There is "a lot of very wary, careful, mutual watching," Cheng said. Song Xiaojun, a military expert and commentator on China's CCTV, said thatsubstantial cooperation in the space field is impossible without mutual trust. Achieving that, he said, "depends on whether the U.S. can put away its pride and treat China as a partner to cooperate on equal terms. But I don't see that happening in the near future, since the U.S. is experiencing menopause while China is going through puberty." But while China may still be an adolescent in terms of space exploration - launching its first astronaut in 2003 - it has made some notable strides in recent months and years, and plans seem on track for some major breakthroughs. On the day Hu left for his U.S. trip, Chinese news media reported the inauguration of a new program to train astronauts - called taikonauts here - for eventual deployment to the first Chinese space station, planned for 2015. As part of the project, two launches are planned for this year, that of an unmanned space module, called Tiangong-1, or "Heavenly Palace," by summer, and later an unmanned Shenzhou spacecraft that will attempt to dock with it. On a separate track, China is also working through a three-stage process for carrying out its first manned moon landing. The first stage was completed in October with the successful launch of a Chang'e-2 lunar orbiter. In 2012 or 2013, an unmanned landing craft is scheduled to take a rover to the moon to collect rock and soil samples. By 2020, according to the plan, a taikonaut could land on the moon.

## AT: Chinese Coop – No Coop ext

**US-China coop is risky – empirically proved by risky technology transfers**

Rutkowski 8 Ryan Rutkowski, Johns Hopkins University School of Advanced International Studies - Nanjing University Center for Chinese - American Studies, 2008, The Prospect of US – China Collaboration for Manned-Space Exploration http://mysite.verizon.net/ryan.rutkowski/Blog/US-China%20Space%20cooperation.pdf]

Despite the U.S. efforts to engage with the international community more in manned-space exploration, U.S. and China collaboration remains limited. Indeed, U.S.-China space cooperation has been poor since the mid-1990s when several U.S. companies were accused of transferring potentially sensitive military information to China. The primary problem with U.S-China space cooperation continues to be concerns about inadvertent technology transfers. Certain U.S. officials fear that dual-use space technology could easily be transferred to China. This is encompassed in the U.S ban on sale of military technology and export restrictions of certain “sensitive” technologies to China. Nonetheless, in 2006, NASA Administrator Michael Griffin visited China to begun a limited dialogue on cooperation. However, any progress towards cooperation on space technology was halted when China tested its first successful anti-Satellite weapons technology heightening security tensions between the U.S and China.

### US-China space coop is unlikely due to rivalry and suspicion

Richburg 11 [Keith B. Richburg, staff writer at the Washington Post, January 22, 2011, Mistrust stalls U.S.-China space cooperation, Washington Post, http://www.washingtonpost.com/wp-dyn/content/article/2011/01/21/AR2011012104480.html]

BEIJING - China's grand ambitions extend literally to the moon, with the country now embarked on a multi-pronged program to establish its own global navigational system, launch a space laboratory and put a Chinese astronaut on the moon within the next decade. The Obama administration views space as ripe territory for cooperation with China. Defense Secretary Robert M. Gates has called it one of four potential areas of "strategic dialogue," along with cybersecurity, missile defense and nuclear weapons. And President Obama and Chinese President Hu Jintao vowed after their White House summit last week to "deepen dialogue and exchanges" in the field. But as China ramps up its space initiatives, the diplomatic talk of cooperation has so far found little traction. The Chinese leadership has shown scant interest in opening up the most sensitive details of its program, much of which is controlled by the People's Liberation Army (PLA). At the same time, Chinese scientists and space officials say that Washington's wariness of China's intentions in space, as well as U.S. bans on some high-technology exports, makes cooperation problematic. For now, the U.S.-China relationship in space appears to mirror the one on Earth - a still-dominant but fading superpower facing a new and ambitious rival, with suspicion on both sides. "What you have are two major powers, both of whom use space for military, civilian and commercial purposes," said Dean Cheng, a researcher with the Washington-based Heritage Foundation and an expert on the Chinese military and space program. NASA's human spaceflight program has been in flux in recent years, fueling particular concern among some U.S. observers about the challenge posed by China's initiatives in that area. There is "a lot of very wary, careful, mutual watching," Cheng said. Song Xiaojun, a military expert and commentator on China's CCTV, said that substantial cooperation in the space field is impossible without mutual trust. Achieving that, he said, "depends on whether the U.S. can put away its pride and treat China as a partner to cooperate on equal terms. But I don't see that happening in the near future, since the U.S. is experiencing menopause while China is going through puberty."

### Tech transfer, moral compromise, and ineffectiveness are reasons why US-China space coop is challenging.

Logan 8 [Jeffrey Logan, specialist in Energy Policy, Resources, Science, and Industry Division, China’s Space Program: Options for U.S.-China Cooperation, September 29, 2008, http://www.fas.org/sgp/crs/row/RS22777.pdf]

Some of the most important challenges of expanding cooperation in space with China include: Inadvertent technology transfer. From this perspective, increased space cooperation with China should be avoided until Chinese intentions are clearer. Joint space activities could lead to more rapid (dual-use) technology transfer to China, and in a worst-case scenario, result in a “space Pearl Harbor,” as postulated by a congressionally appointed commission led by Donald Rumsfeld in 2001. Moral compromise. China is widely criticized for its record on human rights and non-democratic governance. Any collaboration that improves the standing of authoritarian Chinese leaders might thus be viewed as unacceptable. Ineffectiveness. Some argue that increased collaboration will not produce tangible benefits for the United States, especially without a new bilateral political climate.

### China considers US a liability to their space plans – coop not possible

Johnson-Freese 11 [Joan Johnson-Freese, Professor of National Security Affairs at the U.S. Naval War College, June 10, 2011, US-China Space Cooperation: Congress’ Pointless Lockdown, http://www.chinausfocus.com/peace-security/us-china-space-cooperation-congress%E2%80%99-pointless-lockdown/]

China has energetically and broadly moved out on their own in space, and based on watching on-going US political kabuki dances about its future space plans, and seeing how difficult and tenuous it can be for other countries to partner with the US – on the International Space Station (ISS), for example – most Chinese space officials consider working with the United States as a potential liability to their own already-underway plans. In fact, many countries consider that they can afford only so much US friendship, though Congress continues to act as though the US is the only game in town if countries want to develop a robust space program. Rarely do US attempts at isolating countries – ally or competitor – succeed without unexpected, and negative, consequences. The Atomic Energy Act of 1946 restricted data sharing from the Manhattan Project with allies including Britain, resulting in a significant wartime rift and leading to Britain developing their own bomb. After the infamous Cox Commission Report in 1999 which investigated charges of theft and illegal satellite technology transfer to China, the US attempted to block dual-use satellite technology from sale or launch there. As a result, European space industries that had been niche providers developed much broader capabilities so they could circumvent US prohibitions. US companies have lost business and the globalization of technology marches on. For many years, Chinese politicians considered there would be geostrategic benefits to be derived from being a partner on the ISS, symbolic of the “international family of spacefaring nations.” The United States stiff-arming them from involvement is a factor behind China now developing its own space station.

### US-China coop unlikely due to low interest and fears of tech transfer

Wolf 11 [Jim Wolf, space analyst from MSNBC, Space: A frontier too far for U.S.-China cooperation, http://www.msnbc.msn.com/id/40897403/ns/technology\_and\_science-space/t/space-frontier-too-far-us-china-cooperation/]

WASHINGTON — The prospects for cooperation between the United States and China in space are fading even as proponents say working together in the heavens could help build bridges in often-testy relations on Earth. The idea of joint ventures in space, including spacewalks, explorations and symbolic "feelgood" projects, have been floated from time to time by leaders on both sides. Efforts have gone nowhere over the past decade, swamped by economic, diplomatic and security tensions, despite a 2009 attempt by President Barack Obama and his Chinese counterpart, Hu Jintao, to kick-start the bureaucracies. U.S. domestic politics make the issue unlikely to advance when Obama hosts Hu at the White House on Jan. 19. Washington is at odds with Beijing over its currency policies and huge trade surplus but needs China's help to deter North Korea and Iran's nuclear ambitions and advance global climate and trade talks, among other matters. Hu's state visit will highlight the importance of expanding cooperation on "bilateral, regional and global issues," the White House said. But space appears to be a frontier too far for now, partly due to U.S. fears of an inadvertent technology transfer. China may no longer be much interested in any event, reckoning it does not need U.S. expertise for its space program. New obstacles to cooperation have come from the Republicans capturing control of the House of Representatives in the Nov. 2 congressional elections from Obama's Democrats. Repr. Frank Wolf, R-Va., for instance, is set to take over as chairman of the appropriations subcommittee that funds the U.S. space agency in the House. A China critic and human rights firebrand, the Republican congressman has faulted NASA's chief for meeting leaders of China's Manned Space Engineering Office in October. "As you know, we have serious concerns about the nature and goals of China's space program and strongly oppose any cooperation between NASA and China," Wolf and three fellow Republicans wrote NASA Administrator Charles Bolden on Oct. 15 as he left for China.

### China will not like or cooperate with the plan – empirically proven with Bush’s VSE **Lawler et al, ‘04** [Andrew Lawler is a senior writer with [Science Magazine](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=3&Itemid=11), and freelance writer for[Smithsonian](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=5&Itemid=12), [National Geographic](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=6&Itemid=13), [Discover](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=7&Itemid=14), [Archaeology](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=8&Itemid=15),[Audubon](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=13&Itemid=20), [American Archaeology](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=9&Itemid=16), Air & Space, [Columbia Journalism Review](http://www.andrewlawler.com/~andrewla/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=10&Itemid=17), and other magazines. He has written hundreds of articles on topics ranging from asteroids to zebrafish; interviewed politicians such as Dan Quayle and Al Gore, visionaries like Arthur C. Clarke, and scientists ranging from Harvard biologist E.O. Wilson to Nobelist Sam Ting. During a quarter-century of reporting, he has filed stories from more than two dozen countries, including Afghanistan, China, Egypt, India, Iraq, Iran, Mongolia, Sudan, Syria, Turkmenistan, and Yemen. "Scientists Add Up Gains, Losses in Bush's New Vision for NASA," Science Magazine, January 2004, [www.sciencemag.org/content/303/5657/444.full](http://www.sciencemag.org/content/303/5657/444.full)]

To the relief of many lawmakers, scientists, and space enthusiasts, the United States now has a vision for space exploration with a White House seal of approval. But the remedy for NASA's woes, presented last week by President George W. Bush, includes some unpleasant scientific side effects. It would end the Hubble Space Telescope's brilliant run and could jeopardize the future of any activity that doesn't directly serve the exploration effort. On 14 January, Bush announced his intention to retire the aging shuttle, redefine the purpose of the half-built space station, and design and build a vehicle to take humans to the moon and then Mars. White House and NASA officials insist that researchers would prosper under the proposal, gaining a new flotilla of lunar robots, increased support for Mars rovers, and advanced technology to benefit outer solar system missions. “This provides more opportunities for science,” says presidential science adviser John Marburger. But, while applauding the desire to fix NASA's troubled human space flight program—grounded since last February—some scientists worry that a portion of the funding for the new venture will come out of the hide of existing research programs. “It's a serious issue, and people are going to be passionate on all sides,” says Charles Kennel, an earth scientist who heads NASA's Advisory Council and directs the Scripps Institution of Oceanography in La Jolla, California. Bush's announcement, made at NASA Headquarters in Washington, D.C., follows intensive debate in the White House over how to rebound from the Columbia disaster. It paints a dramatic picture of human exploration over the next 2 decades, but with few details. Bush said the agency would begin testing a new launcher dubbed the Crew Exploration Vehicle in 2008, while a series of lunar robotic missions begins probing the moon. After hauling up the last pieces of the space station in 2010, the shuttle would halt operations. But it would be another 4 years before the new launcher would be ready to transport humans. Work on a lunar base could begin as early as 2015, and the space station would be abandoned the following year. A trip to Mars would follow much later. “The vision I outline today,” Bush said, “is a journey, not a race.” And other nations are welcome to join in, he added. To pay for it, Bush will ask Congress to add $800 million to NASA's pending $15.4 billion budget for 2004. Its budget would grow by 5% in each of the following 3 years, followed by 1% increases in 2009 and 2010. The bulk of the money for the new initiative, however, would come from reshuffling and cutting existing NASA programs. The biggest savings would not come until the end of the decade, when the shuttle's $4-billion-a-year budget would be available. Administration officials refused last week to say exactly what areas will be cut until the 2005 request is released on 2 February. That reticence tempered early reviews of the proposal. “Everyone is confused,” says one scientist. “I am particularly concerned that NASA's other missions not be cannibalized in an attempt to cover the costs of these proposals,” adds Representative Bart Gordon (D-TN), ranking Democrat on the House Science Committee that oversees NASA. “A couple of billion dollars a year extra for NASA would go a long way to solving this,” says Kennel. Collateral damage. Planetary scientists, flush with the success of the Mars Spirit rover, are ecstatic about the possibility of a new line of lunar robotic missions and an even more robust Mars effort. Astronomers and earth scientists are much less enthusiastic, however. Astronomers were stunned to learn that the president's plan precludes any more servicing missions to the Hubble Space Telescope. “It's a disaster for science and a giant step backward for U.S. astronomy,” says Yale University astronomer Meg Urry. The shuttle was expected to make one trip between 2006 and 2008, and as recently as this fall scientists held out hope for an addtional servicing mission that would have kept Hubble flying until the James Webb Space Telescope is in orbit in 2011. “We're very seriously concerned,” adds Sidney Wolff, director of Kitt Peak National Observatory in Arizona. “It would leave a very long gap.”Mooonstruck. President Bush's plan to go to the moon and Mars, unveiled 14 January, draws applause from NASA Administrator Sean O'Keefe. CREDIT: MARK WILSON/GETTY IMAGES NASA space science chief Ed Weiler says that killing the mission was a “tough call” but that there was no alternative. Hubble's position in an orbit different from that of the space station raised serious safety issues, he said, and the rush to finish the station by 2010 left no time for a rendezvous with the telescope. Weiler expects Hubble to be able to continue operating normally until around 2007, with the chance of extending its life by adopting power-saving procedures. Wolff proposes that two instruments built for the next Hubble servicing mission instead be placed in orbit by an expendable launch vehicle and operated independently of Hubble. Weiler declined to discuss details of the upcoming 2005 budget request but allowed that “there are not going to be radical, drastic, large cuts to any parts of space science.” Other agency managers said that major observatories—both those on the drawing board and those in orbit—would not suffer either under the president's new plan. An apparent decline from his pending 2004 budget of $4 billion, Weiler added, will reflect the transfer of some programs to the new exploration office NASA created last week. The long-term fate of earth sciences, on which NASA spends $1.6 billion annually, is less certain. Some Administration sources told *Science* that large portions of the effort would be shifted to the National Oceanic and Atmospheric Administration (NOAA) to make room in NASA's 2006 budget for the new exploration programs. “It's not true,” replies Ghassem Asrar, NASA's earth sciences chief. He says that satellites deemed operational will be transferred to NOAA, but that there are no major budget decreases planned for the next few years. O'Keefe backs him up, insisting that there will be “no diminution” of the program. “There should be no concerns,” he adds. In his speech, Bush said that the space station, designed to host experimental facilities covering work in materials science, fundamental physics, and molecular biology, would henceforth be devoted to gathering data on the effects of long-term space living. That will force yet another replanning of station research, a topic that a National Research Council panel will tackle in March. “We're excited,” says Mary Kicza, chief of NASA's biological and physical research office. “This gives us a clarity of objective and purpose.” Although Kicza declined to say what research would be halted, or how the budget would be affected, O'Keefe said “it will be a very dramatic adjustment.” The 2016 termination date is several years earlier than NASA had planned to retire the station. In the intervening years, the Russian Soyuz would ferry crews, and an automated European vehicle could transport scientific equipment and samples. Beyond repair.  NASA says it can't send any more missions to the Hubble Space Telescope, shown getting new gyroscopes in 1999. CREDIT: NASA Sales pitch. Bush and O'Keefe must now sell their vision to Congress. The president's father failed to do this when, in 1989, he proposed a similar return to the moon and Mars. But many lawmakers appear hopeful that the president's new direction for human space flight will overcome the high costs, low reliability, and lack of focus that has plagued current efforts. “Exactly the jump-start NASA needs to move into the future,” says Senator Sam Brownback (R-KS), who heads the space panel within the Senate Commerce, Science, and Transportation Committee. Representative Sherwood Boehlert (R-NY), who chairs the House Science Committee, called the proposal “a thoughtful, gradual, achievable set of missions.” Brownback's panel will hold a hearing 4 February, with Boehlert's committee to follow the next week. With elections in November, the president's proposal has already sparked a response along partisan lines. Former Vice President Al Gore, a Democrat, dismissed the Bush plan as “an unimaginative and retread effort to make a tiny portion of the moon habitable for a handful of people.” Marburger's predecessor under President Bill Clinton, physicist John Gibbons, called it “a misplaced focus on the future” that caters to “people who like making money building things in space. … It means profits for them.” Bush's plan could create business for the aerospace industry. But companies already benefiting from shuttle contracts would lose out if expensive upgrades were avoided and the vehicle was retired. It's too early to know the impact of the new plan on other spacefaring nations. But space officials in several countries that are partners on the space station generally praised the plan as a way to bolster their field and international cooperation. Russian officials were busy dusting off their own plans for lunar and Mars exploration and were quick to say that they would be able to provide important elements of human expeditions—such as large vehicles—at low cost and with high reliability. “It's a good thing,” says European Space Agency spokesperson Franco Bonacina in Paris: “We're excited; it shows increased interest in space activities.” Canadian Space Agency President Marc Garneau hopes that NASA's emphasis on Mars exploration will help persuade Ottawa to provide the necessary funding for a robotic mission to Mars that he has proposed for early in the next decade. Japanese officials, meanwhile, declined to comment. In contrast, Chinese officials were decidedly cool to Bush's proposal. “China will still depend on its own ability to carry out space plans, including manned flights and deep-space exploration,” says Li Jinduo, spokesperson for Beijing's Commission of Science, Technology, and Industry for National Defense. Li Mingzhu, deputy chief of the Center for Space Science and Applied Research at the Chinese Academy of Sciences, says that “China will not be affected very much” by the U.S. plan. But he speculates that “the shift of U.S. focus will have an impact on the whole world in the long run.”

### China not interested in cooperation – more interested in unilateral military build-up of space

Want China Times, 2011 Staff Writer of Want China Times“US-China Cooperation May Not Reach Final Frontier: Report” (http://www.wantchinatimes.com/news-subclass-cnt.aspx?cid=1104&MainCatID=11&id=201101060000086 January)

The prospect of US-China cooperation in space is fading with the White House's escalating wariness of Beijing's growing space power, according to an article from Reuters. China and the United States released a joint statement in 2009 to call for closer "cooperation in space exploration on the basis of mutual benefit and reciprocity" when US President Barack Obama met Chinese President Hu Jintao in Beijing. However, the idea of joint ventures in space including spacewalks and exploration has dimmed on both sides, says Jim Wolf, author of the analysis. One reason is the US government's grave concern over the unintentional transfer of technology through cooperation and exchanges. Another obstacle, according to the analysis, comes from the Republicans regaining control of the House of Representatives in the mid-term congressional elections in November. Frank Wolf, a Republican and chairman of the appropriation subcommittee that funds the US space agency, has faulted NASA's chief for meeting leaders of China's Manned Space Engineering Office in October. "As you know, we have serious concerns about the nature and goals of China's space program and strongly oppose any cooperation between NASA and China," Wolf and three fellow Republican congressmen said after NASA administrator's visit to China in October. China in 2008 became the third country to send astronauts on a spacewalk outside an orbiting craft and launched its second moon orbiter in October. Beijing's anti-satellite test in January 2007 further complicated possible cooperation on both sides when the Chinese government used a ground-based missile to knock out one of its inactive weather satellites in high polar orbit, an act which Wallace Gregson, assistant US secretary of defense for Asian and Pacific security affairs described as "destabilizing." "It has become increasingly evident that China is pursuing a long-term, comprehensive military buildup that could upend the regional security balance," according to Gregson. The Heritage Foundation, a conservative US thinktank, called on members of the incoming Congress to be wary of any space cooperation with China on the grounds it could bolster Beijing's knowledge and harm US security, the analysis said. In a sense, [space] cooperation would be more of a political project than a technical one, said Gregory Kulacki, China project manager for the Union of Concerned Scientists, a group often at odds with US policy. "We need to get past the idea that the Chinese need us more than we need them," he said.

US-Chinese space cooperation impossible

Joan Johnson-Freeman June 10 2011. Joan Johnson-Freese is a Professor of National Security Affairs at the U.S. Naval War College US-China Space Cooperation: Congress’ Pointless Lockdown. http://www.chinausfocus.com/peace-security/us-china-space-cooperation-congress%E2%80%99-pointless-lockdown/  
After a hiatus following the Cox Commission Report, small gestures of space outreach between the US and China began with NASA Administrator Mike Griffin’s 2006 trip to China during the Bush Administration, though the overall US policy toward China on cooperation remained largely negative. While the Obama Administration has been much more generally positive about cooperation, including with China, there have been no US-China cooperative programs put on the table by either side to consider, nor are any apparently in the works. Since 2006, US-China space cooperation has been treading water at best, so why the need now to make this bold, and pointless, political statement is unclear. Perhaps supporters were just waving a “pay attention to us” flag at NASA regarding any potential future plans, though if that was the case there were certainly other ways to send that message while still considering the broader aspects of US strategic communication.  
What is clear, however, is that other countries have no such compunction as the US about working with China – indeed many are anxious to have the opportunity to work with a country they see as more open to partnerships, rather than the sub-contractor status some ISS “partners” have felt the US afforded them. There may be little need to bar the door to countries wanting to work with the US on space activities, as there may soon be fewer and fewer countries knocking. Congress and the Administration working together to refocus the US space program, icluding realistic cooperation, would go further to maintain US space leadership than pointless isolation gestures.

## AT: Chinese Coop – AT: Relations

### Regime prevents conflict

Ross ‘9

Robert. professor of political science at Boston College, an associate of the John King Fairbank Center for East Asian Research at Harvard University and a fellow of the Security Studies Program at the Massachusetts Institute of Technology. September/October 2009. <http://www.nationalinterest.org/Article.aspx?id=22022>.

Professor Friedberg’s concluding suggestion that China’s illiberal political system exacerbates the China threat fails to grasp that Beijing’s authoritarian system is its greatest vulnerability. The Chinese leadership dares not risk war; it is acutely aware of its vulnerability to the will of its people and the necessity to minimize strategic adventurism and the risk of military defeat, lest it be the cause of its own demise. A balanced rather than an ideological assessment of the Sino-American dynamic offers the United States the confidence to compete with China and secure U.S. interests, and simultaneously promote U.S.-China cooperation.

### Interdependence checks

Perry and Scowcroft ‘9

William (Michael and Barbara Berberian professor at Stanford University.) and Brent (resident trustee of the Forum for International Policy.) “US Nuclear Weapons Policy.” 2009. Council on Foreign Relations. Online.

Economic interdependence provides an incentive to avoid military conflict and nuclear confrontation. Although the United States has expressed concern about the growing trade deficit with China, the economies of the two countries have become increasingly intertwined and interdependent. U.S. consumers have bought massive quantities of cheap Chinese goods, and Beijing has lent huge amounts of money to the United States. Similarly, Taiwan and the mainland are increasingly bound in a reciprocal economic relationship. These economic relationships should reduce the probability of a confrontation between China and Taiwan, and keep the United States and China from approaching the nuclear brink, were such a confrontation to occur. On other nuclear issues, China and the United States have generally supported each other, as they did in the six-party talks to dismantle North Korea’s nuclear weapons programs. Here, the supportive Beijing-Washington relationship points toward potentially promising dialogues on larger strategic issues.

### China will back down – economics and they can’t win

Denmark ‘9

Abraham M. Denmark is a Fellow at the Center for a New American Security. China’s Arrival: A Strategic Framework for a Global Relationship. September 2009. Online.

Beijing’s focus on maintaining China’s internal sta­bility and economic growth drives a foreign policy that is geared towards preserving China’s economic development and avoiding foreign conflicts and entanglements that may jeopardize these goals, as demonstrated by PRC President Hu’s departure from the G8 meeting in Italy to return to Beijing because of an uprising in Xinjiang province. However, China’s leaders also recognize that global and regional issues increasingly impact China domestically, primarily since China’s economy depends on foreign resources and markets. Beijing must therefore address these issues and exam­ine the development of military capabilities to protect China’s access to needed foreign markets and resources. Avoiding military conflict with the United States is a major part of maintaining a stable and peace­ful external environment, at least in the near term. China’s leaders understand that China’s economy is closely tied to that of the United States, and that any conflict would significantly damage China’s economic development. Additionally, Chinese strategists appear to recognize that the People’s Liberation Army (PLA)’s capabilities remain signif­icantly behind those of the U.S. military, and that for the foreseeable future China would be unlikely to achieve its political objectives through a conflict with the United States.

## AT: Chinese Coop – AT: Science Diplomacy

### Obama increasing focus on science diplomacy now

Furney 10 (William, writer @ SciDev.net [http://www.scidev.net/en/science-and-innovation-policy/science-diplomacy/news/us-extends-science-ties-with-indonesia.html] US extends science ties with Indonesia/ July 1)

[JAKARTA] The United States has allocated US$136 million for a partnership programme with Indonesia in the areas of science, environment, society and technology, as part of its continued diplomacy push in the country. The announcement followed President Barack Obama's meeting with Indonesia's president Susilo Bambang Yudhoyono last week (27 June) at the G20 summit in Toronto. "Stable, dynamic and strong relations between Indonesia and the US are good for our region and for our world," said Yudhoyono. Under the partnership, named SOLUSI — Indonesian for 'solution' and standing for Science, Oceans, Land Use, Society and Innovation — a second Tropical Forest Conservation Act agreement will be forged, along with a Forestry and Climate Support Project, Marine and Climate Support Program and a Clean Energy Development programme. In March, the two countries signed a science and technology pact that the US Embassy in Jakarta said would "strengthen and promote scientific research and technological cooperation and will be based on shared responsibilities, equitable contributions and benefits". Under the agreement, science and technology experts, universities and related government agencies from both countries could collaborate by, for example, exchanging information and conducting joint research projects.

### No evidence that science diplomacy works—it has been only successful in situations were the will to cooperate preexisted—it has never successfully secured cooperation when political will was lacking

Dickson 9 (David, director @ SciDev.net [http://scidevnet.wordpress.com/2009/06/02/science-diplomacy-the-case-for-caution/] Science diplomacy: the case for caution/ June 2)

One of the frustrations of meetings at which scientists gather to discuss policy-related issues is the speed with which the requirements for evidence-based discussion they would expect in a professional context can go out of the window. Such has been the issue over the past two days in the meeting jointly organised in London by the American Association for the Advancement of Science (AAAS) and the Royal Society on the topic “New Frontiers in Science Diplomacy“. There has been much lively discussion on the value of international collaboration in achieving scientific goals, on the need for researchers to work together on the scientific aspects of global challenges such as climate change and food security, and on the importance of science capacity building in developing countries in order to make this possible. But there remained little evidence at the end of the meeting on how useful it was to lump all these activities together under the umbrella term of “science diplomacy”. More significantly, although numerous claims were made during the conference about the broader social and political value of scientific collaboration – for example, in establishing a framework for collaboration in other areas, and in particular reducing tensions between rival countries – little was produced to demonstrate whether this hypothesis is true. If it is not, then some of the arguments made on behalf of “science diplomacy”, and in particular its value as a mechanism for exercising “soft power” in foreign policy, do not stand up to close scrutiny. Indeed, a case can be made that where scientific projects have successfully involved substantial international collaboration, such success is often heavily dependent on a prior political commitment to cooperation, rather than a mechanism for securing cooperation where the political will is lacking.

Science diplomacy doesn’t solve—it doesn’t spill over to policy

Dickson 9 (David, Director @ SciDev [http://scidev.net/en/editorials/the-limits-of-science-diplomacy.html] The limits of science diplomacy/ June 4)

But — as emerged from a meeting entitled New Frontiers in Science Diplomacy, held in London this week (1–2 June) — using science for diplomatic purposes is not as straightforward as it seems.  Some scientific collaboration clearly demonstrates what countries can achieve by working together. For example, a new synchrotron under construction in Jordan is rapidly becoming a symbol of the potential for teamwork in the Middle East.  But whether scientific cooperation can become a precursor for political collaboration is less evident. For example, despite hopes that the Middle East synchrotron would help bring peace to the region, several countries have been reluctant to support it until the Palestine problem is resolved.  Indeed, one speaker at the London meeting (organised by the UK's Royal Society and the American Association for the Advancement of Science) even suggested that the changes scientific innovations bring inevitably lead to turbulence and upheaval. In such a context, viewing science as a driver for peace may be wishful thinking.  Conflicting ethos  Perhaps the most contentious area discussed at the meeting was how science diplomacy can frame developed countries' efforts to help build scientific capacity in the developing world.  There is little to quarrel with in collaborative efforts that are put forward with a genuine desire for partnership. Indeed, partnership — whether between individuals, institutions or countries — is the new buzzword in the "science for development" community.  But true partnership requires transparent relations between partners who are prepared to meet as equals. And that goes against diplomats' implicit role: to promote and defend their own countries' interests.  John Beddington, the British government's chief scientific adviser, may have been a bit harsh when he told the meeting that a diplomat is someone who is "sent abroad to lie for his country". But he touched a raw nerve.  Worlds apart yet co-dependent  The truth is that science and politics make an uneasy alliance. Both need the other. Politicians need science to achieve their goals, whether social, economic or — unfortunately — military; scientists need political support to fund their research.  But they also occupy different universes. Politics is, at root, about exercising power by one means or another. Science is — or should be — about pursuing robust knowledge that can be put to useful purposes.

## AT: Warming Scenario

### Solar shield allows no local control and risks global ice age

Climate Options promote the discussion and research of options for dealing with our climate 2007

http://www.climateoptions.org/2007/02/09/solar-shield-light-weight-lenses/

There is no local control, so while climate models so far show it to have a generally beneficial effect, it does not allow any finer grain control that may turn out to be necessary.

If we lost control of the solution and needed to turn it off, we would have a very big problem, as it may be sufficient to precipitate the next ice age.

### No warming—we’ve entered a 30 year period of cooling—proved by PDOs

Easterbrook ‘10

Don, g[eology](http://en.wikipedia.org/wiki/Geology) professor emeritus at [Western Washington University](http://en.wikipedia.org/wiki/Western_Washington_University). EVIDENCE OF THE CAUSE OF GLOBAL WARMING AND COOLING: RECURRING GLOBAL, DECADAL, CLIMATE CYCLES RECORDED BY GLACIAL FLUCTUATIONS, ICE CORES, OCEAN TEMPERATURES, HISTORIC MEASUREMENTS AND SOLAR VARIATIONS. http://myweb.wwu.edu/dbunny/research/global/easterbrook\_climate-cycle-evidence.pdf

‘Global warming’ (the term used for warming from 1977 to 1998) is over. No warming above the level temperatures in 1998 has occurred and global cooling has deepened since 2005 (Fig. 24). Switching of the PDO back and forth from warm to cool modes has been documented by NASA’s satellite imagery (Figs. 25, 26). The satellite image from 1989 is typical of the warm mode (1945-1977) with most of the eastern Pacific adjacent to North America showing shades of yellow to red, indicating warm water. The satellite image from 1999 (Fig. 27) shows a strong contrast to the 1997 image, with deep cooling of the eastern Pacific and a shift from the PDO warm to the PDO cool mode. This effectively marked the end of ‘global warming’ (i.e., the 1977 to 1998 warm cycle). Figures 27–30 show that the switch of the PDO from its warm cycle to the present cool cycle has become firmly established. Each time this has occurred in the past century, global temperatures have remained cool for about 30 years (Fig. 31). Thus, the current sea surface temperatures not only explain why we have had global cooling for the past 10 years, but also assure that cool temperatures will continue for several more decades.

### Warming isn’t human induced—empirical evidence that Co2 doesn’t correlate with global temperatures.

Easterbrook ‘10

Don, g[eology](http://en.wikipedia.org/wiki/Geology) professor emeritus at [Western Washington University](http://en.wikipedia.org/wiki/Western_Washington_University). EVIDENCE OF THE CAUSE OF GLOBAL WARMING AND COOLING: RECURRING GLOBAL, DECADAL, CLIMATE CYCLES RECORDED BY GLACIAL FLUCTUATIONS, ICE CORES, OCEAN TEMPERATURES, HISTORIC MEASUREMENTS AND SOLAR VARIATIONS. http://myweb.wwu.edu/dbunny/research/global/easterbrook\_climate-cycle-evidence.pdf

1945 to 1977 cool period with soaring CO2 emissions. Global temperatures began to cool in the mid–1940’s at the point when CO2 emissions began to soar (Fig. 4). Global temperatures in the Northern Hemisphere dropped about 0.5° C (0.9° F) from the mid-1940s until 1977 and temperatures globally cooled about 0.2° C (0.4° F) (Fig. 1). Many of the world’s glaciers advanced during this time and recovered a good deal of the ice lost during the 1915–1945 warm period. However, cooling during this period was not as deep as in the preceding cool period (1880 to 1915). Many examples of glacial recession during the past century cited in the news media show contrasting terminal positions beginning with the maximum extent at the end of a ~30 year cool period (1915 or 1977) and ending with the minimum extent of the recent 20 year warm period (1998). A much better gauge of the effect of climate on glaciers would be to compare glacier terminal positions between the ends of successive cool periods or the ends of successive warm periods. Figure 4 shows CO2 that even though emissions from 1945 to 1977 soared, global temperature dropped during that 30–year period. If CO2 causes global warming, temperature should have risen, rather than declined, strongly suggesting that rising CO2.did not cause significant global warming.

### Warming won’t cause massive deaths—humans adapt.

Michaels and Balling ‘9

Patrick, professor of environmental sciences @ The University of Virginia and a senior fellow in the environmental studies at the CATO institute; Robert, professor in the climatology program in the School of Geographical Sciences at @ASU. “Climate of Extremes: Global Warming Science They Don’t Want You to Know” pgs 178-180

There is no question that the heat wave of 2003 was a natural disaster in Europe with a substantial loss of human life. Europe was not prepared for an event that, from a purely statistical view point, was inevitable, with or without global warming. In 2006, another article appeared in the International Journal of Biometeorology that put the 2003 disaster in perspective. Mohamed Laaidi and two coauthors, from the Medical University at Dijon, France, examined daily temperature and mortality data from 1991-95 for six "departments" (a.k.a., states or counties) located in urban, oceanic, interior, mountain, and two different Mediterranean settings (Figure 6.2). They broke the data into three age groups including less than 1 year old, 1 to 64 years old, and greater than 64 years old. They also divided the data by sex and by major causes of death including respiratory disease, cardiovascular disease or stroke, heart disease, and other diseases of the circulatory system. Murders and accidents were excluded. The Laaidi et al, team found that for the whole population As expected, temperature and daily deaths exhibited a marked temporal pattern. For all the departments investi- gated, mean daily counts of deaths showed an asymmetrical V-like or If-like pattern with higher mortality rates at the time of the lowest temperatures experienced in the area than at the tune of the highest temperatures. The data also clearly showed that people adjust to their environments. Individuals living in cold regions experience more mortality in warm temperatures, and those from warm areas are more susceptible to cold Ones. There is also a range in temperature, called the thermal optimum, in which mortality is low; the authors noted: The level of the thermal optimum rises in line with the warmer climatic conditions of each department. The thermal optimum is greater in Paris, probably due to the urban heat island, than in the Herault, which is situated in the extreme south of France in a Mediterranean climate. In other words, here's the shocking news: People adjust to the climate in which they reside. In Meltdown, one of us (Michaels) cited work he had done with Robert Davis at the University of Virginia in which they found that heat-related mortality declined as cities get warmer, which cities do with or without global warming. The same phenomenon was seen by Laaidi et al., except they added in the adjustment for cold climates, showing less mortality there from cold waves than occurs when temperatures fall dramatically in warm climates. Concerning any temperature rise for any reason, Laaidi et al. found: "For both men and women mortality was higher at low temperatures, suggesting a lesser ability to adapt to the cold." On the basis of another related study, they state, "In England and Wales, the higher temperatures predicted for 2050 might result in nearly 9,000 fewer winter deaths each year." Laaidi et al. conclude: "Our findings give grounds for confidence in the near future: the relatively moderate (2'C) [3.6'F] warming predicted to occur in the next half century would not increase annual mortality rates." Computer models for carbon dioxide-induced global warming consistently predict more warming in winter in midlatitude locations such as France and less warming in the summer. The Laaidi et al, study shows that the greater threat of human mortality lies in the cold end of the thermal spectrum rather than the warm end. Higher temperatures in the winter would certainly decrease mortality, and we could conclude from this and other studies that in terms of temperature-related mortality, global warming would save lives- a message not well conveyed in the hundreds of thousands of websites on the subject.

### Most recent evidence disproves the warming theory

Chapman ‘8

Phil, geophysicist and astronautical engineer, Sorry to ruin the fun, but an ice age cometh, http://www.sciencealert.com.au/opinions/20082105-17356.html

The scariest photo I have seen on the Internet is [www.spaceweather.com](http://www.spaceweather.com/), where you will find a real-time image of the sun from the Solar and Heliospheric Observatory, located in deep space at the equilibrium point between solar and terrestrial gravity. What is scary about the picture is that there is only one tiny sunspot. Disconcerting as it may be to true believers in global warming, the average temperature on Earth has remained steady or slowly declined during the past decade, despite the continued increase in the atmospheric concentration of carbon dioxide, and now the global temperature is falling precipitously. All four agencies that track Earth's temperature (the Hadley Climate Research Unit in Britain, the NASA Goddard Institute for Space Studies in New York, the Christy group at the University of Alabama, and Remote Sensing Systems Inc in California) [report](http://wattsupwiththat.wordpress.com/2008/02/19/january-2008-4-sources-say-globally-cooler-in-the-past-12-months/) that it cooled by about 0.7C in 2007. This is the fastest temperature change in the instrumental record and it puts us back where we were in 1930. If the temperature does not soon recover, we will have to conclude that global warming is over.

# \*\*\*SPACE INDUSTRY ADV\*\*\*

## Space Industry Adv – 1NC

### Plan trades-off with private sector and reduces Obama’s job creation

Mace 11 (Frank, “In Defense of the Obama Space Exploration Plan”, Harvard Political Review, 4-7, http://hpronline.org/united-states/in-defense-of-the-obama-space-exploration-plan/)

Last April, President Obama unveiled a comprehensive overhaul of NASA’s future and cancelled much of the Bush-era Constellation plan to return to the moon. Obama’s plan looked to add $6 billion to the NASA budget over the next five years, renew the focus on scientific discovery, lengthen the lifespan of the International Space Station, and most importantly, dramatically increase the role of private contractors in NASA missions. Obama rightly prioritized jobs, science, and national inspiration with his new direction for NASA.

This plan drew immediate criticism from, among others, Apollo 11 Commander Neil Armstrong, Apollo 13 Commander James Lovell, and Apollo 17 Commander Eugene Cernan, who jointly wrote in a letter to President Obama: “It appears that we will have wasted our current $10-plus billion investment in Constellation and, equally importantly, we will have lost the many years required to recreate the equivalent of what we will have discarded. For The United States, the leading space faring nation for nearly half a century, to be without carriage to low Earth orbit and with no human exploration capability to go beyond Earth orbit for an indeterminate time into the future, destines our nation to become one second or even third rate stature.” The three commanders, however, overvalue pure nationalism at the expense of the NASA roles in job creation, science, and national inspiration.

In today’s economic climate, our first consideration should be jobs. The Obama Plan would add 2,500 more jobs to the American economy than the Bush-era plan. Additionally, the increased private sector involvement in the space program could generate upwards of 10,000 jobs. Conservative critics of Obama’s plan should take note of this increased reliance on the private sector for innovation—after all, a belief in the efficiency of the private sector is a central Republican tenet.

### Aerospace is rebounding

Lopez 10 (Ramon, Editor-in-Chief – Air Safety Week, “Rebound for Aerospace Industry in 2010”, Aviation Today, 2-8, http://www.aviationtoday.com/regions/usa/Rebound-for-Aerospace-Industry-in-2010\_66262.html)

A new study by the Center for Aviation and Aerospace Leadership (CAAL) at Embry-Riddle Aeronautical University predicts that the aerospace industry will recover in 2010 – and the rate of recovery could be relatively quick. In fact, the study, titled the Aerospace Economic Report and Outlook for 2010 (the AERO 2010 Report), goes even further by suggesting that the recovery in aerospace manufacturing may help lead the U.S. economy out of the recession. “It may take some time to return to the pre-recession levels of output and employment in our economy, but we anticipate that the rate of growth in aerospace manufacturing will be better than other sectors,” said Dr. Saul “Sonny” Barr, a senior aerospace economist at CAAL and primary author of the study. However, the study also revealed a subtle but ominous trend. More specifically, the data indicates that there is a strong long-term trend toward the importation of aerospace components and parts. Even though the United States continues to lead the world in the export of assembled aircraft, it is clear that a growing percentage of the components that go into the assembled aircraft are being produced overseas. “The vast network of U.S. manufacturers that are so critical to the production and support of both civilian and military aerospace products may be at risk if this trend continues,” said retired USAF Brig. Gen. Robert Mansfield, an aerospace executive in residence at Embry-Riddle and co-author of the study. Dr. Robert Materna, director of CAAL, echoed Mansfield’s concern and notes that the U.S. aerospace industry is unique because it plays a critical role in our economy as well as our national defense.

### Aerospace resilient

Wharton 8 (Wharton Aerospace & Defense Report, “Despite Economic Turbulence, U.S. Aerospace Industry Shows Resilience”, 12-18, http://executiveeducation.wharton.upenn.edu/wharton-aerospace-defense-report/Economic-Turbulence-1208.cfm)

The aerospace industry is showing resiliency navigating through turbulent economic times — even ending 2008 with modest growth and showing some strength in important areas such as its foreign trade balance and employment levels, the Aerospace Industries Association (AIA) announced. AIA, based in Arlington, Va., noted that while the industry is not immune to the effects of the ongoing global financial crisis, it is showing relative strength. Aerospace sales are on pace to reach $204 billion for 2008, according to AIA. This is an increase of 2.1% — a lower rate than in recent years, but still a record for the fifth consecutive year. The industry will also continue to post strong export numbers, reaching $99.2 billion for the year. That fuels an important foreign trade surplus of about $61 billion, the largest of any U.S. manufacturing sector (though the surplus remained flat compared to 2007). Employment in the sector also remained strong, with an average workforce that will reach 655,500 for the year — about 10,000 more than the average for 2007.

### Multiple alt causes to aerospace decline

Walker 2 (Robert, Chair – Commission on the Future of the U.S. Aerospace Industry, “Final Report”, November,

http://www.trade.gov/td/aerospace/aerospacecommission/AeroCommissionFinalReport.pdf)

The U.S. aerospace sector, most notably the commercial air sector, is seen increasingly as a mature industry lacking in capital investment, innovation, and capacity for growth. Aerospace sector market capitalization, research and development investments and return on investments/assets are down and consolidations are up. The U.S. is losing global market share and its positive balance of trade in aerospace manufacturing is eroding. Jobs are going overseas. The U.S. economic downturn, coupled with the additional security costs resulting from the September 11 terrorist attacks, is crippling the airlines and causing massive layoffs. Meanwhile, today’s air transportation system—based on 1960s technology and operational concepts—is reaching capacity, resulting in increasing delays and costs for both passengers and shippers. At the same time, government investments in longterm civil aerospace research are static, if not declining in real terms. The lack of sustained, long-term investment is stifling innovation and preventing the establishment of new economic growth curves for air transportation and space. While the military has recently received significant increases, both in research and development and in procurement accounts, those increases focus on near-term counter-terrorism and homeland security problems and may be short-lived. The aerospace workforce and infrastructure are aging, and there is a lack of compelling vision or robust financial outlook to draw our youth into this important business sector.

## Space Industry Adv – Resiliency Ext

### No risk of collapse --- long-term contracts, defense spending, and commercial airlines ensure aerospace growth

Deloitte 10 (“2009 Global Aerospace & Defense Industry Performance Wrap-Up”, 5-11, http://www.deloitte.com/ assets/Dcom-UnitedStates/Local%20Assets/Documents/us\_ad\_2009%20Global%20Aerospace%20Defense%20Ind ustry%20Performance%20Wrap-up\_051110.pdf)

Although impacted by the 2009 worldwide economic recession, the Industry has continued to demonstrate its resilience by posting stable revenue and less impactful reductions in operating earnings and operating margins compared to many industries in 2009. This is because the Industry generally relies on long term contracts not greatly impacted by short-term economic events, an increasing requirement for global defense, security and humanitarian aid, as well as the need for increasing commercial airline travel especially in growing non-Western economies.

### Aerospace industry is resilient – even in recession

Brahmand.com – Defence and Aerospace News – 5/13/2010

http://www.brahmand.com/news/Resilience-in-defence--aerospace-industry-despite-recession-Deloitte/3885/1/11.html

WASHINGTON (BNS): Deloitte’s recent study of the 'global aerospace & defence industry financial performance for 2009' evaluated the performance of the 91 global aerospace & defence companies with revenues exceeding $500 million and found that despite recession of 2009 these companies have demonstrated resilience.

“Despite the economic recession of 2009, these 91 global aerospace & defence companies faced financial challenges head-on and experienced less decline than companies in many other sectors, demonstrating the resilience of the industry,” said Tom Captain, vice chairman, and global and United States aerospace & defence sector leader for Deloitte LLP, according to a Deloitte news report.

## Space Industry Adv – Unq

### American aerospace is outpacing EU now

Brahmand.com – Defence and Aerospace News – 5/13/2010

http://www.brahmand.com/news/Resilience-in-defence--aerospace-industry-despite-recession-Deloitte/3885/1/11.html

According to the study report, American aerospace & defence companies grew faster in 2009, at 3.4 percent, than European companies in this study, whose revenue fell by 2.1 percent.

American companies were more profitable again in 2009, with operating margins of 9.3 percent, than European companies in this study, with operating margins of 4.6 percent.

## Space Industry Adv – Alt Causes Ext

### Demographic trends and outsourcing doom U.S. aerospace

Aviation Week 8 (And Space Technology, “Outsourcing’s Hidden Costs”, 4-21, Lexis)

A convergence of demographic changes and short-term corporate policies is creating a crisis that threatens the very foundation of the U.S. aerospace ­industry. The average age of an aerospace engineer at the Boeing Co. is 46. Technical workers are an average of 50. Although U.S. colleges turn out engineering and science degrees at double the pace of 40 years ago, aerospace has lost its luster as a career path. The Baby Boom generation of engineers, technical workers and machinists who design, build and effectively manage the production of aerospace products is fast approaching retirement. Moreover, while one demographic group is planning to rapidly exit the aerospace workforce, the industry is ignoring the need to groom the next generation. Instead, U.S. corporations remain fixated on short-term cost-cutting and cost-shifting strategies to boost the prices of company stocks. One of the primary corporate strategies to paper over this crisis is to cut the domestic workforce and outsource projects to lower cost workers overseas?a strategy predicated upon a fundamental misunderstanding of the aerospace workforce. The idea that complex aerospace products can be outsourced as if they were cheap consumer electronics is profoundly flawed. For example, Boeing developed its business model for the 787 Dreamliner upon the idea that aerospace workers are easily replicated. The assumption was that ?an engineer is an engineer? and that transferred jobs can be leveraged to gain foreign sales. Final assembly was left for the gutted domestic workforce. Although it may make sense to outsource common redundant pieces of mature products, cost savings from outsourcing during the design and initial manufacturing of complex aerospace products is illusory. Boeing discovered this when it had to perform costly rework on thousands of components outsourced for the 787. One particularly devastating example was the 787 center wingbox. Companies obscure the true costs of outsourcing disasters by burying them in overhead. Boeing and other companies are now discovering what the Society of Professional Engineering Employees in Aerospace warned about in 2002: Complex, technical and manufacturing jobs cannot be outsourced. Aerospace is not built on discrete tasks of individual engineers, technicians and machinists. Rather, it is the integration of complex tasks evolved from decades of experience working on similar projects. This value-added synergistic workforce cannot be purchased in the world marketplace by cobbling together a network of global suppliers. Boeing?s answer to its disastrous 787 outsourcing model is to dip into its experienced workforce, and scatter its members around the world to fix the problems at global ?partners.? For today?s problems, it may work. But, without a new generation of aerospace workers training at their side, the company, and our industry, will not be able to solve the next problems. This doesn?t mean there aren?t extremely talented younger workers in the aerospace industry. Of course there are. However, there are not nearly enough of them, and even they are being deprived of the tribal skills-transfer that comes from working projects from development to final rollout. The outsourcing of the intermediate production steps is robbing the workforce of the opportunity to engage in the intergenerational skills-transfer that is vital to keeping the American aerospace industry innovative and competitive.

## Space Industry Adv – Impact D

### Air power is ineffective at fighting current wars

Donnelly ‘9

Thomas. Resident scholar @ AEI. America's Air Supremacy Allowed to Evaporate. 9/8/9. <http://www.aei.org/article/100990>.

Second of all, U.S. armed forces find themselves embroiled in wars that naturally dissipate the effects of air power. Attacking irregular enemies from the air is inevitably a whack-a-mole enterprise. Osama bin Laden and his al Qaeda lieutenants are hard to find and they don't sit still for long. When we can find prime targets, such as Abu Musab al Zarqawi in Iraq or Baitullah Meshud just recently in Pakistan, they prove to be of lesser and brief value; indeed, the air power concept of "leadership" or "high value" targets needs rethinking. Even if we were lucky enough to at last kill bin Laden, it's getting harder to argue that this would produce anything like a decisive effect in the so-called "long war."

### No air power – anti-access weapons and new fighters

Grant ‘9

Greg Grant, contributing editor for DOD Buzz, 9-15-2009, “U.S. Air Dominance Eroding,” DOD Buzz, http://www.dodbuzz.com/2009/09/15/u-s-air-dominance-eroding/

Emphasizing the increasing capabilities of “anti- access weapons,” such as long range precision missiles, Deptula said pilots in future wars will not operate in the “permissive” threat environments of current wars in Iraq and Afghanistan. Deptula, best known for crafting the Desert Storm air campaign, said potential opponents have learned from U.S. operations and will use precision arsenals to stop a buildup of U.S. airpower near their borders before a war even begins. Without functioning ground bases, aircraft cannot operate; the Air Force is investing heavily in shorter ranged tactical aircraft, such as the F- 22 and F- 35, along with a host of older F- 15 and F- 16. Overseas bases from which these aircraft operate are now threatened by increasingly accurate ballistic missiles in Chinese, Russian, Iranian and North Korean arsenals, Deptula said. The newest models are road mobile and exceedingly difficult to locate. Enemies will use cyber attacks to target U.S. command and control networks and satellite relays, the smooth functioning of which the military is now completely dependant. “Space is no longer a sanctuary and our satellites are at risk… for five decades the U.S. has led the world in space,” he said, now, “the space domain is perhaps the most likely arena for threats to achieve leveraged effects,” against U.S. operations. The Chinese are developing anti- satellite weapons, as are the Russians, and the number of countries that can launch sensor- loaded satellites into space is increasing. Because of improvements in over the horizon and passive radars, U.S. aircraft will be detected long before they reach their targets. “The area that we operate in free from detection is rapidly shrinking,” Deptula said, “our adversaries are going to have capabilities that we’ve never operated against.” The newest generation surface- to- air missiles, such as the Russian SA- 21, have ranges exceeding 300 miles and the ability to target low flying aircraft, and will likely be exported. Speaking to the more traditional realm of air- to- air combat, so dear to his audience’s heart, Deptula contends that the U.S. technological edge there is eroding. While “fourth generation” fighters are no match for the most advanced U.S. fighters, Deptula reminded the audience of the Russian export success with the MIG- 21, some 12,000 of which were built, and operated by over 50 countries. Russia and China are both developing “fifth generation” fighters that will be widely exported at prices that will undercut the F- 35 price tag. Both nations will thus acquire “near F- 22 performance… while attempting to proliferate the [aircraft] to perhaps near F- 35 like quantities,” he said. “We may be facing a fighter threat capability in quantities we’ve never experienced before.”

# \*\*\*LINKS\*\*\*

## Spending Link – VSE

### NASA underreports the cost of its missions. Lunar base in actuality will cost at least $300 billion.

Easterbrook, 2006 [Gregg. Friday, Dec. 8, Moon Baseless NASA can't explain why we need a lunar colony. <http://www.slate.com/id/2155164/>, editor of The Atlantic Monthly, The New Republic and The Washington Monthly an editor of The Washington Monthly, a contributing editor to Newsweek and to U.S. News & World Report, a columnist for the ecumenical website BeliefNet.com, a distinguished fellow of the Fulbright Foundation, a visiting fellow of the Brookings Institution]

How much will it cost? NASA said Monday it can build a moon base for about the $10 billion per year it now spends on the (soon-to-be-retired) space shuttle and the space station. (The agency also says that the international community will soon begin funding the space station, but no nation has agreed to this.) Considering that the space station and shuttle cost about $10 billion per year, a moon base might cost much more. The space station is 200 miles away and only goes up, never comes down. The equipment for a moon base would need to be accelerated to a significantly higher speed than was required for the space station, and that means a lot more fuel and a lot more expense. Moon-base ships will also need lots of fuel to descend to the lunar surface, and some will need still more fuel to blast off again. Remember, launching the fuel is a major expense. The Apollo program spent about $135 billion, in 2006 dollars, to place about 50 usable tons on the lunar surface. Even an austere moon base would need 300 or 400 tons of structure, equipment, fuel, vehicles, and life support—and probably more. Suppose today's technology allows for lunar-rated materiel to be built and placed on the moon at half the cost of the Apollo project. This quickly gets you to a program cost of at least $300 billion to build the moon base.

What should NASA do? As I argued in Slate back in March, rational budget priorities for the agency would include first and foremost an exhaustive study of the sun, as well as the Earth and Mars and Venus, the two other Earthlike planets in the solar system, with automated probes and satellites. Second, it borders on criminal that NASA is doing nothing to prepare for a deadly comet or asteroid strike. (The agency says it has already cataloged 835 "potentially hazardous" large space rocks.) Third, space telescopes should continue to be used to study the distant universe. Fourth, researchers should be working on a breakthrough in propulsion technology, which could make getting to the moon more affordable.

For 20 years now, NASA has gone through one iteration after another of supposed "dramatic" self-reevaluations, and always come to the same conclusion: All existing spending programs having to do with the astronaut corps are sacrosanct, regardless of whether they serve any purpose. With public-good space needs unmet and the enunciation of a moon-base plan that will waste colossal sums of public money, agency director Michael Griffin has simply raised NASA's middle finger to the taxpayer.

**VSE spends hundreds of billions of dollars**  
**Morgan 2010** Daniel Morgan is a specialist in science and technology policy, "The Future of NASA: Space Policy Issues Facing Congress," Congressional Research Service, July 8th, 2010, www.fas.org/sgp/crs/space/R41016.pdf; LP

NASA has not provided a cost estimate for the Vision as a whole. In 2004, it projected that developing capabilities for human exploration, not including robotic support missions, would cost a total of $64 billion up through the first human return to the Moon. The Congressional Budget Office (CBO) concluded that, based on historical trends, the actual cost could be much higher. In its 2005 implementation plan, NASA estimated that returning astronauts to the Moon would cost $104 billion, not including the cost of robotic precursor missions or the cost of servicing the ISS after the end of the shuttle program. In 2007, the Government Accountability Office (GAO) estimated the total cost for the Vision as $230 billion over two decades In April 2009, as directed in the 2008 authorization act, the CBO updated its 2004 budgetary analysis of the Vision. It found that NASA would need an additional $2 billion per year through FY2025 to keep the Vision activities on schedule, not counting probable cost growth in other activities. In October 2009, the Augustine report stated that executing NASA’s current plans would require an additional $3 billion per year, even with some schedule delays.

### Lunar base is inordinately expensive -

Pittsburgh Post-Gazette 6 (Pittsburgh Post-Gazette. December 9, 2006. http://www.post-gazette.com/pg/06343/744803-192.stm)

Two years ago, President Bush's call for America's return to the moon after a three-decade absence stirred about as much enthusiasm as simultaneous invasions of Iran and North Korea. Responding to Mr. Bush's mandate for a vigorous return to manned space exploration, NASA Administrator Michael Griffin announced this week an ambitious plan for human habitation of the moon by 2020. He said the effort to build a fully-functioning moon base capable of hosting astronauts for months at a time will cost $100 billion, not counting the additional billions needed to maintain the base annually. By 2024, four-person crews could be living in solar-powered encampments at the lunar north or south poles. NASA hopes that enough liquid in the form of ice can be culled from yet-to-be-discovered craters to replenish the mission's water and fuel needs. In other words, a lot of things have to go right before American astronauts are hitting golf balls on the moon again. As of now, NASA has nowhere near the money it needs to pull off such a technically daunting mission without endangering every other program it has in the pipeline. Though glamorous and inspiring, another manned mission to the moon has little scientific value beyond national vanity and bragging rights. NASA's annual budget is $17 billion. Out of this relatively small pool of funds, the space agency has to squeeze out dollars for unmanned satellites, deep-space probes, the Hubble telescope and its share of the load for building the International Space Station, already woefully behind schedule. Somewhere along the line, NASA would have to find money for the new Orion space ships and Ares rockets that will presumably take the astronauts to the moon -- and beyond. The Congressional Budget Office and the Government Accountability Office believe NASA's cost estimates might as well be made out of green cheese because the space agency has no visible means of fully funding the mission. A faith-based approach to financing a moon base and maintaining it is bad science and even worse economics. If the debacle in Iraq has taught America anything, it's the importance of counting the cost of every venture. Returning to the moon would be America's most ambitious space adventure since the moon landings of the early 1970s. In an ideal universe where a moon base could be funded without robbing programs with tangible scientific value, returning to the moon would be a wonderful thing. Attempting to do so on the cheap would be a disastrous undertaking from beginning to end. NASA can't afford to proceed with stardust in its eyes.

## Politics Links – Flip Flop

### Moon missions trigger partisan battles --- and it’s a flip-flop and a loss for Obama

Statesman 10 (“NASA: Moon Not Among Returns on Investment”, 2-2, <http://www.statesman.com/opinion/nasa-moon-not-among-returns-on-investment-209597.html?printArticle=y>)

Now, faced with daunting budget deficits that grow larger and larger, Obama wants Congress to put the brakes on future lunar missions, including Bush's vision of a lunar base from which Mars missions could begin.

"We do not know where this journey will end, yet we know this: Human beings are headed into the cosmos," Bush told NASA employees in 2004, announcing the ambitious plan and declaring the moon the "home to abundant resources."

Obama's new vision of NASA includes $18 billion for new technologies that eventually could take humans farther into space. The president wants NASA to concentrate on research and development, while the nation would look to commercial companies to handle "space taxi services" to the International Space Station.

John M. Logsdon, former director of George Washington University's Space Policy Institute and one of the experts briefed by the White House, told The New York Times the Obama plan is "a somewhat risky proposition."

But he also noted it's time for something new because "we've been kind of stuck using the same technologies we developed in the '50s and '60s."

To that end, Obama is calling for an end to NASA's Constellation program that has been underway for four years to replace the space shuttles. And while the White House plan calls for a "bold new initiative," it offers no schedules or destinations.

We eagerly await more details on Obama's vision for space exploration. In any form, it is an expensive undertaking. But we know from history that it can be an investment with an attractive rate of return.

These are times that call for cautious spending of precious public funds. Is NASA a wise place to look for savings? Could be, but we trust that Congress will have a full-throated discussion of this before making the radical midcourse correction favored by Obama.

With the NASA facility near Houston (thanks, LBJ), Texas obviously has a large stake in the space program. Texas lawmakers, led by Sens. John Cornyn and Kay Bailey Hutchison, already have pushed back against Obama's plan.

Hutchison blasts the proposed cuts as "very short-sighted \u2026 especially considering how much has been poured into the space program in the past." We agree, but we will withhold final judgment until Congress delves further into the president's plan.

Like most federal projects, NASA probably can stand some trimming. But we believe it continues to be involved in important research that can have benefits here on our little planet.

The last thing we need is a partisan battle over NASA. Can we please shift politics to a back burner, just this one time, so we can have a forward-looking (beyond the next election) discussion abut this?

### Flip-flops destroy Obama’s political capital

Goddard 9 (Taegan, Creator – Political Wire, (One of the Most Widely-Read and Influential Political Web Sites on the Internet), "Does Obama Practice a Different Kind of Politics?", CQ Politics, 3-19, [http://innovation.cq.com/ liveonline/51/landing](http://innovation.cq.com/liveonline/51/landing" \t "_blank))  
#  Dan from Philadelphia: How quickly is Obama burning through his political capital? Will he have anything left to actually keep some of his promises? With potential shifts from his campaign stances on the question of Gitmo, Iraq troop withdrawals and taxing employer healthcare benefits, it seems he is in for tough fights on all fronts.  
# Taegan Goddard: That's a great question. I think Obama spends some of his political capital every time he makes an exception to his principles -- such as hiring a lobbyist to a key position or overlooking an appointee not paying their taxes. Policy reversals such as the ones you note burn through even more of this precious capital.

## Politics Link – Cost O/W’s

### No political support for Moon exploration – cost outweighs any benefit in politicians minds

Thompson 11 (Loren, Chief Financial Officer – Lexington Institute, “Human Spaceflight”, April, <http://www.lexingtoninstitute.org/library/resources/documents/Defense/HumanSpaceflight-Mars.pdf>)

This all makes sense from a budgetary and scientific perspective. What’s missing is a grasp of the rationale required to sustain political support across multiple administrations. While exploration of the Moon’s far side or nearby asteroids may have major scientific benefits, those benefits are unlikely to be appreciated by politicians struggling to reconcile record deficits. NASA’s current research plans do not connect well with the policy agendas of either major political party, and the flexible path will not change that. To justify investments of hundreds of billions of dollars in human spaceflight over the next 20 years while entitlements are being pared and taxes are increasing, NASA must offer a justification for its efforts commensurate with the sacrifices required. Mars is the only objective of sufficient interest or importance that can fill that role. Thus, the framework of missions undertaken pursuant to the flexible-path approach must always be linked to the ultimate goal of putting human beings on the Martian surface, and the investments made must be justified mainly on that basis. The American public can be convinced to support a costly series of steps leading to a worthwhile objective, but trips to the Moon and near-Earth objects aren’t likely to generate sustained political support during a period of severe fiscal stress.

## Security Link – Aerospace Adv

### The aerospace and defense establishment and their conservative backers have vested interests in portraying space as a place where militarization is inevitable and essential—this securitized view of space is a sham designed to prop up the military industrial complex, threatening global survival

Webb, 2006(David, Faculty of Information & Technology – Leeds Metropolitan University, “Space Weapons – Dream, Nightmare or Reality?” Presented at the 47th Annual International Studies Association – San Diego, California, March 22-25)

War in space is undesirable for a number of reasons – not least of which are the problems associated with space debris and the possibility of space based weapons aimed at earth – and nations appear to be united in wishing to prevent weapons being stationed in space. However, the US is determined not to give up its superiority and dominance in space technology and has consistently prevented progress in treaty negotiations and has in fact lead space weapons development through missile defence and other programmes claiming them to be defensive rather than offensive.  However, offense is often in the eyes of the beholder and other technologically capable (or near capable) states are concerned about the dominance and aggressive stance of the US in this area.  A major question often asked is what is the force behind the US drive to space dominance? How do major projects get huge amounts of funding when eminent scientists can show that they are not technically feasible? Are concerns about national security and a national faith in technological solutions to national and global problems too strong in the US? Does the drive come from a desire for world domination and control? Perhaps it is a mixture of many things. Certainly the aerospace and defence industry is a major beneficiary in the effort to achieve “full spectrum dominance” have been at the forefront of the development of a philosophy of security through strength and a role for the US as a global police force through technological superiority. This also fits well with some US right wing political views concerning the destiny of America to police the world the American people’s trust in technology to eventually find solutions to seemingly insoluble problems.  A contributing factor may be the continuing decline in non-military public support for science and engineering programmes and training. The increasing reliance on industry to support military activities has meant that high technology projects in Universities are often linked to military programmes. Students and groups such as the Scientists for Global Responsibility in the UK and the Union of Concerned Scientists in the US actively campaign on issues such as the ethical use of science and engineering and continue to lobby politicians but there has been little positive response from Government. Therefore, there is little choice for those wanting to follow a career in engineering or science but to become an integral part of the ‘military industrial complex’ and contribute to the development of lucrative military projects. Now must be the time for scientists, engineers and politicians to seriously consider what might constitute a workable ethical policy on space. Although fears are that it is already too late.   At a time when satellite and missile related technologies are growing rapidly, an international space weapons race cannot be the path to follow. Many nations and NGO groups agree on a number of issues, including the desirability of the ethical and sustainable use of space. A truly secure future can only be guaranteed if space remains weapon free and the increasing development of military related space systems is limited (or ideally reversed) and rigorously monitored and controlled. There is a significant role for the technologically able nations here. The world is seeing the warnings and suffering the consequences of ill-planned technological growth. Global warming is beginning to be taken seriously by the major energy and resource consumers. Urgent action is needed to prevent global disaster. Technological growth that ignores environmental consequences usually results in human misery and suffering and the leading nations must take the lead even if personal or national pride has to be sacrificed to guarantee future global survival.   A significant step for humanity would be made if the nations of the world could develop a collective dream and trust each other enough to make an international agreement on the Prevention of the Weaponisation of Space - to care enough to make a space environment free of war a reality.

## Privatization CP – 1NC

### The United States federal Government should implement the Space Settlement Prize

Space Settlement Prize encourages the innovation and competition necessary for a permanent lunar base

Space Settlement Institute 2005 http://www.space-settlement-institute.org/Articles/redundancy.htm

It seems like a conundrum, and the thought of private industry paralleling NASA’s efforts at establishing a permanent presence on the Moon still seems farfetched - but only because there is a lack of investment capital, not because there is a lack of will or technical ability.

This is where a multi-billion dollar prize like Space Settlement Prize legislation can fill the vacuum. Note that this legislation would cost the U.S. Treasury nothing. Pass a bill in Congress stating the U.S. courts will officially recognize the huge lunar land claim of the first private industry consortium to build a permanent Moon base and transportation system. To accommodate the rules of international space law, add in specific requirements such as participation by international corporations and even Third-World countries. Base the recognition on Civil Law’s “use and occupation” standard (a standard that is in fact far older than the Common Law “sovereignty” standard) to make it clear the U.S. itself if not claiming any territory.

Then the investment dollars and venture capital can roll in, the idea being that investors will recoup their up-front capital and reap a huge windfall profit after a permanent lunar base is established and the land claim verified. If the claim were allowed to be 4% of the Moon’s surface surrounding the base (about the size of Alaska), then real estate sold from this vast region could easily generate $10-$40 billion on the investment and speculative real estate markets (at a conservative $25-$100 per acre).

Throughout human history, real estate has always been valued as a hard asset and commodity and a good investment. Land values only go up with time. Once a permanent settlement is established on the Moon it will be true there as well. But to kick if off, we need the Space Settlement Prize right now as the catalyst - and as our backup in case NASA’s hands eventually become tied.

## Privatization CP – Solvency Ext

### Private sector can get to the moon

Space Settlement Institute 2005 http://www.space-settlement-institute.org/Articles/redundancy.htm

The private sector is the only logical place to look for a backup plan for the Moon-to-Mars initiative. And they would provide it, too. Maybe not the full plan exactly, but they would certainly like to have the transportation and lunar facilities in place to do business. Just look at the ideas for near space and lunar businesses being discussed these days - solar power generation, mining platinum group metals, space tourism, satellite propellant manufacturing, and many more. The problem is lack of investment capital to get it all started.

The good news, as a recent SpaceDev study concluded, is that private industry would be able to accomplish a return to the Moon at a fraction of what NASA would spend. Unfortunately, even a fraction of NASA’s $100 billion is still a lot of money.

### Reliance on private sector key to further space exploration

Scientific American 2/01/2010 http://www.scientificamerican.com/article.cfm?id=nasa-budget-constellation-cancel

By scrapping the troubled program—along with its focus on a moon landing—and leaning on the private sector, the agency thinks it will actually accelerate efforts to loft astronauts beyond low Earth orbit, the farthest reach of the shuttle. NASA Deputy Administrator Lori Garver declined to specify a preliminary target for exploration in a teleconference Monday afternoon but mentioned near-Earth asteroids as a potential stepping-stone on the path to ultimately exploring Mars and its moons. She also pointed out that, although the agency will relax its focus on the moon, lunar exploration remains on the table. "We're certainly not canceling our ambitions to explore space," Garver said. "We're canceling Constellation."

### Privatizing a lunar base 🡺 necessary innovation

Pelletier Science and technology columnist 2011 Dick Positive Futurist http://www.positivefuturist.com/archive/389.html

Building a Moon base would be even more cost-effective if governments and private industry from the U.S., Russia, Europe, Japan, and China collaborated. Also bandied about is a wild idea to move the ISS nearer to the Moon with scientists aboard to supervise robot construction from a closer vantage point.

In 2010, President Obama cancelled NASA's scheduled Moon trip and proposed instead, manned trips to an asteroid by 2025, and Mars by the 2030s; plus a plan to encourage private industry to develop less expensive ways to access low-Earth-orbit and lunar areas, and create new profitable space activities.

Experts believe that privatizing space development could repeat what the shift from government controls of computer and information technologies did in the 70s and 80s. During that era, businesses were encouraged to develop new technologies, which created the Internet and led to successes like Apple, Intel, Microsoft, and Google, which in turn gave us 'smart' phones, tablets, Twitter, and FaceBook.

### Private sector is developing lunar robots – they are key to low cost innovation

Pelton Research Professor with the Institute for Applied Space Research at George Washington University 2011 Joseph http://findarticles.com/p/articles/mi\_go2133/is\_201105/ai\_n57625395/

Space enterprise is a fast-growing area of R&D. For instance, the entrepreneurs Paul Allen and Burt Rutan recently demonstrated how, for a few tens of millions of dollars, they could create a space plane capable of flying to the edge of Earth's atmosphere and returning safely.

Also, a number of innovative companies build robotic lunar explorers each year and enter them into the Google Lunar X Prize, a competition of robots designed to land on the Moon, travel around its surface, and relay images and data back to Earth. A total of $30 million in prizes will be awarded ($20 million to the first team to succeed). The designs and ideas generated through this competition might not traditionally be funded by a governmental space agency because they are too unconventional and daring.

Robert Bigelow has launched two Earth-orbiting inflatable habitats with private money, and he plans to deploy a private space station larger than the ISS. Most significantly, he has adapted NASA-developed technology to meet his entrepreneurial goals.

There was sound logic in the Aldridge Commission report that advised, among other things, that NASA expand opportunities for international cooperation and limit its role to the development of cuttingedge technologies, space sciences, and governmental functions that are not easily or appropriately carried out by private industry. This is because private industry is more driven to achieve end results at lowest costs, can carry out international cooperative projects with fewer formal constraints and greater flexibility in partnerships and contractual relationships, and is more entrepreneurial and better able to take innovative approaches, with risk-taking bounded by insurance or reassurance agreements.

### **Private sector can get to the moon – developing tech now**

Borenstien, 11

SETH BORENSTEIN, AP Science Writer – Tue Apr 5, 11:42 pm ET <http://old.news.yahoo.com/s/ap/20110406/ap_on_sc/us_sci_space_x_rocket> 6/27/11

WASHINGTON – A high-tech **entrepreneur** unveiled **plans** Tuesday **to launch** the **world's most powerful rocket since man went to the moon**. **Space Exploration Technology** **has** already **sent** the **first private rocket** and capsule **into Earth's orbit as a commercial venture.** It is **now planning a rocket that could lift twice as much cargo into orbit as the soon-to-be-retired space shuttle.** The first launch is slotted for 2013 from California with follow-up launches from Cape Canaveral in Florida. Space X's new rocket called **Falcon Heavy is big enough to send cargo or even people out of Earth's orbit to the moon, an asteroid or Mars**. Only the long retired Saturn V rocket that sent men to the moon was bigger. "This is a rocket of truly huge scale," said Space X president Elon Musk, who also founded PayPal and manufactures electric sports cars. **The Falcon Heavy could put 117,000 pounds into the same orbit as the International Space Station**. The space shuttle hauls about 54,000 pounds into orbit. The old Saturn V could carry more than 400,000 pounds of cargo. The old Soviet Union had a giant moon rocket bigger than the Falcon Heavy, but it failed in all four launch attempts. Another Soviet rocket, also bigger than Falcon Heavy and designed to launch its version of the space shuttle, had one successful flight more than 20 years ago. **While the new Space X rocket is designed initially for cargo, it satisfies NASA's current safety requirements for carrying humans and after several launches could carry people too**, Musk said. He has said that if NASA does buy rides on commercial rockets, he would be able to fly astronauts to the space station in his smaller Falcon 9 rocket and Dragon capsule within three years. Potential customers for the new larger rocket are NASA, the military, other governments and satellite makers. Musk said **Falcon Heavy will be far cheaper than government or private rockets**. **Launches are about $100 million each**. He said the **Air Force pays two older more established aerospace firms about $435 million for each of its launches**. **Over its 40 year** design **history, the space shuttle program has cost about $1.5 billion per launch**, according to a study by the University of Colorado and an Associated Press analysis of NASA budgets. Musk, who has a contract to supply the space station with cargo using the smaller Falcon 9, said his pricing is more fixed than traditional aerospace firms. He joked: "We believe in everyday low prices." To get costs that low, Musk said he needs to launch about four Falcon Heavy rockets a year but plans on launching about 10. **He** doesn't have a paying customer for his first launch, but **is in negotiations with NASA and other customers for flights after his company proves the new rocket flies**. "It would be great if it works, if it's safe," said Henry Lambright, a professor of public policy and space scholar at Syracuse University. "I don't want to come across as skeptical, but I am." Lambright said companies have often made big claims about private space without doing much. But, he added, Musk has some credibility because of his successful Falcon 9. If Musk's plans work, **it will give President Barack Obama's space policy a needed boost**, Lambright said. Obama has been battling some in Congress over his plans to use more private space companies, like Space X, for getting people to orbit with NASA concentrating on missions to send astronauts to new places, such as nearby asteroids. Several companies are vying to launch private rockets that could replace the shuttle. NASA is now paying Russia to send astronauts to and from the space station on Soyuz spacecraft. Howard McCurdy, a space policy expert at American University, said of Musk: "If he's not in the lead, he's well positioned for the finish." McCurdy said **NASA's space shuttle** was a technological marvel, but had a bad business model and **wasn't cost effective**. He said **Musk**, who is using his own money in his privately held firm, **has incentive to be more financially savvy.**