# \*\*\*CASE\*\*\*

# Colonization Advantage

### No overpopulation now- empty land and food surplus

McNeil 08 [Donald G McNeil, Professor of Economics, “Malthus Redux: Is Doomsday Upon Us, Again?”, http://www.nytimes.com/2008/06/15/world/americas/15iht-15mcneil.13714561.html, 6/15/08]

The whole world has never come close to outpacing its ability to produce food. Right now, there is enough grain grown on earth to feed 10 billion vegetarians, said Joel Cohen, professor of populations at Rockefeller University and the author of "How Many People Can the Earth Support?" But much of it is being fed to cattle, the SUV's of the protein world, which are in turn guzzled by the world's wealthy. Theoretically, there is enough acreage already planted to keep the planet fed forever, because 10 billion humans is roughly where the United Nations predicts that the world population will plateau in 2060. But success depends on portion control; in the late 1980s, Brown University's World Hunger Program calculated that the world then could sustain 5.5 billion vegetarians, 3.7 billion South Americans or 2.8 billion North Americans, who ate more animal protein than South Americans. Even if fertility rates rose again, many agronomists think the world could easily support 20 billion to 30 billion people. Anyone who has ever flown across the United States can see how that's possible: there's a lot of empty land down there. The world's entire population, with 1,000 square feet of living space each, could fit into Texas. Pile people atop each other like Manhattanites, and they get even more elbow room. Water? When it hits $150 a barrel, it will be worth building pipes from the melting polar icecaps, or desalinating the sea as the Saudis do. The same potential is even more obvious flying around the globe. The slums of Mumbai are vast; but so are the empty arable spaces of Rajasthan. Africa, a huge continent with a mere 770 million people on it, looks practically empty from above. South of the Sahara, the land is rich; south of the Zambezi, the climate is temperate. But it is farmed mostly by people using hoes.

### Colonization won’t occur in this millennium at best

Kistler 98 [Walter P.– founder of Kistler Aerospace Corporation, “Humanity’s Future In Space”, July 21, 1998]

4. The Very Long-Range Future of Humanity in Space Will humans ever visit other stars and colonize planets in deep space that offer conditions similar to those on Earth-temperate climate, oceans and continents, an atmosphere similar to ours? Only one in a thousand planetary bodies is likely to meet all those conditions. Since the star closest to Earth lies at a distance of over 4 light years, the right planet circling the right sun at the right distance will hardly be found at a distance of less than 10, 20 or 50 light years from our Sun. The farthest stars in our own galaxy lie at distances of nearly 100,000 light years from us. How will humans ever be able to traverse such distances within their lifetimes? They probably won't! The first travelers to distant stars will not be people, but robotic probes, moving at much less than the speed of light and requiring centuries to investigate distant solar systems. Only after exploratory work is done and we know the nature of our near galactic surroundings can humanity afford to venture further into the cosmos. The only conceivable way this can happen is through means of human colonies living in large space islands similar to those suggested by Jerry O'Neal of Princeton University. There is no way we could imagine those large objects, weighing millions of tons, being able to move with anywhere near the speed of light and so, unless people are put in a stage of suspended animation, many generations will come and go before the "promised land" has been reached. T**he spread of humanity throughout our galactic system will be a very, very slow process, not to be expected in the next century, but perhaps in the next millennium.** However, when we look at the millions of years it took us to evolve in our development, humanity will have plenty of time to progress towards our destiny.

## Earth Is Sustainable

### Earth is sustainable, and it’s impossible to economically transport a significant number of people without trading off with the resources that enable sustainability

Elhefnawy 9 [Nader - Professor of English at the University of Miami, writer on IR published in journals including International Security, Astropolitics, and Survival, February 2, 2009, “Planetary demographics and space colonization,” online: http://www.thespacereview.com/article/1296/1

The idea that population growth will drive space expansion is an old one. In 1758, the Danish Reverend Otto Diederich Lutken made reference to the settlement of human beings on other planets as a way to alleviate population pressure in his article, “An enquiry into the proposition that the number of the people is the happiness of the realm, or the greater the number of subjects, the more flourishing the state.” It was also much on the mind of Nikolai Fedorov in his development of his important ideas about space travel. The population explosion of the 20th century and the increased concern about the planet’s ecological limitations have kept these concerns alive and well, figuring prominently in visions like Gerard K. O’Neill’s 1976 book The High Frontier, and a great deal of space opera. Today the world is still seeing large-scale migrations, but it seems highly unlikely that they will translate into a “push” off-planet, even were the technology to become available in this century as O’Neill (and many others) have predicted. An important reason is that the affluent, technologically advanced states that are most capable of conducting the effort seem least likely to generate space colonists, given their tendency to receive rather than export immigrants in recent decades. This pattern is reinforced by the fact that their populations are aging, and appear to be either stabilizing or gradually declining—not the demographic picture usually associated with such dramatic expansion. This may suggest that the rich industrialized countries will be the main providers of the money and technology for the enterprise, while the fast-growing developing nations provide a disproportionate share of the colonists, but the facts of the situation are more complex. (O’Neill, certainly, was concerned by the need to redress Third World poverty when he wrote The High Frontier.) However, even assuming that the cooperation necessary to make this highly unequal arrangement work is somehow achieved, the fact remains that most developing states are actually well along the demographic path already taken by the industrialized nations. The pundits who dismiss Europe’s future on demographic grounds, while celebrating (or dreading) the rise of China, tend to overlook the reality that Europe and China are in the same boat with regard to family sizes. The Total Fertility Rate (TFR)> for the People’s Republic of China is actually 1.77 births per woman, well below the replacement level of 2.1, and slightly below Norway’s. (The trend is even more marked among the “overseas” Chinese: the four countries with the lowest TFRs in the world being Hong Kong, Macao, Singapore and Taiwan, respectively.) While countries like the Philippines have higher fertility rates, a similar drop is already evident in several other developing East Asian countries (Burma, Thailand, Vietnam), as well as industrialized Korea and Japan. The same trends are evident in the Middle East as well, contrary to what some sectors of the media proclaim. In Turkey, Algeria, Tunisia, Lebanon and Iran, in fact, birth rates have already fallen below replacement level, with fundamentalist Iran’s 1.7 children per woman below the levels of Finland, Denmark, Luxembourg and France. The trends are less advanced in southern Asia, but still evident there too, with India’s TFR at 2.8 and Bangladesh’s at 3.0. Pakistan’s is 3.6, relatively high, but also representing a sustained drop from nearly twice that in the early 1960s, and likely to fall to 2.3 by 2025 according to a United Nations study. (In the same time frame, India’s birth rate is likely to fall to replacement levels, or very close to them.) The situation is similar in the Western hemisphere, and not only in the United States and Canada. While fertility remains relatively high in Central America (Guatemala’s TFR is 3.6 births per woman), these countries still represent a relatively small share of the population of the region as a whole. In populous Brazil, by contrast, births have fallen to fewer than two per woman, and the same goes for Uruguay, with Argentina not far behind. Cuba’s TFR is among the lowest in the world at 1.6. Even in Mexico, the source of so much consternation in the United States, the figure is under 2.4 and dropping. In short, very high fertility rates have become a thing of the past outside sub-Saharan Africa, and even there the likelihood is that development will mean this changes here as well. Of course, that leaves the possibility of population growth from the other end of the telescope: greater longevity, but the prospects for this also seem to have been exaggerated. For American women, life expectancy improved from 47 years in 1900, to 71 years in 1950—a 50 percent increase in that half-century. From 1950 to 2000, this was extended by another eight to ten years, a much more modest 10–15 percent growth in the same length of time. (The profile of male life expectancy in the US followed a similar course.) This is a broad slowdown in the extension of the human life span, despite the skyrocketing cost of health care. Accordingly, just going by the established trends, life is unlikely to get very much longer in the foreseeable future. Indeed, there are signs that this progress is being reversed, with smoking and obesity commonly attacked as the culprits. Of course, there are those who predict revolutionary advances in medicine which will radically extend life and health in the near future, and perhaps even eliminate death, but there has been little in the way of tangible results to support such promises. Because of these trends, where global population nearly quadrupled in the last century, it may actually crest and start to drop by the middle of this one. Of course, none of this is to dismiss claims that the world faces serious population stresses, or to argue that even slower population growth would not be desirable. According to the Worldwatch Institute, the world economy was already consuming the resources of 1.2 Earths by 1999, a figure that had risen to 1.4 Earths by this year. The addition of two to three billion people in the coming decades as the drop in population growth catches up with the drop in fertility rates, as well as the struggle to give billions more of those already here a decent life, will increase it (all other things being equal). The fact that the increase will overwhelmingly occur in the poorest countries also poses important challenges. Of course, it may seem a world of nine billion people or more on a planet facing ecological degradation and resource crunches will still suffice to drive a torrent of settlers out to the rest of the solar system. However, the same economic constraints discussed above would preclude that. Even were space settlement to appear an attractive palliative under those circumstances, it seems unlikely that a really struggling planetary economy would be up to the job of delivering demographically significant numbers of people to new homes in orbit and beyond and equipping them to live off the resources in space, rather than depending on Earth’s limited stock of them. In other words, the motivation would exist, but not the means, and the opposite also seems to be true: that a world economy capable of building habitable space colonies is likely to be one significantly more prosperous than that of today, rather than poorer. For that reason, life would probably be more comfortable for most of the planet’s inhabitants rather than less, diminishing the “push” factor that has historically been so important in such movements in the past. (That this population would on the whole be older—and in that, hardly the demographic profile of a pioneering culture—should also be noted in such a consideration.) This may mean that, as writers like Hans Moravec and Ray Kurzweil have suggested, it is not human beings, but the robotic “mind children” of humanity, that will leave the Earth to explore the universe beyond it, with the vast majority of the flesh-and-blood humans sitting out the adventure at home.

### There’s no need to colonize – the Earth is sustainable

Shapiro 07 [Robert – Professor Emeritus and Senior Research Scientist in the Chemistry Department of New York University. “Why the Moon? Human survival!”. March 19, 2007]

Physicist Stephen Hawking, and a number of others, have called for humanity to spread out to distant planetsof our Solar System. But there is no need to go so far to protect ourselves. After a few decades—centuries at worst—dust and ash will settle, radioactive materials will decay, and viruses will perish. Earth will once again become the best home for humanity in the Solar System. Return would be easiest if a safe sanctuary were nearby. In the more probable instance that only a limited disaster took place, that nearby sanctuary could also play a valuable role in restoring lost data and cultural materials, and coordinating the recovery. And of course, construction of the rescue base will be much easier if it is only days, rather than months or years, away.

## Plan isn’t affordable

### The plan accomplishes nothing – putting humans in that environment isn’t useful and isn’t affordable

Baum 07 [Rudy M. – editor and chief of Chemical and Engineering News. “NASA’s Bad Idea”. http://pubs.acs.org/cen/editor/85/8506editor.html Feb 5, 2007 ayc]

Unfortunately, what no amount of balanced reporting can disguise is that **such a mission to the moon is an egregiously bad idea**. As Morrissey's sources make clear, it will cost a staggering amount of money (an amount that NASA, so far, has not bothered to calculate), deprive NASA's legitimate scientific missions of funding, and accomplish exactly what the International Space Station has accomplished, which is **nothing**. "Nobody is clear on what science the astronauts are going to do on the moon," Robert L. Park, a physics professor at the University of Maryland, told Morrissey. "To invent the project and then look for the science to justify it is not the way it should be done." There is important science to be done in space. Observing our home planet, for example, is one such activity. Unfortunately, neglect of an aging fleet of Earth-orbiting satellites is leading to a significant degradation of our ability to measure changes in Earth's climate. Diverting NASA's attention and resources to establishing a moon base will only exacerbate this problem. In introducing the idea of establishing a base on the moon, President Bush used the inspirational language of exploration and discovery. "The extended human presence on the moon will enable astronauts to develop new technologies and harness the moon's abundant resources to allow manned exploration of more challenging environments," the President said. "The experience and knowledge gained on the moon will serve as a foundation for human missions beyond the moon, beginning with Mars." The idea that humans have to visit a place and leave footprints there for humanity to claim to have explored it is romantic rubbish that NASA's own robotic missions have thoroughly discredited. Over the past three decades, these missions have expanded human understanding of the solar system immeasurably. The Voyager, Galileo, and Cassini missions to the outer solar system have utterly transformed our view of Jupiter, Saturn, Uranus, and Neptune. The Opportunity and Spirit rovers on Mars have performed beyond their designers' wildest dreams and extended human eyes, hands, and brains to explore the surface of Mars at a level of detail that is unprecedented. There is an enormous cost to designing and building spacecraft that can transport humans safely to the moon and beyond. Space will never be anything other than a brutally hostile environment. The surface of the moon is outer space with gravity. The surface of Mars is far harsher than Antarctica in the dead of the austral winter. **Putting humans in these environments serves no useful purpose whatsoever other than satisfying an atavistic hubris that is no longer affordable.**

## No Brink To Extinction

### No Brink to Extinction

Shapiro 07 [Robert – Professor Emeritus and Senior Research Scientist in the Chemistry Department of New York University. “Why the Moon? Human survival!”. March 19, 2007]

Of course,we have been hearing predictions of Doomsday for years, and we are still here. According to geologists,the eruption of Mt. Toba in Indonesia 71,000 years ago darkened the sky for years. The event caused killed much of plant life on the planet. The famine that resulted caused a severe drop in the human population of that time. The Black Death of the 14th century killed perhaps one-third of the population of Europeandthe great flu epidemicof 1918 claimed an estimated 40 million victims. Despite these disasters, and others such as global wars, humanity has muddled through and even prospered. Why should things be differentnow?

## Lunar Resources Not Useful

### Resources on the moon aren’t useful – experts prove

Beattie 07 [Donald A. - worked for NASA from 1965 to 1973, on planning for Apollo and post-Apollo missions. “Just how full of opportunity is the Moon?” February 12, 2007 ayc 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.

## No International Interest

### No countries are interested in the Moon

Beattie 07 [Donald A. - worked for NASA from 1965 to 1973, on planning for Apollo and post-Apollo missions. “Just how full of opportunity is the Moon?” February 12, 2007 ayc 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.

## AT: Spudis

### Spudis’ ideology is flawed

Beattie 07 [Donald A. - worked for NASA from 1965 to 1973, on planning for Apollo and post-Apollo missions. “Just how full of opportunity is the Moon?” February 12, 2007 ayc http://www.thespacereview.com/article/804/1]

In his recent article about the reasons for lunar exploration, Paul Spudis asserts that “…some complain that the reason for going to the Moon is still unclear.” (See “A Moon full of opportunity”, The Space Review, January 22, 2007) That is, unfortunately, an incorrect understanding of why there are objections to returning to the Moon with an emphasis on human settlement and exploration. To characterize as “whiners” those who have expressed concerns that NASA is pursuing the wrong goal does a great disservice to legitimate debate. These concerns are well founded based on disagreements about the benefit and attainability of the goal. Proposing a grand “Vision” to explore our solar system has value; however, what the pace and emphasis should be needs to be continually debated based on evolving national needs and the ability to find required resources. We can “…do everything else that we want to do in space” without detouring to the Moon. All indications are that such a detour will inhibit everything else we “should” do in space with the limited resources available. To provide a detailed analysis of why there are disagreements would require a lengthy response; the following discussion briefly presents the key points.

# HE3 Advantage

## Squo Solves

### We can already produce He3, mining on the moon isn’t necessary

Shea and Morgan ‘010 [http://www.fas.org/sgp/crs/misc/R41419.pdf www.crs.gov Dana A. Shea Specialist in Science and Technology Policy Daniel Morgan Specialist in Science and Technology Policy December 22, 2010]

In addition to whatever helium-3 is currently in the stockpile, the decay of the existing tritium supply produces new helium-3 each year. If a need for helium-3 can be deferred, future production might meet that need even if the current helium-3 supply cannot. In other words, stretching out deployment schedules might defer helium-3 demand enough that future supplies could meet it. This approach could be an adjunct to the options already described for increasing the future helium-3 supply. Deferring federal demand is most likely to be a successful approach if a particular helium-3 use is a one-time event or varies significantly from year to year. In such cases, delaying deployment could smooth out the fluctuating demand such that its peaks are below a sustainable level of annual production. One example that meets this description is the continuing deployment of radiation portal monitors by DHS. That deployment is likely to be self-limiting: the number of locations where DHS could usefully deploy the radiation portal monitors is limited, and once all those locations have received a portal, the need for helium-3 to field new portals appears likely to decline (as indicated in Figure 2). Adjusting deployment schedules is not a short-term solution to the helium-3 shortage, and even in the long term it is unlikely to be a solution unless additional supply is located. For example, even if DHS indefinitely postponed radiation portal monitor deployment, the remaining demand for helium-3 would still exceed the supply. However, adjusting the timing of demand might contribute to a solution that also included other supply and demand measures.

## No Resource Wars---No Violence

### No resource wars - depletion of resources doesn’t cause violence

Victor 7 [David G. - professor at the School of International Relations and Pacific Studies and director of the School’s new Laboratory on International Law and Regulation. “What resource wars?”. http://www.atimes.com/atimes/Global\_Economy/IK14Dj04.html, November 14, 2007 ayc]

Most of this is bunk, and nearly all of it has focused on the wrong lessons for policy. Classic resource wars are good material for Hollywood screenwriters. They rarely occur in the real world. To be sure, resource money can magnify and prolong some conflicts, but the root causes of those hostilities usually lie elsewhere. Fixing them requires focusing on the underlying institutions that govern how resources are used and largely determine whether stress explodes into violence. When conflicts do arise, the weak link isn't a dearth in resources but a dearth in governance. Feeding the dragon Resource wars are largely back in vogue within the US threat industry because of China's spectacular rise. Brazil, India, Malaysia and many others that used to sit on the periphery of the world economy are also arcing upward. This growth is fueling a surge in world demand for raw materials. Inevitably, these countries have looked overseas for what they need, which has animated fears of a coming clash with China and other growing powers over access to natural resources. Within the next three years, China will be the world's largest consumer of energy. Yet, it's not just oil wells that are working harder to fuel China, so too are chainsaws. Chinese net imports of timber nearly doubled from 2000 to 2005. The country also uses about one-third of the world's steel (around 360 million tons), or three times its 2000 consumption. Even in coal resources, in which China is famously well-endowed, China became a net importer in 2007. Across the board, the combination of low efficiency, rapid growth and an emphasis on heavy industry - typical in the early stages of industrial growth - have combined to make the country a voracious consumer and polluter of natural resources. America, England and nearly every other industrialized country went through a similar pattern, though with a human population that was much smaller than today's resource-hungry developing world. Among the needed resources, oil has been most visible. Indeed, Chinese state-owned oil companies are dotting Africa, Central Asia and the Persian Gulf with projects aimed to export oil back home. The overseas arm of India's state oil company has followed a similar strategy - unable to compete head-to-head with the major Western companies, it focuses instead on areas where human-rights abuses and bad governance keep the major oil companies at bay and where India's foreign policy can open doors. To a lesser extent, Malaysia engages in the same behavior. The American threat industry rarely sounds the alarm over Indian and Malaysian efforts, though, in part because those firms have less capital to splash around and mainly because their stories just don't compare with fear of the rising dragon. These efforts to lock up resources by going out fit well with the standard narrative for resource wars - a zero-sum struggle for vital supplies. But will a struggle over resources actually lead to war and conflict? To be sure, the struggle over resources has yielded a wide array of commercial conflicts as companies duel for contracts and ownership. State-owned China National Offshore Oil Corporation's (CNOOC) failed bid to acquire US-based Unocal - and with it Unocal's valuable oil and gas supplies in Asia - is a recent example. But that is hardly unique to resources - similar conflicts with tinges of national security arise in the control over ports, aircraft engines, databases laden with private information and a growing array of advanced technologies for which civilian and military functions are hard to distinguish. These disputes win and lose some friendships and contracts, but **they do not unleash violence.**

## Mining Impossible---No Facilities

### He3 won’t be useful for decades – no fusion facilities or money

Moon Daily, 04 [Moon Daily, “Moon Could Meet Earth’s Future Energy Demands: Scientists”, Nov. 26, 2004]

However, planetary scientist Taylor said the reactor technology for converting helium 3 to energy was still in its infancy and could take years to develop. "The problem is that there is not yet an efficient type of reactor to process helium 3. It is currently being done mostly as a laboratory experiment. Right now at the rate which it (research) is proceeding it will take another 30 years," he said. Other scientists said the reactor would be safe in terms of radioactive elements and could be built right in the heart of any city. "Potentially there are large reserviours of helium 3 on the moon, said D.J. Lawrence, planetary scientist at the US Los Alamos National Laboratory. "Just doing reconnaissance where the minerals are and to find out where helium 3 likes to hang out is the first step, so when the reactor technology gets to work we are ready and have precise information," Lawrence said. "It really could be used as a future fuel and is safe. It is not all science fiction." "There are visionaries out there and now the question arises where the funds come from. If people get on board to do it there is no doubt it could be done," he said. Taylor echoed Lawrence's views adding that **there were no funds available for funding non-petroleum energy projects in the United States.**

### We don’t have any fusion reactor suitable for He3 – building one is decades away

Wylie 04 [Margie - National Correspondent for Science and Technology, The Grand Rapids Press, Feb 1, 2004 “Moon has no fast answer to energy needs: In theory, moon rocks could be a cheap source of electricity. In practice, the technology is decades away,” http://margiewylie.com/media/moon.pdf]

Most of today's fusion research uses the hydrogen isotopes deuterium and tritium, which fuse at relatively low temperatures, about 100 million degrees, Wurden said. But deuterium and tritium mixtures release about 80 percent of their energy in the form of fast neutrons, which produce radioactive waste. A helium-3 and deuterium mix gives off much fewer fast neutrons, but requires about four times the temperature to react. A pure helium-3 reaction, on the other hand, would produce zero radioactive waste at the cost of even higher temperatures. And heat's not the only problem. Helium-3 atoms are about 10 times harder to fuse together than tritium and deuterium and so require more advanced containment systems than we know how to build today, said Wurden, who is the Los Alamos program manager for the U.S. Department of Energy's Office of Fusion Energy Sciences. "Nobody questions that helium-3 is a great fuel," Wurden said. "The problems are it's on the moon and we haven't even built a reactor good enough for a simple deuterium-tritium fuel mix." Even if the physics weren't so difficult, mining helium-3 would present challenges. While the isotope is relatively abundant on the moon, it still occurs at only 50 parts per million, said Alan Binder, director of the Lunar Research Institute in Tucson, Ariz., which advocates commercializing the moon's resources. That means shoveling 20,000 metric tons of regolith into 700-degree ovens to boil off one metric ton of the precious isotope, which must be sorted out from regular helium and other naturally occurring elements, like hydrogen and oxygen. Of course, there's also the expense of transporting it back to Earth. But Binder doesn't expect miners to fly to the moon for the express purpose of bringing back the isotope. Instead, he said, helium-3 would be harvested as a byproduct of building and maintaining a lunar settlement. Schmitt predicted the gas could be returned to Earth for under $1 billion a metric ton. Kulcinski adds that, if it sold for $4 billion a metric ton, helium-3 would still be a good energy value: "That's the equivalent of paying $28 a barrel for oil." Last year, crude oil prices averaged $26.60 per barrel, based on figures from the U.S. Department of Energy. Fortunately, there is time to sort the issues out.

## Mining Impossible---Timeframe Far Away

### Mining He3 is 50 years away

Wylie 04 [Margie - National Correspondent for Science and Technology, The Grand Rapids Press, Feb 1, 2004 “Moon has no fast answer to energy needs: In theory, moon rocks could be a cheap source of electricity. In practice, the technology is decades away,” http://margiewylie.com/media/moon.pdf]

Mining the moon might supply the Earth with clean fusion energy someday, but not any time soon. The top few feet of the moon's surface, called the lunar regolith, contains about 1 million metric tons of helium-3, a near- perfect fuel for nuclear fusion. Rare on Earth, the gas is an isotope, or variant, of the same helium that floats party balloons. Just "one ton of helium-3 could produce anywhere from one to 10 million times the electricity of a ton of coal," said Gerald L. Kulcinski, director of the Fusion Technology Institute at University of Wisconsin-Madison, which has been researching helium-3 fusion since 1986. A mere 30 metric tons, roughly one space shuttle load, could fill the United States' electricity needs for a year, said Harrison H. Schmitt, a former Apollo astronaut and chairman of Interlune- InterMars Initiative, a company that promotes commercializing moon resources. (A U.S. ton equals 2,000 pounds; a metric ton equals 2,204.62 pounds.) But while the gas might someday prove a valuable power source, "nobody's running out to the grocery store for helium-3 to fuel their reactors," said Glen A. Wurden, a fusion researcher at Los Alamos National Laboratory in Los Alamos, N.M. Scientists haven't yet figured out how to generate fusion power with materials much easier to use -- and more readily available on Earth -- than helium-3. And even once astronauts are on the moon, extracting the gas from rocks could prove a task equal to Hercules shoveling out the Augean stables. Fusion, the process that fuels the sun, is the holy grail of nuclear energy. It smashes together atoms to release energy, rather than splitting them apart as modern fission reactors do. Fusion has the potential to produce power that releases no greenhouse gases and creates little or no radioactive waste. **But in more than 50 years' research, scientists have been unable to create a fusion reaction that puts out more energy than goes into starting or sustaining it.**

### Colonization won’t occur in this millennium at best

Kistler 98 [Walter P.– founder of Kistler Aerospace Corporation, “Humanity’s Future In Space”, July 21, 1998]

4. The Very Long-Range Future of Humanity in Space Will humans ever visit other stars and colonize planets in deep space that offer conditions similar to those on Earth-temperate climate, oceans and continents, an atmosphere similar to ours? Only one in a thousand planetary bodies is likely to meet all those conditions. Since the star closest to Earth lies at a distance of over 4 light years, the right planet circling the right sun at the right distance will hardly be found at a distance of less than 10, 20 or 50 light years from our Sun. The farthest stars in our own galaxy lie at distances of nearly 100,000 light years from us. How will humans ever be able to traverse such distances within their lifetimes? They probably won't! The first travelers to distant stars will not be people, but robotic probes, moving at much less than the speed of light and requiring centuries to investigate distant solar systems. Only after exploratory work is done and we know the nature of our near galactic surroundings can humanity afford to venture further into the cosmos. The only conceivable way this can happen is through means of human colonies living in large space islands similar to those suggested by Jerry O'Neal of Princeton University. There is no way we could imagine those large objects, weighing millions of tons, being able to move with anywhere near the speed of light and so, unless people are put in a stage of suspended animation, many generations will come and go before the "promised land" has been reached. T**he spread of humanity throughout our galactic system will be a very, very slow process, not to be expected in the next century, but perhaps in the next millennium.** However, when we look at the millions of years it took us to evolve in our development, humanity will have plenty of time to progress towards our destiny.

### Even if we did mine He3, it wouldn’t be usable for a decades at best

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

While the technological and economic feasibility of fusionbased nuclear energy, particularly fusion reactors utilizing He-3 as fuel, is still uncertain and contested, and its commercial realization at best decades away, the implications of such a development could be far-reaching and profound

## Mining Impossible---Too Expensive

### He3 mining is too expensive – not a high enough demand, especially for expansion to other celestial bodies

Gass 7/7 [Henry Gass – Global Researcher at The Ecologist, 7/7/2011, http://www.globalresearch.ca/PrintArticle.php?articleId=25542]

Cost of strip-mining the moon According to Genge it costs US$25,000 per kilo to lift things into space on a shuttle. Thus, whatever is mined in space in the future, it will have to be in high-enough demand to subsidise the cost of launching it. This is especially true for prospecting missions beyond the Moon. A mission to retrieve Helium-3 from Jupiter’s atmosphere, for example, would take ten years, and businesses will likely be reluctant to wait a decade for a return on such a pricy investment, says Genge.

### Fusion also requires tritium, which is uneconomical and inefficient

Bonde & Tortorello [Jeff, Anthony. “Helium-3, The energy source of tomorrow?” MDCampbell]

•Roughly eighteen tons of tritium stock are required for each ton of helium-3 produced annually by decay. •The production rate is N γ = N t ½ / (ln2). •Note that any breeding of tritium on Earth requires the use of a high neutron flux, which proponents of helium-3 nuclear reactors hope to avoid. Furthermore, the production and storage of huge amounts of the gas tritium appears to be uneconomical

### He3 mining is not feasible – we can’t contain the other elements in fusion and it’s too expensive

Seethaler 09 [Mining helium-3 from the moon is possible, but not economical - SHERRY SEETHALER - a science writer and educator at University of California, San Diego - MONDAY, AUGUST 17, 2009]

The reactor uses the fusion of deuterium – a heavy isotope of hydrogen – into helium-4. An intermediate step in this reaction is the formation of tritium, a radioactive isotope of hydrogen. This fusion process also forms a high-energy stream of neutrons. Because tritium is radioactive, and because neutrons are highly destructive to the reaction vessel, containment is a considerable challenge. On the other hand, helium-3 is not radioactive, and the fusion of helium-3 does not produce radioactive intermediates or neutrons. A small helium-3 fusion reactor has demonstrated the feasibility of helium-3 fusion, but as with deuterium fusion, it currently takes a greater input of energy to drive the fusion reaction than is harnessed from the fusion process. Therefore, creating a prototype fusion power plant is the greatest hurdle to bringing “Moon” out of the realm of science fiction. Mining the moon for helium-3 is theoretically, though not currently economically, feasible. To make fusion a significant source of power, surface rock from enormous swaths of the moon would need to be collected and processed.

## Mining Impossible---US Can’t Do Alone

### Mining He3 must be a global effort

Bentz 09 [Julie – Director, Nuclear Defense Policy, National Security Staff, Office of the WMD Coordinator. “US Government Approach to Addressing the He-3 Shortage” 2009]

There is a critical shortfall in the availability of He-3. The US Government agencies are cooperating to bring supply and demand into balance while supporting essential uses for which there are no alternatives. **The shortage cannot be resolved by the US alone, but requires a global effort.** Organizations such as the INMM must also play an active role in information sharing on detector development and best practices for use.

### He3 mining is a global endeavor – even if the US had the capabilities, it won’t go to the Moon because of political and international constraints

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

However, even if the United States could "go it alone" in this way, there are reasons why it may not wish to do so. First, neither the U.S. government nor U.S. private enterprise is likely to be willing to risk the very substantial investment and long-term effort necessarily involved in seeking to develop He-3-based fusion energy without some assurance that-assuming the very difficult technical and engineering obstacles to developing efficient fusion reactors and establishing permanent moon bases can be overcome-the requisite supply of lunar He-3 can continue to be obtained without encountering significant legal or political difficulties. Whatever may be the most legally persuasive interpretation of existing international law, other nations or people on Earth may challenge the unilateral appropriation of lunar resources by the United States, especially of a potentially uniquely valuable resource such as He-3. This, certainly, was the international experience in the 1960's when developing nations vigorously protested the prospect that a few technologically advanced countries and their private enterprises might alone appropriate what was at the time assumed to be the mineral riches of the deep seabed. That perception ultimately led to the enunciation of the "common heritage" doctrine, the convening of UNCLOS-3, and the adoption of part XI of the 1982 LOSC."18 Only a broadly accepted international agreement is likely to offer the continued legal and political predictability that is essential if a long-term He-3-based fusion energy program is to be undertaken and sustained. Second, current commitments already obligate the United States to a certain level of international cooperation in space activities. While the Outer Space Treaty and present international law do not expressly bar the unilateral appropriation of lunar resources, they nevertheless impose an obligation on nations to cooperate in outer space activities and to avoid conduct that might give rise to disputes. 120 The United States is also committed to international cooperation in outer space activities under the Outer Space Treaty, the multinational framework for coordination in space exploration entitled "The Global Exploration Strategy,"' 21 and other agreements, such as the International Space Station Agreement,122 and has similarly committed itself to international cooperation in developing fusion energy through its participation in the recently concluded ITER agreement. 123 U.S. insistence on a right to unilaterally appropriate lunar He-3, without further international agreement, could be controversial and regarded as inconsistent with these precedents. Finally, if countries other than the United States also engage in activities on the Moon, as now appears highly likely, it will be in the interest of each of them to have at least some understandings to provide for cooperation on common problems and keep them from interfering with each other's activities. As the Moon Agreement anticipates,12 4 if some kind of lunar agreement is in their common interests, it will be difficult for such an agreement to not address the salient and thus far unresolved issue of lunar resources exploitation. Consequently, if the United States determines that it is serious about seeking to develop an He-3-based fusion energy program, it would seem sensible for it to also seek international agreement on a lunar resource regime designed to provide the long-term legal and political stability that such a program will most likely require.

## Mining Impossible---Laundry List

### Can’t mine He3 on the moon – list challenges to overcome

Beike 11 [Dieter-International Energy Consultant. “Lunar Helium-3 Value Chain: Investment and Funding”, June 30, 2011.]

Complexities for Funding Technical and scientific challenges 1. Conquering high energy physics 2. Developing a space transportation delivery system 3. Developing robotics for lunar operations Commercial challenges 1. Cost competitive with alternative investments 2. Deliver on schedule relative to the other components of the value chain 3. Perform on quality, environmental impact and safety standards Geopolitical Challenges 1. Global cooperation, views and preferences Legal Challenges 1. Jurisdiction on the moon 2. Ownership rights Financing of project 1. Risk Allocation and neutralization 2. Risk/Rewards relationship Management Challenges 1. Several industry sectors need to be coordinated 2. JV Alignment issues of partners

### He3 fusion is inefficient and ineffective

Close 07 [“Fear over factoids”, Aug 3, 2007, Physicsworld, http://www.freerepublic.com/focus/f-news/1888121/posts]

Given that the amount of helium-3 available on Earth is trifling, it has been proposed that we should go to the Moon to mine the isotope, which is produced in the Sun and might be blown onto the lunar surface via the solar wind. Apart from not even knowing for certain if there is any helium-3 on the Moon, there are two main problems with this idea – one obvious and one intriguingly subtle. The first problem is that, in a tokomak, deuterium reacts up to 100 times more slowly with helium-3 than it does with tritium. This is because fusion has to overcome the electrical repulsion between the protons in the fuel, which is much higher for deuterium– helium-3 reactions (the nuclei have one and two protons, respectively) than it is for deuterium– tritium reactions (one proton each). Clearly, deuterium–helium-3 is a poor fusion process, but the irony is much greater as I shall now reveal. A tokomak is not like a particle accelerator where counter-rotating beams of deuterium and helium-3 collide and fuse. Instead, all of the nuclei in the fuel mingle together, which means that two deuterium nuclei can rapidly fuse to give a tritium nucleus and proton. The tritium can now fuse with the deuterium – again much faster than the deuterium can with helium-3 – to yield helium-4 and a neutron. So by bringing helium-3 from the Moon, all we will end up doing is create a deuterium– tritium fusion machine, which is the very thing the helium aficionados wanted to avoid! Undeterred, some of these people even suggest that two helium-3 nuclei could be made to fuse with each other to produce deuterium, an alpha particle and energy. Unfortunately, this reaction occurs even more slowly than deuterium–tritium fusion and the fuel would have to be heated to impractically high temperatures that would be beyond the reach of a tokomak. And as not even the upcoming International Thermonuclear Experimental Reactor (ITER) will be able to generate electricity from the latter reaction, the lunar-helium-3 story – like the LHC as an Armageddon machine – is, to my mind, moonshine.

## Mining Impossible---Internal Problems

### Internal problems between NASA and the DOE prevent anything from happening

Bradish 09 [S.L. – BrightHub author, “Helium 3 – Tomorrow’s Energy Source within Our Grasp”, August 28, 2009]

The main problems with getting to the moon, collecting the Helium 3 and bringing it back are that we now have a lack of engineering students interested in the project. Prof. Kulcinski is working to remedy that problem through his University of Wisconsin programs and with NASA to inspire more interest in the general public. **The other difficulty is the innate distrust of government entities. NASA and DOE (Dept. of Energy) don’t have much faith in one another and can’t seem to get working together even on such an important project and perfect fuel source.**

## Mining Impossible---Not Beneficial

### He3 mining isn’t practical – it takes more energy to mine than it yields

Lasker 06 [John Lasker. “Race to the Moon for Nuclear Fuel”. 12-15-06. http://www.wired.com/science/space/news/2006/12/72276?currentPage=all.]

However, there are those who doubt helium-3 could become the next super fuel.

Jim Benson, founder of space contractor SpaceDev, which helped build SpaceShipOne's engine and is a subcontractor of the Missile Defense Agency, said mining the moon for **helium-3 doesn't pass the "net energy analysis" test. It would require more energy to retrieve helium-3 and bring it back than it would yield.** Just, sending mining equipment to the moon, and then returning processed helium-3 back to earth, would cost billions in rocket fuel, said Benson. "We just don't have a need for helium-3," he said. "It's not practical."

## Mining 🡪 Conflict

### No consensus of distribution of the moon causes conflict

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

However, the growing interest in lunar He-3 poses its own problems. As yet, there is no international consensus on whether, or how, any nation or private entity can exploit or acquire title to lunar resources. The U.N.-developed 1967 Outer Space Treaty 7 does not specifically address this question. The related U.N. sponsored 1979 Moon Agreement 8 purports to lay the groundwork for the eventual establishment of a regime for the exploitation of lunar resources, but that agreement has thus far been ratified by only a very few countries-not including the United States and none of which are currently leading space powers. 9 **Absent an agreed international legal framework, attempts by the United States or any other nation or private entity to acquire and bring to Earth significant quantities of He-3 could give rise to controversy and conflict.** Indeed, without the security of an established legal regime, nations or private entities might well be reluctant to commit the very substantial money, effort, and resources necessary to mine, process, and transport back to Earth the amounts of lunar He-3 sufficient to support the broad-scale terrestrial use of He-3-based fusion energy.

### Competition over He3 creates conflict because it’s a desirable resource

Hatch 10 [Benjamin D. - Emory International Law Review, DIVIDING THE PIE IN THE SKY: THE NEED FOR A NEW LUNAR RESOURCES REGIME, April 1, 2010]

Yet, regardless of whether the language is res nullius or res communes, the existence of a vast, unowned, but claimable area of resource-rich land will inevitably spawn political conflict. At first glance, this might appear to be counter-intuitive: the logic of res communes would seem to suggest that when a proprietary claim is disallowed, states would have no reason to have conflicts over an unownable entity.^^^ One example of the success of res communes with respect to conflict resolution is in Antarctica. Prior to the Antarctic Treaty of 1959, the continent was the subject of a series of territorial claims, some dating back as far as the 1840s.'^''^ By the early part of the twentieth century, eight different countries had launched "scientific expeditions," some of which were as much about annexation as exploration.^"^ By 1950, eight claims had been made on the continent,^" and these eight would be the claims that would be locked in place during the 1959 Antarctica Treaty.^"^ This treaty, along with supplementary agreements (altogether comprising the "Antarctic Treaty System") have managed to "avoid[] conflicts over sovereignty . . . prevent[] the militarization of the continent. . . [and] prevent[] an unregulated gold rush in Antarctica."^°^ This success has, at least in part, been attributed to the application of the res communes doctrine to the Antarctic Treaty System.^"' There are two crucial points, however, that differentiate Antarctica from the Moon and that predict the failure of the OST regime once the Moon becomes a resource base that is readily accessible. First, Antarctica is not a true res communes. The Antarctic Treaty did not require states parties to disavow their territorial claims.^'^ Rather, it only barred the modification of the claims that were in existence in 1959.^" States not only still maintain their claims on Antarctic territory, but some have gone as far as to issue postage stamps in the name of their Antarctic territories to reassert the vitality of those claims.^'^ The impact of this perpetuation of territorial claims has been mitigated by other arrangements in the Antarctic Treaty System that severely limit the profitability of states exploiting their claims, such as the Protocol on Environmental Protection to the Antarctic Treaty,^''\* which has barred extraction of Antarctic resources until 2048.^'^ Additionally, Antarctica does not have the mineral or resource wealth of the Moon.^'^ For these reasons. Antarctica has not been worth developing, much less fighting over. Contrast this with the current dispute over the resource-rich Arctic—where states are trying to maintain assertions of territorial control to horde the energy resources beneath the seabed^'^—and it is clear that where resources and profits are accessible, conflict surely follows. **The historical conflicts over imperialist regimes and colonialism tend to suggest that when powerful states have an interest in amassing something that exists in large, previously un-owned quantities in one location, they will inevitably come into conflict with one another**. States have a limited economic interest in the Antarctic, and so they are unlikely to invest military assets and the necessary financing to vindicate or broaden their claim to something that is not generating them any wealth. In contrast, states seem to believe that they have potentially great economic interests in the Moon and, accordingly may have a correspondingly large motivation to have conflicts over it.^" Exploration of the Moon will benefit humanity—on Earth, new technologies will be have to be developed to aid states in the new space race— and on the Moon, providing new opportunities for human growth and expansion ^^^ Whatever name a regime wants to give to the Moon—res nullius or res communes—the Moon represents an unparalleled opportunity. Imagine a situation where one state was able to not only find large quantities of Helium-3 or some other valuable resource on the Moon but also succeeded in denying access to other states. That, state would enjoy a tremendous economic advantage by cornering the market in some ultra-rare, useful commodity. **Resources by their nature breed conflict**.^^' As demonstrated above, states will soon be converging on the Moon to reap the benefits that it may provide. Given the recent actions by the United States and China, and the spirit of conquest and competition that seems to be informing the current Moon rush, the vague and generic OST will not be able to sufficiently stop state conflict over the greatest economic opportunity in history.

# Aerospace Advantage

## Solvency Takeouts- Aerospace Advantage

### Aerospace is resilient- Their sales rose even through the recession and experts forecast growth

Aviation Today, 8 [Aviation Today, magazine focused on the American aerospace industry, “AIA: Aerospace Resilient In Recession,” December 11, 2008, <http://www.aviationtoday.com/av/topstories/AIA-Aerospace-Resilient-In-Recession_28331.html>, DA 7/20/11]//RS

AIA: Aerospace Resilient In Recession The United States aerospace industry will record its fifth straight year of growth this year and is “in a relatively good position” despite the economic recession, according to the Aerospace Industries Association (AIA). Delivering the organization’s year-end review and 2009 forecast Wednesday in Washington, D.C., AIA President and CEO Marion C. Blakey said total civil, military, space and missile sales are on track to reach $204 billion, an increase of 2.1 percent over 2007. The growth rate is less than in recent years, mainly due to a work stoppage at Boeing that caused industry repercussions, Blakey said. AIA noted strength in shipments, up 7 percent to $197 billion, and backlog, up nearly 10 percent to $404 billion. However, orders for aircraft, parts and equipment declined 14 percent to $234 billion from the record set in 2007. The organization forecasts continued growth in 2009, but at a much more modest pace than in recent years. Sales are expected to reach $214 billion, up 4.8 percent. That increase would be even less had the eight-week Boeing strike not occurred, Blakey said. “The gang-buster trends of the last few years of our industry are almost certainly over for a while,” Blakey said. “But we do not anticipate a severe downturn in the near term, either.”

### The plan will fail- There are no Earth-Moon communication capabilities

NASA Academy, 8 [NASA Academy, researchers in aeronautics and space, “Roadmap to a Space Faring Civilization,” August 2008, <http://commercialspace.pbworks.com/f/NA08_GSFC_RSFC_VER_1.0.pdf>, DA 7/20/11]//RS

Communication and data relay capabilities are very important to any lunar mission, governmental or otherwise. As NASA prepares to begin mission for its Exploration Policy, a reliable system of communication must be considered and implemented. The Deep Space Network (DSN) is currently used by all sorts of spacecraft and scientific missions, and its largest antennas are prioritized for missions that travel much farther than the Moon (the first, and arguably most important, destination of the Policy), and so would make a poor choice for dedicated and permanent Earth-Moon communication.

### No communication- DSN has limited resources and depleting hardware infrastructure

NASA Academy, 8 [NASA Academy, researchers in aeronautics and space, “Roadmap to a Space Faring Civilization,” August 2008, <http://commercialspace.pbworks.com/f/NA08_GSFC_RSFC_VER_1.0.pdf>, DA 7/20/11]//RS

The DSN sells its services through proposals. However, its resources are limited, and the number of missions requiring reliable Earth to deep space communication grows every year. The growth of the DSN is limited due to being governmentally run, and its resources and future requirements no longer meet. Additionally, the hardware infrastructure is reaching the end of its life, and competitiveness with legacy, or extended, missions disconcerts current mission 23 proponents. Looking forward, the DSN‘s crucial role in space exploration is mired by inefficiency and ineffectiveness, as well as government agency bureaucracy

### Plan can’t solve heg & cyberwar scenarios- Aerospace industry is not key to the Air Force

Kinne, 10 [Lieutenant Colonel Christopher E. Kinne, served in a variety of acquisition corps assignments, he has served on the staff of the Assistant Secretary of the Air Force and has commanded two squadrons, "Preserving the industrial base: is the United States Air Force responsible?,” Air Force Journal of Logistics 34.1-2, Spring-Summer 2010, DA 7/20/11]//RS

The Air Force is not responsible for the future of the US aerospace industry. The Air Force is responsible for organizing, training, and equipping a force capable of accomplishing the missions assigned by the President and the Secretary of Defense. There is no legislative or policy basis for the Air Force to attempt to proactively manage the US aerospace industrial base for the purpose of preserving a domestic capability for producing future generations of US military aircraft weapon systems. In the absence of any specific national security policy regarding the defense industrial base, DoD has decided to allow free market forces to determine the general fate of the defense industry while preserving the possibility of acting when necessary to protect certain segments of the critical technology infrastructure. In general, these segments are second- and third-tier suppliers of subcomponents and raw materials. The DoD has generally decided not to act to preserve domestic US prime contractors. There is no requirement for additional information about the state of the US aerospace industry and the associated risks of a dwindling industrial infrastructure. These issues have been well documented by many groups, public and private. The important issue is for the senior leadership of the United States--the President of the United States and the US Congress--to deal with the risk assessment and make some critical decisions about how the United States will develop and manufacture aerospace systems while also assuring national security. DoD is responsible for providing the military instrument of power to the country. It is the responsibility of the President of the United States and the US Congress to determine how best to acquire and sustain the military instrument of power. Pierre Chao observed in 2008 that the US industrial policy debate is usually focused on the spectrum of sourcing options ranging between global and national markets, with the key issue being how to get technology to the US warfighter while preserving US jobs and assuring a source of supply. (60) Unfortunately, this policy dilemma is not well served by the current state of the US military acquisition system because, as Chao also noted, the military is primarily in a sustainment mode where costs are increasing to maintain the same capability. The defense industry, however, is positioned earlier in the acquisition cycle--system development--where there is more opportunity for competition, new ideas, and profit. (61) As a result, the defense industry, which is considered a candidate for government intervention, is not necessarily interested in the current business being offered by DoD. A national security policy decision needs to be made--sustain the old systems with whatever part of the industrial base wants to do the work, or develop new systems and encourage innovation across the defense and aerospace industries. Unfortunately, the national security establishment often fails to make this kind of key national security decision. Members of Congress and the President, recognizing that the defense and aerospace industry represents a significant number of jobs in the US as well as a significant portion of the gross domestic product, continue to focus on competition when competition is not the issue. With a few notable exceptions--most recently, the Darleen Druyun scandal comes to mind--DoD and the Air Force play by the rules and procure military systems through robust competitive processes. In 1998, David Cooper of the Government Accountability Office submitted testimony before the Senate Subcommittee on Acquisition and Technology, Committee on Armed Services that stated "there is little evidence that the increased consolidation has adversely affected current DoD programs." (62) Mr Cooper's testimony included a table that showed the number of contractors providing fixed-wing aircraft reduced from eight to two between 1990 and 1998 (only Boeing and Lockheed Martin remained). (63)

## Alt Causalities- Demand Mobility

### Plan can’t solve the key internal link- Aerospace must have on demand mobility

Moore, 6 [Mark D. Moore, the Personal Ai r Vehicle Sector manager in the NASA Fundamental Aeronautics Program, “The Third Wave of Aeronautics: On-Demand Mobility,” 2006, <http://cafefoundation.org/v2/pdf_tech/NASA.Aeronautics/ThirdWaveTech.pdf>, DA 7/20/11]//RS

The third wave of aeronautics is much more than the id e a o f o n -d ema n d , d i s t r i b u t e d a i r t r a n s p o r t a t i o n meeting mid-range travel needs. It is an airspace and vehicle technology empowerment of completely new missions and markets that could impact all stratas of society in a more daily way. These emergent markets a r e b a s e d o n c r i t i c a l n a t i o n a l n e e d s t h a t c o u l d b e accomplished by all sorts of new vehicle types, from large numbers of small sensor aircraf t to moni tor the atmosphere, borders, or traffic congestion, to pseudosatellites aircraft that provide low cost communication platforms, from faster response of EMS services that protect l i fe in the golden hour , to regional extremely short takeoff air travel that opens up rural parts of the c o u n t r y d i r e c t l y c o n n e c t t o d o w n t o w n m e t r o p o l i s locations. In an age of global competition, this 3 rd wave of aeronautics would become digital air superiority for the US marketplace, to provide on-demand information and accessibility for goods and services. We cannot possibly predict what new markets this capability set wo u l d p ro d u c e , a n d t h a t i s w h y i t ’ s s o c r i t i c a l t h a t instead of predicting the future, the most robust aviation solution space is achieved so markets can expand i n each of these directions without growth constraints. The thi rd wave is not merely an ext rapolat ion o f t h e existing aviation services that provide a critical role to o u r c o u n t r y , b u t a r a d i c a l t e c h n o l o g y s h i f t , b u i l t o n fundamental aeronautics capabilities, that empowers dramatic new markets that will daily impact ever citizen of our count ry. The resulting integrated airspace and aircraft technologies will provide the equivalent of an internet PC ubiquity, to an air transportation system that now exists as a centralized hub and spoke mainframe. The emergent markets of the third wave of aeronautics are based on critical national needs that can only be achieved by capitalizing on the future potential of our airspace. The most convincing evidence of this change in civil aeronautics stems from the U.S. military future net-centric battlefield, and their requirements to institute on-demand, distributed operations across foreign and domestic airspace. These operations will permit peerto-p e e r q u e r y a n d i n t e n t t h a t e s s e n t i a l l y p e rmi t t h e equivalence of f ree f l ight , the abi l i ty to ful ly use the airspace across drastically different platforms with high d e n s i t y o p e r a t i o n s , a c r o s s c o n s t a n t l y c h a n g i n g conditions with maximum robustness and versatility. However, it is not merely the development of a dynamic, d i g i t a l a i r s p a c e t h a t e m p o w e r s t h i s t h i r d w a v e o f aviatio n ; i t i s t h e i n t e g r a t i o n wi t h e n a b l i n g s e n s o r s , s e n t i e n t a n d a d a p t i v e c o n t r o l s , p o w e r e d -lift aerodynamics, low noise propulsion, lightweight and resilient structures, and many other technologies into complex, highly integrated vehicles and networks that yield critical societal capabilities. These capabilities will be accompl ished through col laborat ive government p o l i c y , r e g u l a t i o n s , t e c h n o l o g y r e s e a r c h , a n d infrastructure solutions across the FAA, the Department of Defense, academia, industry, and NASA.

## Alt Causalities- ITAR

### Turn- Plan will be canceled- ITAR governs almost every technology concerning space flight

NASA Academy, 8 [NASA Academy, researchers in aeronautics and space, “Roadmap to a Space Faring Civilization,” August 2008, <http://commercialspace.pbworks.com/f/NA08_GSFC_RSFC_VER_1.0.pdf>, DA 7/20/11]//RS

One policy that is slowing the growth of commercial space sector is the International Traffic in Arms Regulations (ITAR). ITAR is designed to monitor trade conducted by parties of the United States of items and ideas pertaining to defense to insure that any exchange will not injure the foreign policy and national security interests of the United States. ITAR is administered by the Directorate of Defense Trade Controls (DDTC), a branch of the Department of State, and was created by section 22USC2788 of the Arms Export Control Act and Executive Order 11958. The main objective of the International Traffic in Arms Regulations is to avert the proliferation of sensitive or high tech weapons and technologies by regulating the export of these items. While ITAR concerns items that are considered to be military in nature, the Export Administration Regulations (EAR) administered by the Department of Commerce, concerns the export of those items considered to have dual-use applications that are mostly commercial but can also be military. The term export is defined by ITAR as the release of a defense article to a party outside of the United States (whether foreign or U.S. Citizen), the disclosure of defense technical data to a non U.S. citizen or the carrying out of a defense related service for the benefit of a non-citizen. In some circumstances, it is absolutely necessary to violate the export guidelines set forth in ITAR. In these cases, an export license must be obtained from the Office of Defense Trade Controls Licensing within the Department of State. These authorizations are not uncommon, but they must be reviewed on a case-by-case basis and take weeks or sometimes months to obtain. Individuals found to be in violation of ITAR, without the appropriate license, could face criminal charges of up to one million dollars in fines and ten years of imprisonment per violation. For an item to fall under the export control of the International Traffic in Arms Regulations, it must be named in Section 38 or 47 of the Arms Export Control Act. This section, better known as the 36 United States Munitions List (USML), enumerates 20 classes of items considered to be defense articles. The items of specific concern to the space industry include, but are not limited to: launch vehicles, rocket technology, ablatives, control equipment, range finding electronics, guidance systems, training electronics, personal protective equipment, propellant and any spacecraft (manned and unmanned), or associated equipment. In short, ITAR governs basically every technology concerning space flight. With regard to the future of space exploration, ITAR is definitely an issue worthy of addressing.

### ITAR prevents the growth of the aerospace industry

NASA Academy, 8 [NASA Academy, researchers in aeronautics and space, “Roadmap to a Space Faring Civilization,” August 2008, <http://commercialspace.pbworks.com/f/NA08_GSFC_RSFC_VER_1.0.pdf>, DA 7/20/11]//RS

Another area of concern with ITAR is its effect on the United States aerospace industry as a competitor in the global market. Because the process to obtain export licenses can be so costly, foreign customers often choose to deal with ITAR-free or non-U.S. companies. According to research done by the Department of Commerce and the Bureau of Industry and Security, between 2003 and 2006, the US share in the global market has decreased by 20% for all commercial communications satellites and by 10% for geosynchronous satellites. **The reported loss of all foreign sales due to ITAR during the four year period was $2.35 billion**. Furthermore, the study found that the average yearly cost of compliance industry-wide was $49 million. Many countries who would usually buy from the United States are instead researching the technologies themselves, which is essentially proliferating the same technology that ITAR is intended to protect.

## Alt Causalities- Retiring Workforce

### Decline inevitable- workforce retiring- The AE industry will become too inexperienced soon

Anselmo, 7 [Joseph C Anselmo, “Baby Boomer retirements could trigger A&D engineering crisis,” Aviation Week & Space Technology, February 5, 2007, http://integrator.hanscom.af.mil/2007/February/02082007/02082007-17.htm]

The alarming truth is that the A&D industry is not attracting nearly enough skilled workers, particularly engineers, to replace those getting ready to retire. The looming shortfall, underscored in two workforce studies undertaken for Aviation Week & Space Technology by Bain & Co. and Deloitte Consulting, threatens to sap the industry's vitality and could make it harder for the U.S. military to maintain its enviable technological edge over the long run.  The long shadow of an aging workforce is cast across the entire industry, from military scientists to commercial pilots to maintenance, repair and overhaul technicians. But the danger is most acute in engineering. "Engineering is the core of what makes companies successful, and it is by far the function that is most constrained by supply," says Michael Goldberg, lead partner in Bain's A&D practice. By next year, an estimated one-in-four U.S. aerospace workers will be eligible to retire; nearly one-in-three civilian scientific and technical workers in the Defense Dept. have already reached that milestone (see p. 48). And the full impact of the graying workforce hasn't hit yet. In 2011, an 18-year-long wave of baby boomers will start collecting Social Security and Medicare benefits. Another problem: massive layoffs during the consolidations of the 1990s that left the defense industry with a shortage of middle-aged talent. This means the tasks of many retirees could fall to younger, less-experienced workers**.** "We need to go out and basically generate a new workforce of knowledge workers to replace those experienced people who are going out the door," says Clay Jones, president/CEO of Rockwell Collins. Finding those workers will be a daunting challenge. U.S. students show an alarmingly low interest in science and math. And for those that do go into engineering, aerospace doesn't have the cachet it did during the Cold War and Apollo program. Today's engineering graduates rank A&D low--if not dead last--on their list of industries providing desirable employment, far behind high tech and professional services (AW&ST Jan. 15, p. 72). Just 7% of students at 15 top engineering schools interviewed for the Bain study expect to pursue a career in A&D. "It was not even in my consciousness as an engineering graduate in 1968 that I had an opportunity to make a lot of money**,"** saysLester L. Lyles**,** a retired four-star U.S. Air Force general who is now a technology consultant. "The young people today have so much more available to them and so many other opportunities to make money quickly. Silicon Valley sort of galvanized that. I don't think the interest in coming up to be a pure engineer is there anymore."

### The aerospace industry will not have enough people to work

Anselmo, 7 [Joseph C Anselmo, “Baby Boomer retirements could trigger A&D engineering crisis,” Aviation Week & Space Technology, February 5, 2007, http://integrator.hanscom.af.mil/2007/February/02082007/02082007-17.htm]

Bain & Co.'s Goldberg believes that focusing on supply alone won't be enough to bridge the shortfall between retirees and the supply of new engineers. He says companies need to make "strategic portfolio investments" based on engineering being a constrained resource**.** At the workplace level, A&D contractors should try to reduce demand on engineers by offloading non-critical tasks, giving them new hardware and software tools to increase productivity "Hiring someone in a support function to handle less-technical tasks is much cheaper than hiring another engineer," he says. "It also has the double benefit of making the engineer's job much more appealing, which helps with retention and increases engineering design capacity at the same time." Pratt & Whitney is one of the companies in the forefront of looking for alternative sources of engineering talent. Five years ago, the company began outsourcing basic design work to Infotech, an engineering services company based in India, to free up its U.S. engineers to work on defense projects. Today, Infotech is taking on more complex engineering tasks and serves as a flexible outlet for Pratt's work. Even those who, so far, have been insulated from the problem see challenging times ahead. "We're going to lose a lot of experience," says Lockheed Martin's Lawson**.** "There may be some fuzz on exactly when it will happen--people may stay longer than we think they will--but the numbers are the numbers." But Lawson also believes the industry is doing a much better job of retaining experienced technical workers. "The dot.com period was really challenging," he recalls. "We were really having a hard time hanging onto our engineers. We don't have that kind of attrition today." Rockwell Collins' Jones also sees a silver lining in the workforce challenge. The company hires about 2,000 people a year, and most of them are recent college graduates or in that age range. He says they tend to be savvy and much more comfortable with software and other new tools than the retirees they replace. "They're very eager to experiment," he says. "So while we're losing experience, we're gaining some innovation and entrepreneurial spirit."

## Inherency- Aerospace Strong Now

### Aerospace is especially strong now- Increasing demand for satellite production

NASA Academy, 8 [NASA Academy, researchers in aeronautics and space, “Roadmap to a Space Faring Civilization,” August 2008, <http://commercialspace.pbworks.com/f/NA08_GSFC_RSFC_VER_1.0.pdf>, DA 7/20/11]//RS

Four major areas have dominated the space industry: satellite communications, space transportation, global positioning systems, and remote sensing. In 2000, these contributed $80.47 billion to the national economy, of which approximately $67 billion came from satellite communications. Demand for more satellites dropped off steeply and the industry struggled at the turn of the century; it has since re-stabilized and shown growth in profits. According to the Space Report 2008, in 2007, with global revenues over $251 billion. The biggest contributor is commercial satellites (55%), most notably direct-to-home satellites (26%), which increased by 19% over 2006-2007. Satellite production has been the groundwork of the industry, flourishing in the past decade from consumer need for GPS, mobile phones, and satellite TV. As seen in table 1, other major contributors are government spending and commercial infrastructure. In addition, growth of the workforce in the space industry was larger than in the overall private sector (2).

### Aerospace industry is especially strong- NASA will keep their workforce, and private companies will perform better

Spudis, 6/25 [Paul D. Spudis, Senior Staff Scientist at the Lunar and Planetary Institute, Deputy Leader of the Science Team of the Department of Defense, winner of the NASA Distinguished Public Service Medal from the President, “NASA Shifts Into Neutral,” June 25, 2011, Air & Space Smithsonian, <http://blogs.airspacemag.com/moon/2011/06/nasa-shifts-into-neutral/>, DA 7/20/11]//RS

Our country is set to eliminate the one proven system remaining under our control that can access both space and the ISS. The only thing clear about the administration’s current plan is the confusion surrounding it. Initially, the proposal was to replace a government-built and operated space transportation system with a contractor-controlled one. Coined “New Space,” these contractors were to provide access to orbit for both cargo and people. The New Space path was already being pursued under VSE – not as an immediate replacement for a government system but as an interim adjunct to it. The belief and hope of the agency under VSE was that a transition period would allow commercial companies to design, build and perfect their systems into operational status, while working through anticipated difficulties in technology, budget and program set-backs. As NASA began transitioning away from ISS re-supply, workforce continuity would remain as we began building systems for missions beyond low Earth orbit. New Space advocates claim that as “commercial” entities, they can provide the needed capabilities to service ISS faster and at a fraction of the cost of either Shuttle or a new government system. If this promise sounds familiar, it is because thirty years ago, as part of the marketing for Shuttle, we heard similar arguments. What we learned then was that spaceflight is difficult, unforgiving and expensive. While one could argue that Shuttle is an inherently flawed transportation system, it still is a working system and it works because we expended the time, experience and money needed to make it work.

## European Aerospace Tradeoff

### Britain’s aerospace industry is rising now- a tradeoff would give the lead to Brazil, China & India

Milmo, 6/21 [Dan Milmo, QUALS, “Paris air show: European aerospace firms warn against cuts in state aid,” June 21, 2011, <http://www.guardian.co.uk/business/2011/jun/21/paris-air-show-airbus-boeing>, DA 7/15/11]//RS

Visitors to the Paris air show are immersed in the global nature of the aerospace business, mingling with more than 2,100 exhibitors from 45 countries as Russian helicopters, American 747s and Israeli drones compete for buyers' cheques against flypasts from French Rafale jets. But Britain is a quiet power amid the sonic backdrop. It is the world's second-largest exporter of aerospace products, from engines to wings, and employs 96,500 people in an industry that generated British sales of £23.1bn last year, up 2% on 2009. One of the dominant exhibits at Le Bourget airport is the Airbus A380 superjumbo parked between the showhalls and the runway. Although it is more commonly associated with mainland Europe and its French assembly base in Toulouse, Britain has played a significant part in its creation, with the wings built at a world-class facility in Broughton, north Wales. Rolls-Royce is the home-grown pride and joy with its jet engine business, but major players also include EADS, parent of Airbus, which employs 17,000 people at 25 sites in Britain, including the Airbus plant at Filton, Bristol. Tom Williams, head of Airbus UK and plane development, places aerospace in a triumvirate of world-leading British industries alongside pharmaceuticals and financial services. "The UK government has tough budgetary challenges but our message is that you have got to have a growth strategy as well," he says. "I hate to use the term 'invest in winners' because that is anathema to government policy but you have to invest in the areas that are successful." Cuts in state funding for research and development are one concern. Of the £1.8bn spent on civil and defence R&D in the aerospace industry last year, about £430m came from the government. Airbus also invests in UK research and technology funds, the early-stage equivalent of R&D, where concepts are thrashed out, at higher education institutions such as Cranfield university. "It is clearly important we have a good, strong relationship with UK research institutions," Williams continues. "We want to make sure from a government point of view that these institutions continue to be invested in. If you look at the tremendous success of the A320 it is easy to look back and say, 'That was a great investment' but that was research and technology done in the 1980s and here we are cashing in 20 or 30 years later." Among established manufacturers there is an implicit concern that if research funding wanes, then nations such as Brazil, China and India will end up producing the workhorses of the sky in a few decades' time, rendering places like Broughton increasingly obsolete. Randy Tinseth, head of marketing at Boeing, which employs more than 1,000 people in the UK, says the air travel market is increasingly "Asia-centric", with about 50% of all air traffic expected to fly in an and out of Asia in 20 years' time. "You are going to be investing in markets where it will help you with access. If you develop your supplier and support network you have to consider all of these things," says Tinseth, whose company makes the 737 short-haul aircraft and wheeled out its extended 747 jumbo at Paris. However, he stressed that the UK will be one of Boeing's top five markets over the next 20 years.

### Plan tradesoff with European aerospace industry which is key to European competitiveness and economy

Hayes, 2k [Philip Butterworth-Hayes, QUALS, “Efficiency gains pay off in Europe,” Aerospace America, November 2000, <http://www.aiaa.org/aerospace/Article.cfm?issuetocid=28&ArchiveIssueID=7>, DA 7/15/11]//RS

In the past 12 months, a growing number of reports have suggested that European aerospace companies have at last begun to overtake their U.S. competitors in terms of operating efficiencies—labor costs, productivity, and so on. Europe, it appears, which has traditionally been synonymous with high labor rates, high transport costs, long holidays, low margins, and punitive corporate taxation, has finally caught up with its leaner, meaner competitors across the Atlantic. Now, with the further weakening of the euro against the dollar, European aerospace manufacturers could soon enjoy even greater competitive benefits as labor costs descend "to third-world levels," according to one aerospace analyst. Airbus efficiency improvements. Source: Airbus Industrie. Gain in competitiveness "Together with subdued price and cost increases, exchange rate development led to an additional gain in the cost competitiveness of euro area producers—against other industrialized countries—of about 3.5% in the first quarter of this year, leading to a total gain of 14.5% since the launch of the euro." So said the European Commission’s Economic and Financial Affairs directorate’s latest "Quarterly Report on the Price and Cost Competitiveness of the European Union and its Member States" (website: www.europa.eu.int/comm/economy\_finance/document/ pccr/pccr\_en.htm). "In a historical perspective, the unit labor cost position of euro area producers is currently very favorable relative to U.S. producers," continued the report, "better than at any time since 1985. Unit labor costs in the United States relative to the 11 euro states are some 34% above their 1987-99 average. The cost competitiveness for 11 euro producers against their U.S. competitors has improved by around 18% since the launch of the euro." After five years of strenuous cost-cutting by European aerospace companies, the continuing weakness of the euro against the dollar has been seen by many in Europe as the icing on the cake. "The rapid recent decline in the value of the euro and the pound against the dollar creates an opportunity for the European aerospace industry to improve its competitiveness in the marketplace," according to John Crampton, vice president and aerospace specialist at management consultants Cap Gemini Ernst & Young. "If this currency exchange advantage can be combined with a fast, cost-effective integration of the partners into EADS [European Aerospace, Defense and Space], the results could cause real problems for its U.S. competitors."

### European economic decline causes US and global economic collapse

Breslow & Lombardi 10 [Jason Breslow, Senior Writer at PBS, Domenico Lombardi, Senior Fellow at the Brookings Institute, “What Is the Next Sick Economy of Europe?, http://www.pbs.org/newshour/rundown/2010/05/who-is-the-next-sick-economy-of-europe.html, 5/27/2011] SV

DOMENICO LOMBARDI: At this moment, the crisis has already become European in full respect. The euro is a global currency. It's the second largest currency in the world after the dollar so whatever happens to the euro has repercussions for all the other economies in the world. We see that even in Beijing they are following the European crisis with increasing concern because they have seen their own currency, the renminbi, has been appreciating vis-a-vis the euro in a non-negligible way over the last few weeks. If the European economy does badly, they will be exporting less to Europe, which is really their most important trading partner . Therefore, they might feel less inclined to appreciate their own exchange rate vis-a-vis the dollar, as the Americans have requested several times, not least in the context of the recent high-level meetings they held in Beijing in the beginning of this week. What does all this mean for the U.S. and global economy? DOMENICO LOMBARDI: This crisis clearly at this stage has spillover effects not just in the euro area but also vis-a-vis third countries, including the U.S. And there are at least a couple of channels through which the U.S. economy may be affected. First, there may be a chilling effect in its own banking sector. Americans banks are not directly exposed to Greece. However, they are exposed to other European banks which in turn are exposed to Greece. In the absence of enough information, this may generate a chilling effect and therefore break down transactions in the financial markets even if it's on the other side of the ocean. There is also another effect, and that is because the euro is going to stay weak in the near future, European manufacturers will increase their competitiveness in selling their goods abroad and therefore they will be slightly better off than U.S. manufacturers. Clearly this may be a problem for an economy like the U.S., which needs to export more in order to create more jobs. And indeed, President Obama has made increasing exports really one of the goals of his own economic strategy. So all in all, we have seen that by not containing the crisis early enough, the crisis has now spread to the euro area and is threatening the stability of the global economy.

### Global economic crisis causes nuclear great-power war

Mead 9 – [Walter Russell Mead, the Henry A. Kissinger Senior Fellow in U.S. Foreign Policy at the Council on Foreign Relations, 2-4, 2009, “Only Makes You Stronger,” The New Republic, <http://www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2>]

If current market turmoil seriously damaged the performance and prospects of India and China, the current crisis could join the Great Depression in the list of economic events that changed history, even if the recessions in the West are relatively short and mild. The United States should stand ready to assist Chinese and Indian financial authorities on an emergency basis--and work very hard to help both countries escape or at least weather any economic downturn. It may test the political will of the Obama administration, but the United States must avoid a protectionist response to the economic slowdown. U.S. moves to limit market access for Chinese and Indian producers could poison relations for years. For billions of people in nuclear-armed countries to emerge from this crisis believing either that the United States was indifferent to their well-being or that it had profited from their distress could damage U.S. foreign policy far more severely than any mistake made by George W. Bush. It's not just the great powers whose trajectories have been affected by the crash. Lesser powers like Saudi Arabia and Iran also face new constraints. The crisis has strengthened the U.S. position in the Middle East as falling oil prices reduce Iranian influence and increase the dependence of the oil sheikdoms on U.S. protection. Success in Iraq--however late, however undeserved, however limited--had already improved the Obama administration's prospects for addressing regional crises. Now, the collapse in oil prices has put the Iranian regime on the defensive. The annual inflation rate rose above 29 percent last September, up from about 17 percent in 2007, according to Iran's Bank Markazi. Economists forecast that Iran's real GDP growth will drop markedly in the coming months as stagnating oil revenues and the continued global economic downturn force the government to rein in its expansionary fiscal policy. All this has weakened Ahmadinejad at home and Iran abroad. Iranian officials must balance the relative merits of support for allies like Hamas, Hezbollah, and Syria against domestic needs, while international sanctions and other diplomatic sticks have been made more painful and Western carrots (like trade opportunities) have become more attractive. Meanwhile, Saudi Arabia and other oil states have become more dependent on the United States for protection against Iran, and they have fewer resources to fund religious extremism as they use diminished oil revenues to support basic domestic spending and development goals. None of this makes the Middle East an easy target for U.S. diplomacy, but thanks in part to the economic crisis, the incoming administration has the chance to try some new ideas and to enter negotiations with Iran (and Syria) from a position of enhanced strength. Every crisis is different, but there seem to be reasons why, over time, financial crises on balance reinforce rather than undermine the world position of the leading capitalist countries. Since capitalism first emerged in early modern Europe, the ability to exploit the advantages of rapid economic development has been a key factor in international competition. Countries that can encourage--or at least allow and sustain--the change, dislocation, upheaval, and pain that capitalism often involves, while providing their tumultuous market societies with appropriate regulatory and legal frameworks, grow swiftly. They produce cutting-edge technologies that translate into military and economic power. They are able to invest in education, making their workforces ever more productive. They typically develop liberal political institutions and cultural norms that value, or at least tolerate, dissent and that allow people of different political and religious viewpoints to collaborate on a vast social project of modernization--and to maintain political stability in the face of accelerating social and economic change. The vast productive capacity of leading capitalist powers gives them the ability to project influence around the world and, to some degree, to remake the world to suit their own interests and preferences. This is what the United Kingdom and the United States have done in past centuries, and what other capitalist powers like France, Germany, and Japan have done to a lesser extent. In these countries, the social forces that support the idea of a competitive market economy within an appropriately liberal legal and political framework are relatively strong. But, in many other countries where capitalism rubs people the wrong way, this is not the case. On either side of the Atlantic, for example, the Latin world is often drawn to anti-capitalist movements and rulers on both the right and the left. Russia, too, has never really taken to capitalism and liberal society--whether during the time of the czars, the commissars, or the post-cold war leaders who so signally failed to build a stable, open system of liberal democratic capitalism even as many former Warsaw Pact nations were making rapid transitions. Partly as a result of these internal cultural pressures, and partly because, in much of the world, capitalism has appeared as an unwelcome interloper, imposed by foreign forces and shaped to fit foreign rather than domestic interests and preferences, many countries are only half-heartedly capitalist. When crisis strikes, they are quick to decide that capitalism is a failure and look for alternatives. So far, such half-hearted experiments not only have failed to work; they have left the societies that have tried them in a progressively worse position, farther behind the front-runners as time goes by. Argentina has lost ground to Chile; Russian development has fallen farther behind that of the Baltic states and Central Europe. Frequently, the crisis has weakened the power of the merchants, industrialists, financiers, and professionals who want to develop a liberal capitalist society integrated into the world. Crisis can also strengthen the hand of religious extremists, populist radicals, or authoritarian traditionalists who are determined to resist liberal capitalist society for a variety of reasons. Meanwhile, the companies and banks based in these societies are often less established and more vulnerable to the consequences of a financial crisis than more established firms in wealthier societies. As a result, developing countries and countries where capitalism has relatively recent and shallow roots tend to suffer greater economic and political damage when crisis strikes--as, inevitably, it does. And, consequently, financial crises often reinforce rather than challenge the global distribution of power and wealth. This may be happening yet again. None of which means that we can just sit back and enjoy the recession. History may suggest that financial crises actually help capitalist great powers maintain their leads--but it has other, less reassuring messages as well. If financial crises have been a normal part of life during the 300-year rise of the liberal capitalist system under the Anglophone powers, so has war. The wars of the League of Augsburg and the Spanish Succession; the Seven Years War; the American Revolution; the Napoleonic Wars; the two World Wars; the cold war: The list of wars is almost as long as the list of financial crises. Bad economic times can breed wars. Europe was a pretty peaceful place in 1928, but the Depression poisoned German public opinion and helped bring Adolf Hitler to power. If the current crisis turns into a depression, what rough beasts might start slouching toward Moscow, Karachi, Beijing, or New Delhi to be born? The United States may not, yet, decline, but, if we can't get the world economy back on track, we may still have to fight.

## Private Sector AFIT Advantage CP

CP Text: Private corporations should substantially expand the Air Force Institute of Technology through funding, promotion, and increased job opportunities for the purposes of increasing faculty, students and aeronautic developments.

Observation 1: Competition- The counterplan is non-topical and competes through net benefits.

Observation 2: Solvency

### CP solve heg & aerospace - AFIT works closely with the military and DOD to increase aeronautic efforts which are key to the economy

Givhan, Trias & Allen, 11 [Walter D. Givhan, Eric D. Trias, William H. Allen, QUALS, “The Criticality of Defense-Focused Technical Education,” Air & Space Power Journal, Vol XXVI, No. 2, Summer 2011 Edition, <http://www.airpower.au.af.mil/airchronicles/apj/2011/2011-2/2011_2_02_givhan.pdf>, DA 7/13/11]//RS

AFIT The United States Air Force is a service born of technology, and throughout its history, technology has remained central to its identity and power. From the start, visionary leaders realized the importance of technologically focused education to advancing airpower. Consequently, through the years, institutions of higher learning such as the Air Force Institute of Technology (AFIT), as well as the civilian institution program it administers, have continued the meaningful work of developing the technology and organic human capital to sustain the Air Force’s edge as a fighting force. As advances in technology have led the Air Force into the new domains and challenges of space and cyberspace, the role of delivering defense oriented technical education has become even more critical. In this process, leveraging our network of science and technology partners to produce technically educated and operationally focused Airmen has proved as significant as the advances themselves. Because demand for these graduates continues to increase, deliberate investment in science, technology, engineering, and mathematics (STEM) education must also increase. Today, as yesterday, experienced Air Force leaders with a defense focused technical education are **essential to maintaining our military supremacy**, and AFIT continues to meet that need—as it has since its inception in 1919. In the Beginning Even during the early days of aviation in Dayton with the Wright brothers—a time marked by fledgling, primitive technology (wood, wire, and fabric)—the miracle of powered flight inspired leaders to think of military applications and the transformational effect they could have. From that time to the present day, the education and research conducted at Wright-Patterson AFB, Ohio, have been instrumental in setting the course for the development of air, space, and cyberspace power. One of the visionary leaders present at the beginning, Col Thurman H. Bane, led the way in creating the Air School of Application, the forerunner of AFIT. Bane realized that technology lay at the core of the new Air Service’s identity and capability; thus, **technologically focused education for Airmen was central to the service’s effectiveness**. Bane wrote to the director of military aeronautics in Washington, DC, emphasizing the importance of education in support of the emerging airpower domain, observing that “no man can efficiently direct work about which he knows nothing.” 1 The school’s first class, led by Lt Edwin Aldrin (father of Senior Leader Perspective astronaut Edwin “Buzz” Aldrin Jr.), graduated in 1920. Since that time, AFIT has produced a string of senior leaders whose technical education and foundation have shaped the Air Force and its progress.

### Empirically AFIT solves best- Their rapid developments during the Afghanistan war prove

Givhan, Trias & Allen, 11 [Walter D. Givhan, Eric D. Trias, William H. Allen, QUALS, “The Criticality of Defense-Focused Technical Education,” Air & Space Power Journal, Vol XXVI, No. 2, Summer 2011 Edition, <http://www.airpower.au.af.mil/airchronicles/apj/2011/2011-2/2011_2_02_givhan.pdf>, DA 7/13/11]//RS

Natural career progression and the professional network inherent in the Air Force continue to create opportunities for partnering. Such partnerships are most critical and valuable when they respond to an immediate mission need. Through its connections to students’ gaining and losing commands as well as its alumni, mission partners, and deployed faculty and staff, AFIT frequently becomes aware of urgent, developing requirements. In these cases, military organizations can respond with unmatched speed and flexibility without the need for complicated government-tocivilian contractual agreements. In 2009, when tasked by US Central Command to monitor the progression of the Afghan Air Force, NATO Training Mission–Afghanistan turned to AFIT for development of an automated tool kit that for the first time enabled the use of comprehensive data collection and regression routines to track key indicators. Within three months, AFIT had made available the first tool kit prototype. Also at the request of Central Command, AFIT is designing 22 logistics and acquisition courses for the Iraqi military, scheduled for delivery starting this year. AFIT possesses the invaluable organic capability to rapidly generate not only technical leaders but also science and technology innovations in a systematic way.

### The CP is key to solving aerospace, heg and econ- R&D needs funding and faculty

Givhan, Trias & Allen, 11 [Walter D. Givhan, Eric D. Trias, William H. Allen, QUALS, “The Criticality of Defense-Focused Technical Education,” Air & Space Power Journal, Vol XXVI, No. 2, Summer 2011 Edition, <http://www.airpower.au.af.mil/airchronicles/apj/2011/2011-2/2011_2_02_givhan.pdf>, DA 7/13/11]//RS

These kinds of examples show the value of a core technological education capability and of highly educated technical graduates in ensuring that the modern Air Force remains on the edge of innovation. Their research and classroom projects feed into war-fighting operations and research programs around the country. At the same time, state-of-the-art research reaches back to inform and refresh the classroom. T**his symbiotic relationship between research and curriculum requires a critical mass of students, faculty, and funding to thrive and generate the intended result**s. A robust technical program will produce capable technical leaders and show the way to potentially game-changing technology. **Without a steady stream of defense-focused, technically educated individuals, every aspect of the technologically demanding Air Force mission will suffer**. With graduates in such high demand, AFIT has transformed our educational methods by using Internet and satellite technology to bring itself to the Airman in addition to bringing the Airman to AFIT. These efforts produced 28,000 graduates of professional continuing education last year alone, in addition to 320 graduates with MS degrees, 31 with PhDs, and 2,600 from civilian institutions.

### The CP solves for aerospace, economy and heg better than the aff- AFIT researches cyber resilience, GPS, satellite systems and improving space situational awareness

Givhan, Trias & Allen, 11 [Walter D. Givhan, Eric D. Trias, William H. Allen, QUALS, “The Criticality of Defense-Focused Technical Education,” Air & Space Power Journal, Vol XXVI, No. 2, Summer 2011 Edition, <http://www.airpower.au.af.mil/airchronicles/apj/2011/2011-2/2011_2_02_givhan.pdf>, DA 7/13/11]//RS

The Future A recent report by the National Research Council of the National Academies identified the loss of technical competence within the Air Force as an underlying problem in several areas of science, engineering, and acquisitions. 7 At the same time, the Report on Technology Horizons, Headquarters US Air Force’s vision for science and technology, recognizes that the capabilities we need also lie within the reach of potential adversaries because of their access to the same science and technology. 8 In the midst of budgetary constraints, advances in technology are imperative to increase manpower efficiencies as well as enhance the Air Force’s capabilities. Several areas in which AFIT research and education directly support the Report on Technology Horizons vision include cyber resilience, adaptable autonomous systems, operating in an environment without benefit of the Global Positioning System (GPS), rapidly composable satellite systems, and improvement of space situational awareness. In the spirit of the Report on Technology Horizons, this edition of Air and Space Power Journal contains a small sampling of articles covering critical areas of research in cyberspace, energy and fuels, GPS alternatives, and technology that can improve wartime effectiveness and operational efficiencies. As was the case with General Schriever and development of the ICBM force, these advances can occur efficiently and effectively only with the guidance and vision of leaders who have a solid grounding in science and technology that includes technologically focused education. Early on, Gen Henry “Hap” Arnold realized that scientists and engineers were the kind of people who would bring him the ideas he needed. 9 According to the Air Force Science and Technology Strategy, which serves as the cornerstone of all of the service’s science and technology activities, maintaining our technological dominance faces a challenge from globalization and other nations’ ready access to the technology and human capital that make possible the development of advanced capabilities. Furthermore, innovation is at risk unless the United States can develop scientists and engineers well grounded in STEM and attract them to careers in the Air Force. 10 AFIT serves as a key resource in meeting the need for wellqualified STEM professionals.

### AFIT solves long term- they prepare the next generation of aerospace through a pyramid of progression

Givhan, Trias & Allen, 11 [Walter D. Givhan, Eric D. Trias, William H. Allen, QUALS, “The Criticality of Defense-Focused Technical Education,” Air & Space Power Journal, Vol XXVI, No. 2, Summer 2011 Edition, <http://www.airpower.au.af.mil/airchronicles/apj/2011/2011-2/2011_2_02_givhan.pdf>, DA 7/13/11]//RS

Back to 1919 . . . and Beyond! Technology is part of Airmen’s DNA. Our first leaders realized that fact even when the technology of flight was in its infancy. They also understood the importance of defense-focused technical education to carrying out our mission and to sustaining the Air Force our nation needs to attain its strategic goals. Advances in science and technology that have led us into new domains confirm the wisdom of that vision and the necessity of doing even more in this regard to preserve our edge and competitiveness. When a corporation needs a new executive officer, it may promote from within or hire one with the desired experience from another organization. Military organizations, however, must grow their own. This pyramid of progression accentuates the necessity of investing in our Airmen to ensure that future leaders have the education and technical foundation to develop the capabilities demanded by our Air Force and country. At AFIT we prepare those leaders while advancing air, space, and cyberspace power for the nation, its partners, and our armed forces. We do so by offering relevant, defense-focused technical graduate and continuing education, research, and consultation. As Gen Charles A. Gabriel, former Air Force chief of staff, once said, “The AFIT of today is the Air Force of tomorrow.” 12 That statement was true in 1919— and it’s even truer today. 

## Solvency Takeouts

### No solvency- Obama’s recent tax cuts for corporate jet owners will inevitably hurt the aerospace industry

Fox News, 6/30 [FoxNews.com, “Aviation Industry Assails Obama for 'Cynical' Call to End Corporate Jet Tax Break,” June 30, 2011, http://www.foxnews.com/politics/2011/06/30/aviation-industry-assails-obama-for-cynical-call-to-end-corporate-jet-tax-break/#ixzz1S8YSczZN<http://www.foxnews.com/politics/2011/06/30/aviation-industry-assails-obama-for-cynical-call-to-end-corporate-jet-tax-break/#ixzz1S8UfXTIe>, DA 7/14/11]//RS

General aviation employs 1.2 million Americans and generates $150 billion a year in revenue. President Obama praises it as one of America's industries that still maintains an advantage over other countries' manufacturers. So it disappointed several in the aviation industry when the president on Wednesday held up an obscure tax break for corporate jet owners as an example of why Congress should close tax loopholes as part of any deficit reduction deal. "While such talk may appear to some as good politics, the reality is that it hurts one of the leading manufacturing and exporting industries in the United States," wrote the General Aviation Manufacturers Association and the International Association of Machinists and Aerospace Workers in a letter sent to the president. In a lengthy press conference, Obama repeatedly cast the debate over the deficit as a choice between ending tax breaks for jet owners and jeopardizing children's education and safety. "You go talk to your constituents -- the Republican constituents -- and ask them, are they willing to compromise their kids' safety so that some corporate jet owner continues to get a tax break?" Obama said, recalling his discussions with Republicans. Repealing such a tax break would add up to just $3 billion over 10 years, a tiny step toward the $4 trillion over 10 years that Obama and others are calling for in deficit reduction. The kind of tax break Obama criticized was actually granted to corporate jet owners in the Democrats' stimulus package in early 2009. That provision let companies take bigger deductions earlier for depreciation. Several organizations lambasted the president for his rhetoric. "The president has inexplicably chosen to vilify and mischaracterize business aviation -- an industry that is critical for citizens, companies and communities across the U.S., and one that can play a central role in the economic recovery he says he wants to promote," National Business Aviation Association President Ed Bolen said in a statement. He called on Congress to reject the call, describing the current tax structure for jet owners as a "proven formula for incentivizing the purchase of American products." "Equally alarming, the president's disparaging remarks reflect a total lack of understanding -- or a complete disregard -- for general aviation in the U.S.," Bolen said, describing his proposal as "bad policy and cynical politics." Ironically, Obama praised the U.S. aviation industry just minutes after describing its tax treatment as an example of what is wrong with the tax code. "Obviously, the airplane industry is an area where we still have a huge advantage. I want to make sure that we keep it," Obama said, as he called on Boeing, union workers and the National Labor Relations Board to resolve a contentious dispute that's dragged on for weeks. The president also plans to fly in the country's most famous personal jet -- Air Force One -- to get to Democratic National Committee fundraisers in Philadelphia Thursday night. In their letter, the aviation manufacturers and machinists and aerospace workers groups warned that "the rhetoric" could cause economic hardship. They noted that Transportation Secretary Ray LaHood recently visited the aviation industry hub of Wichita, Kansas, and lauded the industry's work. Obama's comments Wednesday underscored the deep divide between Democrats and Republicans as they try to piece together stalled talks over deficit reduction. Republicans want significant spending cuts as a condition for supporting an increase in the $14.3 trillion debt ceiling. They oppose tax increases, but Obama and congressional Democrats say revenue has to be on the table. Obama highlighted tax breaks for oil and gas companies as one possibility, but mentioned corporate jet owners no fewer than six times in his opening remarks. He pitched ending their tax breaks as far more palatable than making certain cuts to spending. "If we choose to keep those tax breaks for millionaires and billionaires, if we choose to keep a tax break for corporate jet owners, if we choose to keep tax breaks for oil and gas companies that are making hundreds of billions of dollars, then that means we've got to cut some kids off from getting a college scholarship, that means we've got to stop funding certain grants for medical research, that means that food safety may be compromised, that means that Medicare has to bear a greater part of the burden," Obama said. "Those are the choices we have to make."

### No solvency- Middle East war, rising debt & operations costs

Douglass, 3/10 [John Douglass, President & CEO Emeritus, Aerospace Association, “Testimony of John Douglass,” DA 7/14/11]//RS

Generally, the performance of the civil aerospace sector is highly correlated to that of the overall national and global economies. When the global financial crisis struck in 2008, all civil aerospace sectors were affected, albeit at varying stages and severities. The business jet market was hit first and most severely, followed by the regional jet market, which suffered less of a downturn. The large commercial aircraft market is the most resistant to fluctuations in the overall economy, but as it represents the largest share of the civil industry as measured by value, slight changes can have a significant effect on overall civil sales. Recovery within the civil industry is expected to be in reverse order of downturn; e.g., the large commercial aircraft market will recover first, followed by regional and then business jets. The civil aircraft market was rather rocky in 2010. Over the year, sales dropped nearly six percent to $48.2 billion. A rebound is expected in 2011, but will hinge on several factors, including the economy, the price of jet fuel, availability and terms of aircraft financing, and environmental regulations. To some degree, the military side of aerospace is also affected by prevailing economic conditions, as is evident by the current downward pressure on the defense budget due to the soaring national debt and from competing budget priorities. However, historically, military aerospace spending levels are driven primarily by the needs of national security and defense. Consequently, as military operations in Iraq and Afghanistan wind down, military aerospace budget authorizations and outlays are also likely to decline. While some cyclical movement in the military budget is expected and inevitable, **AIA believes that allowing military spending to fall too fast and too far will produce numerous long- and short-term negative results**. The most obvious is a weakened national security capability. As procurement levels drop/fall, the U.S. industrial base will also deteriorate as manufacturers shift away from products and services no longer supported. A real concern is that valuable skills and experience may be permanently lost from the industry. Given the extremely sophisticated technology associated with today’s aerospace industry, expecting to reconstitute such a highly skilled workforce on an “as needed” basis would be problematic, if not **impossible**. In 2010, sales of military aircraft continued to improve in 2010, reaching $64.5 billion, an 8 percent increase over 2009. Military aircraft sales have nearly doubled since 2000, but this pace is likely to ease considerably in the coming years. According to Department of Defense (DOD) officials, the Pentagon’s 2011 base budget will – at best – be limited to about 1 percent real growth or less. Further, because of rapidly increasing personnel and operations costs, even a nominal top line increase would result in a decrease to the procurement account.

### Alt causalities- Aerospace industry will inevitably be doomed because of the inability to remove lead astray

Wall, 5 [Robert Wall, the Aviation Week & Space Technology Paris Bureau Chief and previously served as the publication's Senior Pentagon Editor, he holds a Master's degree in International Relations from the George Washington University, “Lead Astray; Regulations banning some metals in electronics raise concern through aerospace industry,” Aerospace Business; Pg 58 Vol. 163 No.13, October 3, 2005, <http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=awst&id=news/100305p10.xml>, DA 7/13/11]//RS

Aerospace companies and some of their customers are struggling to deal with a movement to phase out lead and other dangerous metals from electronics products. And they are worried the trend could have a significant impact on their systems' performance. Europe is leading the charge on trying to eliminate dangerous metals, with a European Union mandate in place stipulating that electronic products introduced after July 1, 2006, can no longer feature lead or certain other metals. Industry officials expect others to follow, noting that China and some U.S. states at the local level are pursuing similar policies. Aerospace suppliers have managed to obtain an exclusion from the EU rule after lobbying from Airbus, ckwell Collins and others, and with the backing of the European Aviation Safety Agency and FAA. But that hasn't completely eased the predicament. Many suppliers to avionics and other component makers generate most of their revenue through business in the commercial electronics world, so they are phasing out proscribed materials nevertheless. ONE EXAMPLE IS LEAD-SOLDER, which is on the list of items the commercial electronics industry will have to do without to remain in compliance with EU rules. As a result, the aerospace industry is not only faced with a dwindling supply of these components made with familiar processes, but also the possibility of needing to recertify systems to comply with the offered alternatives--and soon. "Our ability to buy lead-plated components is diminishing rapidly," notes Roger Southgate, director of avionics certification at Rockwell Collins.

## Private Sector CP- Perm Do Both Solvency

### Perm solves best- Empirically private sector space missions fail and need government action first

The Lufkin Daily News, 10 [The Luftkin Daily News, NASA Editorial, March 8, 2010, “NASA’s Future: Obama’s plans could cause US to lose its position as the leader in space exploration,” <http://lufkindailynews.com/opinion/editorials/article_4b658cfc-2b37-11df-87ef-001cc4c03286.html>, DA 7/14/11]//RS

United States Sen. Kay Bailey Hutchison (R-Texas) wasted little time after her defeat in last week’s Republican Gubernatorial Primary before resuming what Texans elected her to do — represent their best interests. One of her first tasks was to take the lead, as her status as ranking member of the Senate Committee on Commerce, Science and Transportation allows her to do, in chiding the Obama Administration’s plans to turn over NASA’s manned space missions to private industry as President Obama proposed in his 2011 budget. Yesterday, Hutchison announced she has introduced legislation to extend the life of the shuttle program and allow NASA to continue to develop the next generation of space vehicles. Running counter to his administration’s plans for a government takeover of health care, Obama is betting NASA’s reputation, deserved or not, as a slow-moving bureaucracy will convince Congress that privatizing the country’s manned space travel is the right thing to do. Obama’s proposal would spend $6 billion for the next five years to turn over space exploration to private companies and relegate NASA’s chief role to scientific endeavors. Sounds good in theory but as Taylor Dineman wrote in the Wall Street Journal last month, the private sector is not up to the job. Dineman, who writes a column on space and is involved with a private company developing solar power in space, pointed out a number of private space companies have tried and failed during the last two decades to join the race for space. Perhaps the most memorable was Lockheed Martin’s partnership with the government to replace the shuttle with its X-33. The project was scrapped in 2001 after five years of development work that cost taxpayers $912 million and Lockheed Martin $357 million. If a giant in the aerospace industry has difficulty, what does that portend for small start-up companies? Obama would also cancel the Constellation program, NASA’s attempt to return to the moon. We’ve already spent $9 billion on the effort and many think that program has been too slow and wasteful. However, deep space exploration will certainly require technology like NASA’s new Ares launch vehicle to succeed. But the deal-breaker, in our opinion, is Obama’s extension of funding for the International Space Station beyond 2016 while severely limiting NASA’s role in manned space flight. The United States’ participation in the program will soon rely on transportation via Russian spaceships, something we are not ready to rely on. Obama’s plan for NASA is meeting stiff opposition from Congressional delegations from states where NASA employs thousands. NASA surely is a large bureaucracy, one that has frittered away taxpayer dollars. But unlike many other government programs, NASA has ultimately produced results. Forget Tang and Velcro. Innovations developed by NASA in conjunction with its manned space flights include microalgae nutritional supplements, magnetic resonance imaging, infrared thermometers, efficient lithium batteries, new materials like memory-foam and composites for commercial applications and more. Without a manned space flight mission it is doubtful those advances would have been made so quickly. Turning over the manned space flight mission to private contractors has been tried before without much success. While NASA has had its ups and downs and can undoubtedly continue to improve its efficiencies, it is still something America can be proud of. President John F. Kennedy outlined NASA’s mission when he said, “We choose to do these things, not because they are easy, but because they are hard.” We’ve done those things as a country and that should continue. If not, we risk losing our position as the leader in space exploration and the possibilities it brings.

# Space Leadership Advantage

### No internal link - no other country can compete with US space leadership

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

As indicated, there does not at present appear to be any legal barrier to the United States engaging in lunar mining, save for the very general limitations imposed by the Outer Space Treaty and broader international law. 113 Moreover, as a practical matter, no other nation is likely in the near future to be in a position to prevent the United States from establishing a lunar base and conducting activities on the Moon as it wishes. 114 Consequently, the United States could presumably proceed with an He-3-based fusion energy program on the assumption that it could mine and bring to Earth lunar He-3 without any need for seeking further international approval. Under this approach, the United States could develop an appropriate legal regime of its own, consistent with its own needs and principles, rather than having to reach compromises with other countries. There is precedent for unilateral U.S. action of this kind-the 1980 United States Deep Seabed Hard Mineral Resources Act,115 which, following U.S. rejection of the 1982 LOSC, continues to govern the commercial recovery of deep seabed minerals by U.S. companies. 116 Subsequent to its enactment, the United States concluded international agreements with several other states in 1982 and 1984 (Belgium, France, Germany, Italy, Japan, the Netherlands, and the United Kingdom) to resolve overlapping claims with respect to mining areas for polymetallic nodules of the deep seabed.

### China isn’t challenging US –also lacks tech and experience

Watt ‘11

(Louis Watt, Manila Bulletin Publishing Cooperation, “China Aims High in Space,” <http://www.mb.com.ph/articles/326698/china-aims-high-in-space>, 7/14/11, DA: 7/19/11, MadSu)

China is still far behind the US in space technology and experience, but what it doesn’t lack is a plan or financial resources. While US programs can fall victim to budgetary worries or a change of government, rapidly growing China appears to have no such constraints. “One of the biggest advantages of their system is that they have five-year plans so they can develop well ahead,’’ said Peter Bond, consultant editor for Jane’s Space Systems and Industry. “They are taking a step-by-step approach, taking their time and gradually improving their capabilities. They are putting all the pieces together for a very capable, advanced space industry.’’ In 2003, China became the third country to send an astronaut into space on its own, four decades after the United States and Russia. In 2006, it sent its first probe to the moon. In 2008, China carried out its first spacewalk. China’s space station is slated to open around 2020, the same year the International Space Station is scheduled to close. If the US and its partners don’t come up with a replacement, China could have the only permanent human presence in the sky. 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 US, Russia, Canada, Japan, and 11 European countries. “China has lagged 20 to 40 years behind the US in developing space programs and China has no intention of challenging US 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 US 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 US’’ 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. India, which has already achieved an unmanned orbit of the moon, is planning its first manned space flight in 2016. The US has no plans to return to the moon. “We’ve been there before,’’ Obama said last year. “There’s a lot more of space to explore.’’ He prefers sending astronauts to land on an asteroid by 2025 and ultimately to Mars. But those plans are far from set. Instead, NASA is closing out its 30-year space shuttle era this month, leaving the US dependent on hitching rides to the space station aboard Russian Soyuz capsules at a cost of $56 million per passenger, rising to $63 million from 2014. The US also hopes private companies will develop spacecraft to ferry cargo and crew to the space station. China, having orbited the moon and starting collecting data on it, is moving toward sending a man there – and beyond. It hopes to launch the rover-releasing moon probe in about two years. Chinese experts believe a moon landing will happen in 2025 at the earliest.

### Russia is no threat –they don’t want to rise as a hegemon and don’t have the capability of it

Bradley ‘11

(Jason Bradley, former military combatant and founder of The Western Experience, “Russia Will Not and Cannot Challenge US Hegemony,” <http://bigpeace.com/jbradley/2011/03/05/russia-will-not-and-cannot-challenge-us-hegemony/>, 3/5/11, DA: 7/20/11, MadSu)

While true they are making efforts to modernize their military, mostly comprised of old Soviet era equipment, they still have a lot of making up to do. Even under the most optimistic of circumstances, Russian military clout would still leave a lot to be desired, at least compared to the US. What is clear, at least for the foreseeable future, is a resurgent Russia set to challenge US hegemony just isn’t in its future. The Russian Federation’s ascension from the Cold War has operated paradoxically. It is not a nation state (in the European sense) but has strong currents of nationalism running through the mainstream of life, entertainment, politics, and education. It projects itself as modern, democratic, and Western but distinctly Russian therefore often putting it at odds with the Western nations. Yet it has steadily veered towards reimperialization, struggles with implementing a market economy, shown no use for political pluralism, and autocratic control from the Kremlin increases each year, with each passing election. Relations between the US and Russia have reached different points of and hot and cold over the years since the Cold War ended. They seemed to have worsened in the last months of George W Bush’s presidency. Some have tried to make it easy to speculate that an extension of the Cold War resumed when the US placed American missiles in the Czech Republic and Poland. Likewise, they made easy to entertain the Cold War entered a re-icing stage when Russia invaded Georgia. The Russian-Georgia war could be viewed as a turn for the worse in the US-Russian confrontation. And the Russian victory plus the will to use military force in its region, tipped the balance to Russia. This is fanciful thinking. Russia does not possess the superpower qualities needed in order to align the world back in a bipolar arrangement, as was the case during the Cold War. Nor is it able to operate and deploy globally to such an extent as to significantly undermine America’s long-term interests or force it to reallocate resources away from fighting terrorism in the Middle East. Instead, Russia exists on the periphery of Europe with a few basic goals: Sovereignty, reclaiming some of its geopolitical clout, oil production, nuclear non-proliferation, and counter-terrorism. As is always dominant in international relations, Russia has sought domestic strength and stability through its oil supply and used its leverage in natural resources as a political weapon. Between 1998 and 2006, the price of oil rose from $15 to $70 per barrel creating huge cash surpluses. When the price of oil plummeted, the vulnerabilities of Russia’s economy were apparent. While it is true that Russia is the main oil and natural gas supplier in Europe, with some future estimates predicting it could possibly export 70 percent to the region, it appears these estimates could be flawed. Partly the reason why Russia is exporting so much oil in recent years is because it started at the bottom after the Soviet collapsed. In other words, Russia climbed so high because of how far it had fallen. Since then, however, it has discovered no new oil, relies on old wells, and allows little foreign investment for industry growth. As a result, oil exports have declined since 2008. Russia’s oil exports seem to have peaked at least for the time being. Even more troubling perhaps is Russia’s demographic crisis. Russia’s population has lost 7 million people since 1992; death rates outnumber birth rates by a quarter million. “In the last 40 years the death rate for men between 15 and 64 years of age has jumped by an average of 50 percent” (J. McHugh, 2008). Conclusion These are not the qualities of a robust nation destined to challenge US hegemony. Instead, Russia resents the US policy of full spectrum dominance and nuclear supremacy, because of which Russia finds itself unable to compete. All the old Cold War relics simply add theater to a very basic international relations scenario. A stronger power is preventing a weaker one from doing what it wants. Nonetheless, there is real apprehension on the part of Russia from perceived encirclement by NATO, a growing number of American military bases throughout the world, and American missiles. The simple truth is that the Cold War did indeed end with the collapse of the Soviet Empire and Russia is not likely to fill the role as new Cold War nemesis. Neither though does it have to be a partner with the US or the West. “Until recently, Russia saw itself as Pluto in the Western Solar system, very far from the center but still fundamentally a part of it. Now it has left that orbit entirely: Russia’s leaders have given up on becoming part of the West and have started creating their own Moscow-centered system” (D. Trenin, 2007). In the eyes of Russia, the missile shield project is about America establishing nuclear primacy. With American missiles in the region, American military armaments going to Georgia, and high tech experimental missile defense satellites into space, Russia has lost the capability to counter a nuclear first strike. Russia finds its considerable nuclear arsenal vulnerable if not obsolete. By greatly reducing Russia’s threat of nuclear strike, the US has essentially eliminated “mutually assured destruction (MAD). MAD of course was viewed as the ultimate equilibrium in the nuclear standoff during the Cold War. American nuclear primacy, however, swung the equilibrium decidedly in the favor of America leaving Russia out in the cold. It is no mystery as to why Russia feels exposed to possible hostility from the U.S. and NATO over its expansion. In view of this, Russia can become more aggressive, obstruct international cooperation, and exert its influence in places that are possible. It can even increase its military posture and become more Moscow-centric. For example, Russia announced this year it will continue its military modernization and buildup that started in 2008. Reportedly, Russia is willing to spend an estimated $600 to 700 billion over ten years to move away from its Soviet era weaponry. This equates to roughly 5 percent of Russia’s estimated gross domestic product. In comparison, the US on the other hand makes up roughly 47 percent of the world’s total military spending! At such a reduced state and under an insurmountable disadvantage, militarily and economically speaking, today’s Russia and the world it finds itself in pales in comparison to yesterday’s Soviet Union and the bygone Cold War era. Therefore, at no time in the foreseeable future can Russia rise to the status of the former Soviet Union, realign the world back into a bipolar arrangement, and hope to challenge the US across the globe.

### US heg sustainable

Walt ‘10

(Steven M. Walt, professor of international relations at Harvard University, “Five Big Questions,” <http://walt.foreignpolicy.com/posts/2010/07/12/five_big_questions>, 7/12/10, DA: 7/20/11, MadSu)

Is the era of U.S. primacy over? How will the end of post-Cold War primacy affect its grand strategy and foreign policy? The United States will remain the world's most powerful state for some time to come. Its economy will be the world's largest until 2030 at least, and its per capita income will be much higher than that of other potential rivals (meaning there is great potential wealth that can be mobilized for national purposes). Unlike Europe, Japan, and Russia, the U.S. population will continue to grow and will not as old. And it will take a great deal of time before any other country amasses global military capabilities akin to ours.

### Space leadership sustained by US private agencies

Xinhua ‘11

(Chinese News Agency, “U.S. will keep leadership in space exploration for half century: NASA head,” <http://www.chinadaily.com.cn/xinhua/2011-07-02/content_3071963.html>, 7/1/11, DA: 7/20/11, MadSu)

Although next week's final space shuttle launch means the end of the 30-year-old Space Shuttle Program, the United States will continue to lead in space exploration for at least half an century, NASA Administrator Charles Bolden said Friday. "Some say that our final shuttle mission will mark the end of America's 50 years of dominance in human spaceflight," Bolden said in a speech at the National Press Club. "As a former astronaut and the current NASA administrator, I'm here to tell you that American leadership in space will continue for at least the next half- century because we have laid the foundation for success -- and failure is not an option." "We are not ending human space flight, we are recommitting ourselves to it and taking the necessary -- and difficult -- steps today to ensure America's preeminence in human spaceflight for years to come," he said. "Our destinations for humans beyond Earth remain ambitious. They include: the moon, asteroids, and Mars. The debate is not if we will explore, but how we'll do it." However, next week's swan song for the shuttle program -- Atlantis takes off on the last shuttle mission July 8 -- does mark the end of an era, Bolden said. NASA's shuttle program is ending due to high operating costs. The Obama administration wants to spur private companies to get into the space taxi business, freeing NASA to focus on deep space exploration and new technology development. When the U.S. space shuttle program officially ends later this year, the Russian space program's Soyuz capsule will be the only method for transporting astronauts to and from the station. "We have to get out of the business of owning and operating low- Earth orbit transportation systems and hand that off to the private sector, with sufficient oversight to ensure the safety of our astronauts. American companies and their spacecraft should send our astronauts to the ISS (International Space Station), rather than continuing to outsource this work to foreign governments," Bolden said. Within a year, Bolden said, private companies can take over the process of sending cargo shipments into orbit. By 2015, he said industry can take over astronaut transport, freeing NASA to focus on the long-term goals of reaching beyond Earth's shadow

# Solvency – Feasibility

## Solvency - Feasibility

### Can’t colonize –environment conditions make it impossible

Deen ‘9

(Munim, Oklahoma Daily writer, “Space Exploration Yields Few Results,” CBS News, <http://www.cbsnews.com/stories/2008/11/19/politics/uwire/main4615911.shtml>, 2/11/09, DA: 7/13/11, Madeline)

By the 1960s, the United States was a bona fide space power, along with Russia. The space race instilled and embodied immense national pride in both nations and wsometimes even global pride among mankind. The 1969 lunar landing was indeed a giant leap for humanity. But what good did it really do? Not that much, honestly. The six NASA moon landings between 1969 and 1972 didnt directly improve anything tangibly. No magic source of perpetual energy was found. The lunar rocks did not yield the cure for the common cold or for any other earthly ailment. There was no breakthrough of any kind on earth that came from the moon landings. To be fair, some of the research and developmental work that went into making the moon landings happen did have some benefit in the real world. However, the most lasting and most recognized example of this has been a pen that can write upside down and under water. Infomercials and magazine ads still tout them as having flown into space . Can you think of anything else useful that we use regularly that came from the moon missions? I cant. The very fact that the moon missions were stopped after 1972 shows that there were little long-term benefits to be had from these missions. After the moon was conquered, attention turned to living in space. With this came the concept of the space station, in which astronauts could live for extended periods of time. Astronauts generally conducted scientific studies during their time up there. Scientific study is always good as long as it produces valid results, positive or negative. However, because of the particular environment of the space station, studies conducted in space are valid only in space. An experiment conducted in zero-gravity conditions produces results that are only applicable in zero-gravity conditions and therefore not valid on Earth. Considering thats pretty much the only place humans can live, the experiments, and therefore the missions, and the space stations themselves, are really of no direct benefit to earthlings. In todays world, there are not just two space powers. Several countries have conducted missions into space. The European Space Agency, Japan, India and China all have built up a long record of space missions. In addition, almost a dozen other smaller national agencies conduct minor space-related operations. Combined, the worlds space agencies have approved budgets of about $50 billion. NASA alone spends about $17 billion annually. While some of these missions involve launching or repairing useful technology such as communications and weather satellites or pertinent atmospheric and weather conditions, the majority of the missions involve scientific experto iments whose results have little bearing on earth because the experiments are conducted in environments that are nothing like earth. Some defend space experiments as being necessary precursors to mans eventual colonization of other planets. I dont buy it. We have yet to find a planet remotely capable of sustaining humanity. Even the vaunted efforts to find evidence of life and water on Mars have come up short. The best evidence of life put forth thus far were fossilized remains of what could be bacteria. Most scientists, particularly bacterial microbiologists, describe this evidence as shaky at best. Mars has no magnetic field. This mens that Martian atmosphere is unable to stop solar wind and radiation from interacting directly with surface soil. This would make life as we know it on Earth impossible. NASAs earliest projections put a manned Mars mission no earlier than 2037. Because of Martian conditions, the mission would essentially be akin to an extended stay on a space station, but with gravity. A fully contained inside and outside on any structure on Mars would be absolutely necessary. That would be true of any attempts to live on Mars, as well. So, in 40 years, astronauts may set foot on another planet. But theyll have to wear spacesuits wherever they go. Their base will have to be artificially maintained to simulate Earth because the planet theyll be on is by most estimates incapable of supporting life. And any attempt to build civilization there will have to start from the ground up. There is nothing there. Imagine the most desolate desert on Earth, make it very cold, take away all the oxygen, and make it impossible to leave without rockets. Thats what Mars is like right now. Even with all of Earths problems, who would seriously want to go to Mars? You cant live there, you cant make a living there, and if something goes wrong, you probably wouldnt be able to leave there in time. Thus, justifying space experiments as leading the way to Martian colonization does not sway me because the entire premise of Martian colonization is flawed. Aside from satellites that actually have some benefit to Earth and humans, what good is space exploration really doing? Its eating up money in the billions while not really yielding anything of solid value. Were in the middle of global recession right now. There are millions of people starving to death on Earth. Millions more barely make a living due to abject poverty. People die of curable diseases every day. Even factoring out the costs associated with maintaining useful satellites, ending space exploration would save billions of dollars that could be used to improve life on Earth. What good was a man taking a step on the moon when millions of malnourished children die before taking their first step on Earth? Instead of throwing money at outer space, lets make use of it on Earth, where it can actually do good for the people who live here.

### Many difficulties in moon colonization –lunar nights, solar storms, and cosmic rays pose serious problems

Spotts ‘9

(Peter, Staff writer for Christian Science Monitor, “Mon base: Location, Location, Location,” <http://www.csmonitor.com/Innovation/Tech/2009/0305/moon-base-location-location-location>, 3/6/2009, DA: 7/14/11, Madeline)

If, as planned, the United States eventually establishes a lunar base in 2020, one of the most tempting patches of moonscape is Shackleton Crater at the south pole. There may be water ice for drinking or converting to rocket fuel, the nearly constant sunlight at the rim is ideal for solar power, and the temperature is relatively bearable. But perhaps the most compelling reason is something far more primal: surviving the lunar night, which lasts 14 Earth days and can hit temperatures so cold that oxygen turns to liquid. Amid the many challenges that face America's bid to send four astronauts to inhabit a moon base for 180 days at a stretch, the lunar night is among the hardest to unravel - and for now, scientists think the rim of Shackleton Crater might be the best place to find solutions. "If you want to explore the moon, you have to start with the first requirement: surviving a lunar night," says James Head III, a planetary geologist at Brown University. The goal to return humans to the moon by 2020, first established under President Bush, appears to have President Obama's approval. Between his fiscal 2010 budget proposal and the stimulus package passed by Congress, the National Aeronautics and Space Administration (NASA) is slated to get roughly $2.4 billion more than it received in 2008. The 2010 deadline for retiring the space shuttles remains intact. So does the lunar-exploration program, with its rockets to replace the shuttles. But for all its attractiveness as a steppingstone from Earth to Mars, the moon is one nasty place, explains Narayanan Ramachandran, an aerospace engineer who heads the American Institute of Aeronautics and Astronautics' Space Colonization Technical Committee. The allure of Shackleton Crater is that it is relatively hospitable and practical. Explorers perched on its rim would experience a night of only 2 Earth days and 4 hours. The crater's proximity to the moon's day-night boundary - called the terminator - also makes it an ideal place to test technologies and find out what works and what doesn't in both environments. The difficulties to overcome are many. Solar storms and cosmic rays bombard the daylight half of the moon with charged particles dangerous to humans. Cosmic rays continue the onslaught throughout the night. And the particles smack the lunar surface with enough energy to knock neutrons loose and send them speeding upward - another form of radiation. Lunar dust is another serious problem. On Earth, dust gets tumbled around, rounding its edges, and moisture in the atmosphere makes it easier to clean off. On the moon, however, those processes do not exist, meaning the grains of the surface soil, or regolith, remain jagged. And with no moisture to prevent static electricity from building up on the grains, they provide the ultimate example of static cling - on everything from spacesuits to rover batteries.

## Solvency - New diseases and health problems

### Space conditions deteriorate bone strength, leaving people with the bone conditions of raggedy old ladies with osteoporosis

Malik ‘9

(Tariq, senior editor for Space.com, “Space Station Astronauts Lose Bone Strength Fast,” <http://www.space.com/6354-space-station-astronauts-lose-bone-strength-fast.html>, 1/26/2009, DA: 7/14/11, Madeline)

Astronauts that spend long months aboard the International Space Station lose bone strength faster than previously thought and have a higher risk of breaking their hips later in life, a new study reports. A survey of 13 space station astronauts found that their bone strength dipped by at least 14 percent on the average during their half-year stays aboard the orbiting laboratory. Three of the astronauts lost up to 30 percent of their bone strength during their long-duration spaceflights, putting them on par with the bone strength of older women with osteoporosis on Earth, the study reported. If preventive measures are not taken, some of our astronauts may be at increased risk for age-related fractures decades after their missions, said study leader Joyce Keyak, an orthopedic surgery and biomedical engineering professor at the University of California, Irvine. Keyak and colleagues at UC San Francisco and the Universities of Space Research Assn. in Houston used a new computer program designed to examine the risk of hipbone fracture in people with osteoporosis to analyze hipbone scans of one female astronaut and 12 male astronauts. Past studies have found that an astronaut's bone mineral density can decrease by between 0.4 percent and 1.8 percent each month. But Keyak’s investigation found the drop in bone strength, between 0.6 percent and 5 percent each month, to be substantially greater. The NASA-funded research is detailed in the online version of the science journal Bone. NASA has long known that astronauts in space gradually lose muscle strength and bone density over time while on long-duration spaceflights because their bodies float in microgravity, rather than work against the tug of Earth’s gravity each day.

### Space colonization brings many health problems

Davis, Fogarty, Richard ‘8

(Jeffery, Jennifer, Space Life Sciences Directorate for NASA, Elizabeth, Wyle Life Sciences, Human health and performance risk management—an approach for exploration missions, 2/6/08, DA: 7/14/11, Madeline)

In addition, terrestrial medical and physiological data may be utilized as appropriate, such as data regarding the loss of bone mass which underlies fracture risk and effective mitigation strategies. Over the past 15 months, NASA conducted reviews of its human research data through the Human Research Program (HRP), a key program in the Exploration Systems Mission Directorate. These data span many disciplines in the HRP such as cardiovascular, musculoskeletal, nutrition, environmental exposures and radiation exposure to name a few.1 These reviews included known historical data from space flight, ground-based simulations such as bed rest, analog environment data such as from over-wintering in Antarctica, and medical operations data. NASA is now developing a regular data review and reporting mechanism to assure that the best available evidence is utilized in this risk management system. There is a need to regularly evaluate the human space flight operations and research evidence base resulting in identification of human health risks and recommendations to develop or modify standards, requirements, procedures, etc.

### Deadly bacteria in space jeopardizes human health, it mutates easily and cause serious problems

O’Neil ‘8

(Ian, writer for science news agency Universe Today, “Germs Living in Space “Almost Three Times as Likely to Cause Disease,”” <http://www.universetoday.com/13133/germs-living-in-space-almost-three-times-as-likely-to-cause-disease/>, 3/11/08, DA: 7/13/11, Madeline)

In one experiment on board Space Shuttle Endeavor (STS-123) launched early this morning (at 2:28 am EST), the reaction of terrestrial bacteria to zero-G will be tested. When compared with test bacteria bred here on Earth, previous studies suggest that germs bred in space are far more potent and are more likely to cause illness to people in space. The Endeavor mission will continue this experiment in the aim to find some way to prevent these microscopic astronauts causing too many problems to the continuing missions on board the International Space Station and future space tourism companies. Until a solution is found, don’t go ordering fish off the in-flight menu on your next spaceship ride… Wherever humans go, a whole zoo of bacteria will follow. Most of the bacteria hitching a ride on our skin and inside our bodies live in symbiosis with us, but occasionallyÂ problem bugs like salmonella orÂ Escherichia coli (E-coli) can get out of control, causingÂ problems such as common food poisoning to more serious, life-threatening ailments such as tetanus, diphtheria, syphilis, cholera… (the list is pretty long.) So, as humans venture into space, it is inevitable that bacteria will come too – the whole symbiotic and parasitic jungle – exploring space with us. Bacteria will mutate, often very quickly, adapting to the environment surrounding the little microbes. Mutation is the difference between a bacteria being harmless to becoming deadly. Mutations help bacteria to survive and as an example, they can become antibiotic resistant. This is a huge problem in places where antibiotics are used very regularly (such as hospitals); genetic information is passed down the generations of bacteria (often doubling in population in a matter of minutes). If just one microbe has the genetic ability to survive a type of antibiotic, its number will multiply, creating a strain of “superbug” that can avoid being killed by antibiotics – one of the most basic examples of “natural selection”. Methicillin-resistant Staphylococcus aureus (MRSA) is one particular nasty strain of the otherwise benign Staphylococcus genus which has mutated to resist commonly used antibiotics. It is of paramount importance to understand how bacteria react to space conditions, so problems with potentially dangerous forms of bacteria, such as MRSA,Â can be avoided. Scientists have discovered that the fairly common salmonella bacteria, usually responsible for terrible food poisoning outbreaks here on Earth, is far more likely to cause serious disease in space and has a much faster rate of reproductionÂ in zero-G. The virilence of salmonella increases drastically in the absense of gravity. The findings from the 2006 Space Shuttle Atlantis mission showed that space-borne bacteria are three times more likely to cause harm to humans in space than humans on the ground, further work was obviously needed to address this potentially deadly barrier to the success of space missions. The project leader of these experiments, Dr. Cheryl Nickerson (at the Center for Infectious Diseases and Vaccinology, Arizona State University’s Biodesign Institute), hopes to find ways of blocking potentially deadly bacteria from multiplying so quicklyÂ in space and find out why zero-G is such a good environment for bacteria to grow. She headed the 2006 experiments on Atlantis. “We are very fortunate to get a follow up flight opportunity, because in spaceflight, you only get one shot for everything to go just right [...] We saw unique bacterial responses in flight and these responses are giving us new information about how Salmonella causes disease. NASA is giving us the opportunity to independently replicate the virulence studies of Salmonella typhimurium from our last shuttle experiment and to do a follow-up experiment to test our hypothesis about new ways this bacteria causes disease in this unique environment.” – Cheryl Nickerson. This is obviously a high priority experiment for NASA and the future of manned missions into space.

### Space causes critical health problems, most harmful to bones and blood

Crowell ‘9

(Benjamin, Physicist, “Biological Effects of Weightlessness,” <http://www.vias.org/physics/bk1_05_07.html>, 6/21/09, DA: 7/13/11, Madeline)

Worse than nausea are the health-threatening effects of prolonged weightlessness. The Russians are the specialists in long-term missions, in which cosmonauts suffer harm to their blood, muscles, and, most importantly, their bones. The effects on the muscles and skeleton appear to be similar to those experienced by old people and people confined to bed for a long time. Everyone knows that our muscles get stronger or weaker depending on the amount of exercise we get, but the bones are likewise adaptable. Normally old bone mass is continually being broken down and replaced with new material, but the balance between its loss and replacement is upset when people do not get enough weightbearing exercise. The main effect is on the bones of the lower body. More research is required to find out whether astronauts' loss of bone mass is due to faster breaking down of bone, slower replacement, or both. It is also not known whether the effect can be suppressed via diet or drugs. t / U.S. and Russian astronauts aboard the International Space Station, October 2000. The other set of harmful physiological effects appears to derive from the redistribution of fluids. Normally, the veins and arteries of the legs are tightly constricted to keep gravity from making blood collect there. It is uncomfortable for adults to stand on their heads for very long, because the head's blood vessels are not able to constrict as effectively. Weightless astronauts' blood tends to be expelled by the constricted blood vessels of the lower body, and pools around their hearts, in their thoraxes, and in their heads. The only immediate result is an uncomfortable feeling of bloatedness in the upper body, but in the long term, a harmful chain of events is set in motion. The body's attempts to maintain the correct blood volume are most sensitive to the level of fluid in the head. Since astronauts have extra fluid in their heads, the body thinks that the over-all blood volume has become too great. It responds by decreasing blood volume below normal levels. This increases the concentration of red blood cells, so the body then decides that the blood has become too thick, and reduces the number of blood cells. In missions lasting up to a year or so, this is not as harmful as the musculo-skeletal effects, but it is not known whether longer period in space would bring the red blood cell count down to harmful levels.

### Space presence causes health concerns to colonists

Casper & Moore ‘95

(Monica Casper, PhD, Professor in Humanities, Lisa Jean Moore, Ph.D. MPH, Professor of Sociology and Gender Studies School of Natural Social Sciences, Sociological Perspectives, Vol.38. No 2, <http://ljmoore.pbworks.com/f/Sociological%2BPerspectives.pdf>, Summer 1995, DA: 7/14/11, Madeline)

Sex and reproduction are discussed within space discourses as if they were inevitable: "If you can do it in the back seat of a '57 Chevy, you can do it anywhere" and "when people have sex, the woman is going to get pregnant." Yet, these activities may in fact be highly problematic in space, not only socially as we have discussed but also physiologically. A number of scientists (Smith 1990; Fowler 1991; David 1992) have argued that there are often very serious problems affecting human bodies in space, and that almost all of the human body's functions and processes may be affected. More specifically, space motion sickness, muscle atrophy, bone loss, and an array of other problems have all been recorded during space flights (Fowler 1991). Of course, since much of this data is based on flights in which mostly men served as crew members, its relevance to female bodies is questionable. As one might expect, such major physiological changes have potentially serious consequences for the short- and long-term health of crew members. Yet, questions are raised not only about the damaging effects of travel and/or habitation in space but also about potential problems when astronauts reenter Earth's atmosphere and "normal" levels of gravity. Most scientists seem to agree that the major causes of physiological problems are microgravity and radiation (Monga and Gorwill 1990), from which the space shuttle and space suits can only minimally protect astronauts." However, because there have not until recently been extensive long-term flights (at least in the U.S. program), data on these problems are limited To some degree, NASA is operating blindly with inadequate experiential data and no solid scientific evidence about the long-term impacts of space travel and habitation.

## Solvency - No Reproduction

### Space hurts embryos and prevents reproduction

Casper & Moore ‘95

(Monica Casper, PhD, Professor in Humanities, Lisa Jean Moore, Ph.D. MPH, Professor of Sociology and Gender Studies School of Natural Social Sciences, Sociological Perspectives, Vol.38. No 2, http://ljmoore.pbworks.com/f/Sociological%2BPerspectives.pdf, Summer 1995, DA: 7/14/11, Madeline)

In addition, animal studies have indicated that while ovulation, copulation, and fertilization may occur in space, there are potentially serious implications for resulting offspring (Santy, Jennings, and Craigie 1989). According to one informant, a reproductive scientist, embryos and fetuses may be impaired during space flight. The physical movement necessary for fetal development on Earth may be impossible in a weightless environment. If fetuses experience the same physiological deconditioning that adults do, this could severely impact fetal growth and development. This raises a possibility that fetuses which develop in a space environment may be unable physiologically to return to Earth once they are born. Would fiscal, materia], and moral responsibility for "space babies" then fall on the astronauts who birth them, or on the country, corporation, or movie star who sponsored the mission? Scientific accounts of sexual reproduction thus stress the problematic nature of female bodies and raise a number of intriguing questions about the construction of sex differences in outer space. In short, NASA has chosen to define reproduction and sexuality as synonymous and interchangeable. A simplified relationship would look like this: sexuality = men fucking women — reproduction. There are two contradictory readings here. First, NASA's long-term political goals include colonization of space as discussed earlier, which requires propagating the human species in a space environment. Given current reproductive conditions, female bodies are a necessary "space" for the creation and maintenance of fetuses. In such a reading, heterosexual sex becomes a necessary means through which reproduction is accomplished, especially given the limited use of assisted reproductive technologies in space. In this framing, NASA's reluctance to talk about sex seems somewhat puzzling. If the agency wants to colonize, it needs women and it needs heterosexual sex. Yet a second reading, drawing on the above data on reproduction, tells us that there is a fundamental problem with NASA's colonization goals.).

### Infertility in space

Taylor ‘11

(Jerome, The Independent news reporter, “Why infertility will stop humans colonising in space,”http://www.independent.co.uk/news/science/why-infertility-will-stop-humans-colonising-space-2213861.html, 2/14/11, DA: 7/15/11, Madeline)

The prospect of long-term space travel has led scientists to consider, increasingly seriously, the following conundrum: if travelling to a new home might take thousands of years, would humans be able to successfully procreate along the way? The early indications from Nasa are not encouraging. Space, it seems, is simply not a good place to have sex. Related articles Mock Mars mission simulates landing on Red Planet Leading article: Children of the stars Search the news archive for more stories According to a review by three scientists looking into the feasibility of colonising Mars, astronauts would be well advised to avoid getting pregnant along the way because of the high levels of radiation that would bombard their bodies as they travelled through space. Without effective shielding on spaceships, high-energy proton particles would probably sterilise any female foetus conceived in deep space and could have a profound effect on male fertility. "The present shielding capabilities would probably preclude having a pregnancy transited to Mars," said radiation biophysicist Tore Straume of Nasa's Ames Research Center in an essay for the Journal of Cosmology. The DNA which guides the development of all the cells in the body is easily damaged by the kind of radiation that would assail astronauts as they journeyed through space. Studies on non-human primates have shown that exposure to ionising radiation kills egg cells in a female foetus during the second half of pregnancy. "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," Dr Straume said. Radiation in space comes from numerous sources but the two types that have Nasa scientists most concerned are solar flares and galactic cosmic rays. Flares are the result of huge explosions in the Sun's atmosphere that catapult highly charged protons across space. The Earth's atmosphere and magnetic field absorbs much of this harmful radiation – but in space astronauts are much more vulnerable. Galactic cosmic rays pose an even greater threat. They are made up of even heavier charged particles. Although Nasa's shields can protect astronauts against most flare radiation, it is unlikely they could do the same against cosmic rays.

### Radiation in space causes infertility

Walker ‘11

(James, news writer, “Infertility Concerns May Leave Space Colonization Hopes Barren,” <http://www.gearfuse.com/infertility-concerns-may-leave-space-colonization-hopes-barren/>, 2/14/11, DA: 7/15/11, Madeline)

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, “

### Reproduction impossible in outer space

Mick ‘11

(Jason, writer for DailyTech, “Researchers Study Sex and Pregnancy in Space, Say it Will be Hard,” (blog) <http://www.dailytech.com/Researchers+Study+Sex+and+Pregnancy+in+Space+Say+it+Will+be+Hard/article20904.htm>, 2/14/11, DA: 7/15/11, Madeline)

Looking to penetrate deep into realms where scientists seldom explore, NASAbiophysicist Tore Straume [profile] (Ames Research Center), radiation expert and particle physicist Steve Blattnig (Langley Research Center), and Cary Zeitlin [profile] (Lawrence Berkley National Laboratory), explored the logistics of sex and procreation in space. Their conclusions? It would be hard -- very hard. Would-be space colonists looking to procreate in space would have it very rough, according to the report. One of the biggest dangers would be from cosmic rays. The high-energy protons encountered in deep space could harm male sperm. They would also likely sterilize any human fetuses conceived in space. The embryo would likely die during the second half of the pregnancy from these rays. The only solution would be to adopt better protection, but mankind doesn't currently have a sufficient technology. States Dr. Straume, "The present shielding capabilities would probably preclude having a pregnancy transited to Mars." An even greater danger would be solar flares. Solar flares are giant squirts of matter and energy from the sun during periods of intensely hot solar activity. These solar events would likely bombard the space explorers with even more radiation, raising their risk of miscarriage and infertility. Also dangerous are high-energy cosmic rays that can travel millions of light years and carry tremendous energy. Without a way to block these damaging particles, they would likely pass through the spaceship, further damaging the astronauts’ gonads. When it comes to solar shielding, it appears scientists still have trouble getting it up to speed

### Reproduction not possible in space –cosmic rays and solar flares hamper

Walker 2/14/11

(James, “Infertility Concerns May Leave Space Colonization Hopes Barren,” <http://www.gearfuse.com/infertility-concerns-may-leave-space-colonization-hopes-barren/>, Gearfuse, Science and Technology news agency,2/14/11, DA: 7/14/11, Madeline)

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, “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.Once the colonists reach Mars, the combination of the planet’s atmosphere and shielding from the structures that will almost certainly be built on the planet’s surface will provide some shielding against the radiation. Seeing as how it’s calculated that any manned mission to Mars would take roughly 214 days, this could be seen as more of an issue for colonization outside of the Solar System. After all, there are D&D fans (including this writer, sadly) that have gone longer than seven months without making the beast with two backs, so one would think that trained astronauts could easily practice self-restraint while hurtling towards the Red Planet.

### **No pregnancy in space–lack of gravity and cosmic radiation endanger**

Boyle ‘6

(Alan, Science Editor for msnbc, “Outer-space sex carries complications,” <http://www.msnbc.msn.com/id/14002908/>, 7/24/06, DA: 7/13/11, Madeline)

For example, Russian studies with pregnant rats showed a 13 to 17 percent arrest in the development of nearly every area of the fetal skeleton in zero-G, he said. Logan also noted that the proper formation of neural connections — a process that continues even after birth — requires movement under gravity loading. Immune functions are also compromised in microgravity. Logan isn't worried so much about the early weeks of pregnancy, but he said studies have shown that gravity should play a significant role for human fetuses after about 26 weeks of gestation. "This has significant implications for the colonization of the solar system," he said. Multigenerational life might be impossible without at least some gravity. As an alternative, future space settlers might create artificial gravity — say, on spinning spacecraft like the wheel-like space station portrayed in "2001: A Space Odyssey." How much gravity? So how much gravity is enough? The one-sixth gravity of the moon, or the one-third gravity of Mars? So far, no one knows, Logan said. "We still do not have an inkling of what the 'gravity prescription' is," he said. "Think of gravity as a medication. We don't know the dose, we don't know the frequency, and we don't know the side effects." Cosmic radiation in the space environment is another worry surrounding fetal development in space — and Logan said there may be a synergistic relationship between radiation and the ill effects of zero-G on the fetus. The unknowns are of such great concern that, given the current state of our knowledge, pregnancy in space would be "very dangerous," he said.

(Jim Logan is a NASA physician)

# Solvency – Mechanism

Technology used for the elevator is dangerous to human health

Edwards 03, (Bradley C. Edwards, Ph.D., Eureka Scientific, The Space Elevator NIAC Phase II Final Report, <http://www.isdc2007.org/resources/library/spaceelevator/2003-SpaceElevator-NIAC-phase2.pdf>)

A second health concern is on the use of carbon nanotubes. With any new material there is a question of whether it will cause biological damage when inhaled or ingested. To answer this question we have begun a set of studies to find out what might happen if raw carbon nanotubes or carbon nanotube composites got into a biological system. This would be a concern both during production of carbon nanotube composites and in the event of the ribbon catastrophically returning to Earth. The initial tests conducted by Dr. Russell Potter at Owens-Corning found that carbon nanotubes do not disintegrate in lung fluid. This is to be expected due to the nature of nanotubes. It implies that if carbon nanotubes get into the lungs that it could remain there for a long time. The next question is how well carbon nanotubes and carbon nanotube composites are inhaled or ingested and do they cause any damage in these cases. Dr. Brain at Harvard is currently conducting tests on mice to learn more about this. His initial results are expected soon. Initial results on prior rabbit studies reported by Foster-Miller also showed no adverse effects from carbon nanotube ingestion. Damage in a biological system results when a material is: 1) inhaled, 2) not re-exhaled, 3) remains in the organism for a long period of time, and 4) creates damage to the organism while inside. Our initial results for carbon nanotubes demonstrated that number three is true. Number one is clearly true. Number two and four need further study. Due to the small size of carbon nanotubes it is possible that they will be exhaled like any other single molecule and not remain in the lungs and that because of their small size they may cause no real damage. These are the questions that still need to be answered

# Solvency – Location

## Solvency Takeout—Microgravity Childern

### Low Gravity destroys proper child growth: Makes colonization impossible.

Phil For Humanity 11(Website dedicated to providing ideas and suggestions for the continued survival and perpetuation of humankind: Why The moon will never be colonized: http://www.philforhumanity.com/Colony\_on\_the\_Moon.html)

The Moon will never be colonized for a single reason. Basically, the Moon’s gravity is less than 17% of Earth’s gravity, and people can not survive long periods of time at such low gravity. Even though people could easily survive short time periods in this low gravity, it would be extremely unhealthy for prolonged periods of time especially when returning to Earth. For instance, long stays in low gravity can and will result with significant loss in bone density and muscle atrophy, just to name the two most common issues with low gravity. However, assuming that the colonization of the Moon is a one-way ticket without ever returning back to Earth and Earth’s higher gravity, adults could live relatively long and mostly healthy lives on the Moon. The bigger problem with colonizing the Moon is the effects that low gravity will have on children. The human development process has evolved perfectly with Earth’s high gravity. On the Moon, children would most likely develop severe and possibly fatal deformities under low gravity. For instance, their bones would be extremely brittle and break often. Their hearts would be very weak and never fully develop, as well as possibly all of their other muscles too. Children would literally grow to extreme heights that will cause severe complications on the spinal cord and digestive systems, because these organs have limited stretching capabilities. As a result, colonists on the Moon might not be able to have healthy children capable of living long enough to have children of their own. In my opinion, a colony with little or no possibility of children has no future and is not really a colony. Furthermore in my opinion, no one would even try to start a colony on the Moon knowing the health risks of themselves and their children. As a result, I firmly believe there will never be a colony on the Moon. Of course, mankind can and will use the Moon for several other purposes, such as mining, factories, recreation, military, science and research just to name a few ideas. However, long term colonization on the Moon is not wise. I would even imagine that governments and businesses would ban long stays on the Moon for all pregnant women and children just as a precaution. The only exception that I can think of is if scientists can one day create artificial gravity on the Moon. Unfortunately, this only exists in science fiction right now, so I believe there will never be a colony on the Moon.

## Solvency Takeout- Microgravity Colonization

### Humans cannot survive in Microgravity: Laundry List

Hall 97(Theodore, March: ADVERSE EFFECTS OF WEIGHTLESSNESS: Worked for NASA on a project about Microgravity: http://www.spacefuture.com/archive/artificial\_gravity\_and\_the\_ architecture\_of\_orbital\_habitats.shtml

It is ironic that, having gone to great expense to escape Earth gravity, it may be necessary to incur the additional expense of simulating gravity in orbit. Before opting for artificial gravity, it is worth reviewing the consequences of long-term exposure to weightlessness.**fluid redistribution**: Bodily fluids shift from the lower extremities toward the head. This precipitates many of the problems described below [1, 2].**fluid loss:** The brain interprets the increase of fluid in the cephalic area as an increase in total fluid volume. In response, it activates excretory mechanisms. This compounds calcium loss and bone demineralization. Blood volume may decrease by 10 percent, which contributes to cardiovascular deconditioning. Space crew members must beware of dehydration [1, 3]. electrolyte imbalances: Changes in fluid distribution lead to imbalances in potassium and sodium and disturb the autonomic regulatory system [2, 3].**cardiovascular changes:** An increase of fluid in the thoracic area leads initially to increases in left ventricular volume and cardiac output. As the body seeks a new equilibrium, fluid is excreted, the left ventricle shrinks and cardiac output decreases. Upon return to gravity, fluid is pulled back into the lower extremities and cardiac output falls to subnormal levels. It may take several weeks for fluid volume, peripheral resistance, cardiac size and cardiac output to return to normal [3, 4, 5]. **red blood cell loss**: Blood samples taken before and after American and Soviet flights have indicated a loss of as much as 0.5 liters of red blood cells. Scientists are investigating the possibility that weightlessness causes a change in splenic function that results in premature destruction of red blood cells. In animal studies there is some evidence of loss through microhemorrhages in muscle tissue as well [5, 6]. **muscle damage:** Muscles atrophy from lack of use. Contractile proteins are lost and tissue shrinks. Muscle loss may be accompanied by a change in muscle type: rats exposed to weightlessness show an increase in the amount of "fast-twitch" white fiber relative to the bulkier "slow-twitch" red fiber. In 1987, rats exposed to 12.5 days of weightlessness showed a loss of 40 percent of their muscle mass and "serious damage" in 4 to 7 percent of their muscle fibers. The affected fibers were swollen and had been invaded by white blood cells. Blood vessels had broken and red blood cells had entered the muscle. Half the muscles had damaged nerve endings. The damage may have resulted from factors other than simple disuse, in particular: stress, poor nutrition, and reduced circulation - all of which are compounded by weightlessness; and radiation exposure - which is independent of weightlessness. There is concern that damaged blood supply to muscle may adversely affect the blood supply to bone as well [4, 5, 6, 7]. **bone damage:** Bone tissue is deposited where needed and resorbed where not needed. This process is regulated by the piezoelectric behavior of bone tissue under stress. Because the mechanical demands on bones are greatly reduced in micro gravity, they essentially dissolve. While cortical bone may regenerate, loss of trabecular bone may be irreversible. Diet and exercise have been only partially effective in reducing the damage. Short periods of high-load strength training may be more effective than long endurance exercise on the treadmills and bicycles commonly used in orbit. Evidence suggests that the loss occurs primarily in the weight-bearing bones of the legs and spine. Non-weight-bearing bones, such as the skull and fingers, do not seem to be affected [1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15]. **hypercalcemia:** Fluid loss and bone demineralization conspire to increase the concentration of calcium in the blood, with a consequent increase in the risk of developing urinary stones [1, 4]. **immune system changes:** There is an increase in neutrophil concentration, decreases in eosinophils, monocytes and B-cells, a rise in steroid hormones and damage to T-cells. In 1983 aboard Spacelab I, when human lymphocyte cultures were exposed in vitro to concanavalin A, the T-cells were activated at only 3 percent of the rate of similarly treated cultures on Earth. Loss of T-cell function may hamper the body's resistance to cancer - a danger exacerbated by the high-radiation environment of space [1, 3, 5, 16]. **interference with medical procedures:** Fluid redistribution affects the way drugs are taken up by the body, with important consequences for space pharmacology. Bacterial cell membranes become thicker and less permeable, reducing the effectiveness of antibiotics. Space surgery will also be greatly affected: organs will drift, blood will not pool, and transfusions will require mechanical assistance [1, 3, 17]. **vertigo and spatial disorientation:** Without a stable gravitational reference, crew members experience arbitrary and unexpected changes in their sense of verticality. Rooms that are thoroughly familiar when viewed in one orientation may become unfamiliar when viewed from a different up-down reference. Skylab astronaut Ed Gibson reported a sharp transition in the familiarity of the wardroom when rotated approximately 45 degrees from the "normal" vertical attitude in which he had trained. There is evidence that, in adapting to weightlessness, the brain comes to rely more on visual cues and less on other senses of motion or position. In orbit, Skylab astronauts lost the sense of where objects were located relative to their bodies when they could not actually see the objects. After returning home, one of them fell down in his own house when the lights went out unexpectedly [4, 18]. **space adaptation syndrome:** About half of all astronauts and cosmonauts are afflicted. Symptoms include nausea, vomiting, anorexia, headache, malaise, drowsiness, lethargy, pallor and sweating. Susceptibility to Earth-bound motion sickness does not correlate with susceptibility to space sickness. The sickness usually subsides in 1 to 3 days [4, 5]. **loss of exercise capacity:** This may be due to decreased motivation as well as physiological changes. Cosmonaut Valeriy Ryumin wrote in his memoirs: "On the ground, [exercise] was a pleasure, but [in space] we had to

**Cont.**

force ourselves to do it. Besides being simple hard work, it was also boring and monotonous." Weightlessness also makes it clumsy: equipment such as treadmills, bicycles and rowing machines must be festooned with restraints. Perspiration doesn't drip but simply accumulates. Skylab astronauts described disgusting pools of sweat half an inch deep sloshing around on their breastbones. Clothing becomes saturated [1, 19]. **degraded sense of smell and taste:** The increase of fluids in the head causes stuffiness similar to a head cold. Foods take on an aura of sameness and there is a craving for spices and strong flavorings such as horseradish, mustard and taco sauce [1, 4]. **weight loss:** Fluid loss, lack of exercise and diminished appetite result in weight loss.

Space travelers tend not to eat enough. Meals and exercise must be planned to prevent excessive loss [1, 19]. **flatulence:** Digestive gas cannot "rise" toward the mouth and is more likely to pass through the other end of the digestive tract - in the words of Skylab crewman-doctor Joe Kerwin: "very effectively with great volume and frequency" [1]. **facial distortion:** The face becomes puffy and expressions become difficult to read, especially when viewed sideways or upside down. Voice pitch and tone are affected and speech becomes more nasal [1]. **changes in posture and stature:** The neutral body posture approaches the fetal position. The spine tends to lengthen. Each of the Skylab astronauts gained an inch or more of height, which adversely affected the fit of their space suits [1, 20]. **changes in coordination:** Earth-normal coordination unconsciously compensates for self-weight. In weightlessness, the muscular effort required to reach for and grab an object is reduced. Hence, there is a tendency to reach too "high" [21]. Many of these changes do not pose problems as long as the crew remains in a weightless environment. Trouble ensues upon the return to life with gravity. The rapid deceleration during reentry is especially stressful as the apparent gravity grows from zero to more than one "g" in a matter of minutes. In 1984, after a 237-day mission, Soviet cosmonauts felt that if they had stayed in space much longer they might not have survived reentry [3]. In 1987, in the later stages of his 326-day mission, Yuri Romanenko was highly fatigued, both physically and mentally. His work day was reduced to 4.5 hours while his sleep period was extended to 9 hours and daily exercise on a bicycle and treadmill consumed 2.5 hours. At the end of the mission, the Soviets implemented the unusual procedure of sending up a "safety pilot" to escort Romanenko back to Earth [22]. Soviet cosmonauts Vladimir Titov and Moussa Manarov broke the one-year barrier when they completed a 366-day mission on 21 December 1988. Subsequent Russian missions have surpassed that. These long-duration space flights are extraordinary. They are milestones of human endurance. They are not models for space commercialization

## Solvency Takeout- Microgravity

### **Long Space travel not feasible: Major health impacts**

Chavis 10(Jason, Sept 14: Possible Cons of Space Exploration: He is the author of a variety of publications including USA Today: http://www.brighthub.com/science/space/articles/86999.aspx)

Microgravity creates a number of physical effects that can be considered one of the cons of space expeditions. Those astronauts and cosmonauts taking part in missions to low Earth orbit for long durations have been found to suffer from numerous problems. Among the most common effects of a weightless environment include bone density issues, a decline in muscular strength, and issues with aerobic ability. These can lead to higher potentials of injury among the personnel, especially in regards to long term spaceflights. Scientists have also found that weightless environments create a feeling of disorientation, and even basic motion sickness. Upon a return to gravity, astronauts must readjust to its effects. This can be considerably important in regards to potential space travel to other planetary bodies in the Solar System. For example, if NASA attempted a mission to Mars, the personnel would be subject to the weightless environment for a sustained period of time. Upon arrival, they could find themselves with a 25 percent loss in muscle strength as well as possessing fragile bones. An astronaut could take one step out of the landing vehicle and possibly break a leg, creating an emergency that could compromise the mission.

# \*\*\*OFFCASE\*\*\*

# Moon Agreement CP

### CP TEXT: The United States federal government should accede to the Moon Agreement to [insert plan text]

### CP TEXT: The United States federal government should accede to the Moon Agreement to develop and implement a strategy to return astronauts to the Moon, in order to establish a permanent human presence in space as soon as is feasible

### Acceding to the Moon Agreement is the best way to solve – avoids international controversy

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

Ratifying the Moon Agreement, under conditions which assure that a lunar resource regime acceptable to the United States will eventually be established under articles 11 and 18 of the agreement may be the simplest way of achieving the U.S. objective of providing a stable legal and political environment in support of a long-term commitment to an He-3-based fusion energy program. The arguments in favor of reconsidering the past refusal of the United States to ratify the Moon Agreement are as follows. First, the Moon Agreement is currently the principal "game in town"-the only international instrument specifically designed to deal with issues relating to the exploration of the Moon and the use of its resources. It represents the best efforts and embodies the carefully considered compromises and pragmatic accommodations of some seven years of negotiation by the United States and the principal space powers and other states most concerned. As indicated, the United States fully participated and achieved most of its objectives in this long, drawn-out negotiation. 144 With the arguable exception of article 11, the agreement provides a broadly sensible and noncontroversial set of rules for the conduct of lunar activities already in place. 145

### US accession leads to wider participation from the world

Bilder 09 [Fordham International Law Journal Vol. 33, Issue 2, 2009, Article 1, “A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options”, Richard B. Bilder – prof. @ University of Wisconsin]

It is true, of course, that U.S. accession to the Moon Agreement would involve risks, such as those raised in the 1980 Senate hearings, based on a pessimistic prediction of the likely outcome of any eventual article 11 and 18 negotiations. 152 Thus, U.S. accession might well encourage wider participation in the agreement by many non-space powers and developing statescountries that might have a different ideology and approach to the exploitation of lunar resources from that of the United States. Conceivably, if these nations constituted a majority of parties to the agreement, they might succeed in imposing a resource regime unacceptable to the United States in any future article 11 and 18 negotiations. In this event, U.S. accession to the Moon Agreement could result in embedding and legitimating a lunar resource regime embodying principles contrary to U.S. interests. Moreover, U.S. accession might, in this case, effectively preclude its pursuit of alternative, more hopeful strategies. While it is true that under the agreement the U.S. is not legally obliged to agree to any eventual international regime that it does not like, it might by that time be impractical for the United States to either "go it alone" or seek some other agreement.

### Now is the key time to return to space – the US is losing sight of space benefits and patriotism

Jeffrey 5/26 [Terrence P Jeffrey, Editor in Chief of CNS News, “Former Moon Astronaut and Senator: U.S. Should Settle Moon and Mars” http://www.cnsnews.com/news/article/former-moon-astronaut-and-senator-us-sho, 5/26/2011]

Schmitt, who holds a doctorate in Geology from Harvard, was accepted into NASA’s Scientist-Astronaut program in 1965. In 1972, he served on the three-man crew of Apollo 17, the last U.S. mission to the moon. On Dec. 12 of that year, he and fellow astronaut Eugene Cernan landed in the lunar module in the moon’s Valley of Taurus-Littrow. Cernan exited the module first followed by Schmitt, making Schmitt the last human being to set foot on the moon. Schmitt, a Republican, was elected to the U.S. Senate from New Mexico in 1976 and served one term. He later became chairman of the NASA Advisory Council. He now believes America’s political leadership, and particularly the Obama administration, has lost sight of the importance of the United States leading the world in space exploration. Schmitt believes that reinvigorating the U.S. manned space program would not only yield practical benefits but lift up the hope that America’s unique vision of liberty—as opposed to other political visions--will be carried with the human race to places such as the moon and Mars. When asked whether he believes that a sense of patriotism and the idea that America should be first has been drained out of the space program, Schmitt said: “Well, it certainly has been drained out of the national leadership, particularly the Obama administration. I don’t think it has drained out of the American people. Space is still very exciting to them. I think the vast majority recognize that the United States represents liberty and freedom on this planet and if it is not competitive in space, well then, liberty and freedom are in further jeopardy than they are for other reasons.” “The NSEA [National Space Exploration Administration] would be given the charter to explore deep space, which includes the moon, to settle the moon, and ultimately potentially to settle Mars, and to help the private sector utilize the resources, the energy resources in particular, that we find on the moon,” said Schmitt. “Its primary focus--almost single-minded focus--should be on building the space launch vehicles, the spacecraft, and the operational capability to work at the moon, distances of the moon, and ultimately to Mars and beyond,” he said. Schmitt says that in the long-term the moon “would be another location for the forces of freedom to, I think, grow and prosper.” In the nearer term he believes that the U.S. could retrieve Helium-3 from the moon, an isotope that is abundant on the lunar surface and that Schmitt says is an ideal fuel for nuclear fusion reactors that could create electricity without creating radioactive spent fuel. “More immediately such a [lunar] settlement would be able to supply the Earth with very important clean energy in the form of a light isotope of Helium called Helium-3,” said Schmitt. “That is a literally ideal fuel for nuclear fusion reactors.”

# Privatization CP

## Solvency – General/NASA

### NASA should move aside- privatization should take place. Boaz, 08 ( David, “Space Privatization”, The Cato Institute, September 15th, 2008, Access Date\_7/17/11).

In the premier issue of BBC Knowledge, the Cambridge University astrophysicist Martin Rees makes several provocative arguments about manned space flight. They are: The completion of the International Space Station (ISS) comes with a price tag of $50 billion, with the only profit being the cooperation with foreign partners. There is no scientific, commercial, or military value in sending people to space. Future expeditions to the Moon and beyond will only be politically and financially feasible if they are cut-price ventures. He concludes that fostering good relations with other countries is insufficient justification for the expenditures, and that NASA should move aside and allow the private sector to play a role in manned space flight. The cost of these activities must lessen if they are to continue, and that will only happen with a decrease or removal of government involvement. Rees observes that only NASA deals with science, planetary exploration, and astronauts, while the private sector is allowed to exploit space commercially for things such as telecommunications. However, there is no shortage of interest in space entrepreneurship: wealthy people with a track record of commercial achievement are yearning to get involved. Rees sees space probes plastered with commercial logos in the future, just as Formula One racers are now.

### NASA feels this is the right time to transition to the private sector. Kluger, 10 (Jeffery, “Astronauts Inc.: The Private Sector Muscles Out NASA”, a senior writer at TIME Magazine, and author of several books on science topics, December 17th, 2010, Access Date\_7/17/11).

"It's a historical truth that government goes into those areas in which there is no private-sector profit motive, and the private sector follows behind," says Phil McAlister, acting director of NASA's Commercial Space Flight Development team. "We think the time is right to transition that part to the private sector." Such transitions are usually slow, but Musk, a space newbie, sees no reason to wait. His press conference was equal parts Q&A and touchdown dance — and that raised eyebrows. "People sometimes assume that to take a cargo spacecraft and put a crew into it requires this enormous amount of magical pixie dust or something," he said. "This is not the case. If there had been people sitting in the Dragon capsule today, they would have had a very nice ride."

### NASA wants to private sector to get involved- but NASA will still be an active contributer. NASA, 11 (“NASA Invests in Private Sector Space Flight with SpaceX, Rocketplane-Kistler”, <http://www.nasa.gov/exploration/news/COTS_selection.html>, June 16th, 2011, Access Date\_7/17/11).

NASA is making an unprecedented investment in commercial space transportation services with the hope of creating a competitive market for supply flights to the International Space Station (ISS). Two industry partners will receive a combined total of approximately $500 million to help fund the development of reliable, cost-effective access to low-Earth orbit. The agency is using its Space Act authority to facilitate the demonstration of these new capabilities. NASA signed Space Agreements Aug. 18 with Space Exploration Technologies (SpaceX) of El Segundo, Calif., and Rocketplane-Kistler (RpK) of Oklahoma City to develop and demonstrate the vehicles, systems, and operations needed to support a human facility such as ISS. Once the space shuttle is retired, NASA hopes to become just one of many customers for a new, out-of-this-world parcel service. he venture marks a break with tradition for the 48-year-old space agency. “This is the first opportunity NASA has taken to engage entrepreneurs in a way that allows us to satisfy our needs and lets commercial industry gain a foothold. It could, and should, have profound impacts on the way NASA does business,” said Marc Timm, acting Commercial Orbital Transportation Services (COTS) Program executive in NASA’s Exploration Systems Mission Directorate. Alan Lindenmoyer, manager of the Commercial Crew and Cargo Program Office at NASA's Johnson Space Center, said NASA's offer of seed money fulfills President Bush's Jan. 14, 2004 directive to promote commercial participation in space exploration. The 2005 NASA Authorization Act also calls on the agency to advance space commerce. "We are directly tied to the Vision for Space Exploration and the law of the land," Lindenmoyer said. "COTS marks a significant NASA activity to implement the commercialization portion of U.S. space policy." The demonstrations are scheduled to begin as early as 2008 and continue through 2010 or later. COTS will be carried out in two phases. Phase 1, unveiled Aug. 18, will include safe disposal or return of spacecraft that successfully dock at ISS and deliver cargo. A follow-on option to demonstrate crew transportation also is planned. Once demonstrated, NASA plans to purchase transportation services competitively in Phase 2.

### Space privatization is inevitable. Kluger, 10 (Jeffery, “Astronauts Inc.: The Private Sector Muscles Out NASA”, a senior writer at TIME Magazine, and author of several books on science topics, December 17th, 2010, Access Date\_7/17/11).

The privatization of at least some of the manned space program has been inevitable for a while — particularly since 2003, when the loss of the shuttle Columbia made it clear that the entire aging shuttle fleet was becoming too risky to fly. NASA had made only the sketchiest plans for a shuttle replacement, so in 2006, Griffin created an office called Commercial Orbital Transportation Services (COTS) within the agency to draw private companies into the business of helping to deliver cargo and crew to the International Space Station, even as NASA developed its own Earth-orbital rockets too.

### NASA supports the commercial development of space. Rubin, 10 (Courtney, “New NASA Policy Opens Up Space Market”, a contributing editor at Inc. a Scientific publication, February 17th, 2010, Access Date\_7/18/11).

On Feb. 2, NASA also announced $50 million in awards to support the commercial spaceflight efforts of five other companies. Colorado's Sierra Nevada Corp was the big winner, picking up $20 million to develop its seven-person Dream Chaser craft. Amazon.com founder Jeff Bezos's Blue Origin won $3.7 million to develop a launch escape system and build a crew-carrying module, and Paragon Space Development Corp (No. 953 on Inc.'s 2009 5000) won $1.4 million to perfect its environmental control and life support air vitalization system. Other winners: Boeing, which picked up $18 million for its own seven-person space capsule, and the United Launch Alliance, a Boeing-Lockheed Martin joint project, which received $6.7 million to develop a way to monitor the health of unmanned rockets that could be recycled to launch manned spacecraft.

### Best option for the future of space exploration. Discover Magazine, 10 (“Obama’s NASA Budget: So Long, Moon Missions; Hello, Private Spaceflight”, February 1st, 2010, Access Date\_7/18/11).

Lost in the furor over Constellation is the fact that Obama’s budget actually increases NASA funding slightly. And as DISCOVER blogger Phil Plait points out at Bad Astronomy, private companies were on track to reach orbit faster than the Constellation program even before this proposed sea change in the government’s approach to spaceflight. Even a fully-funded Constellation program would not have gone back to orbit until at least 2015, leaving a five-year gap after this year’s pending space shuttle retirement with no way for Americans to reach orbit other than hitching a ride with the Russians. NASA had seen lots of infighting over whether Constellation, and especially its Ares rockets, were the right approach. Now it might have to accept losing them for good.

### Privatization- next chapter to the US space industry. Pasztor, 10 (Andy, “White House Decides to Outsource NASA Work”, The Wall Street Journal, January 24th, 2010, Access Date\_7/18/11).

The White House has decided to begin funding private companies to carry NASA astronauts into space, but the proposal faces major political and budget hurdles, according to people familiar with the matter. The controversial proposal, expected to be included in the Obama administration's next budget, would open a new chapter in the U.S. space program. The goal is to set up a multiyear, multi-billion-dollar initiative allowing private firms, including some start-ups, to compete to build and operate spacecraft capable of ferrying U.S. astronauts into orbit—and eventually deeper into the solar system.

### Private sector- helping NASA’s advancements. Milstein, 09 (Michael, “NASA Makes Space U-Turn, Opening Arms to Private Industry”, Popular Mechanics, October 1st, 2009, Access Date\_7/19/11).

NASA has undergone a cultural revolution, compared to the 1980s and 1990s, in its attitude toward the private sector, says David Gump, president of Transformational Space Corp., which had an early contract with NASA to help design a new space capsule. He notes that NASA turned away Dennis Tito, the first suborbital tourist, but later tried to help pop star Lance Bass reach space. Gump says this signals the agency's emphasis on public attention and appeal, says Gump, who insists that even space exploration must have commercial value if it's going to sustain itself over the long term.

### The new challenge is getting on the moon. Milstein, 09 (Michael, “NASA Makes Space U-Turn, Opening Arms to Private Industry”, Popular Mechanics, October 1st, 2009, Access Date\_7/19/11).

Private companies, for instance, may find commercial opportunities in space--be it mining the moon or holding lotteries for trips into space--that NASA might never notice or think to exploit. Those same opportunities may pay off for NASA by helping to make mass space transportation of cargo and crews more affordable, Gump says. "The main challenge of going back to the moon is doing it sustainably and affordably," he says. For that to happen, "We've got to move toward things that cost a lot less than they do now ... Governments in general are not willing to step up and take the risk necessary to get to that point. In government, you're only punished for failure. You're not really rewarded for success."

### Private sector involvement key to US space program. Paur, 09 (Jason, “Let Private Sector Help NASA”, FAA Experiments With Integrating Drones in Civil Airspace, August 20th, 2009, Access Date\_7/19/11).

“Really, we’ve given the White House a dilemma,” Norm Augustine, the former Lockheed Martin CEO leading the panel, told PBS last week. “The space program we have today, the human space flight program, really isn’t executable with the money we have. So, either we have to do something with the current program that’s not going to be very successful, I’m afraid, or spend a nontrivial sum more than that to have something that’s really exciting and workable, and that’s the challenge the White House is going to have, is to sort that out.”

### Private sector has plans for taking part with NASA. Paur, 09 (Jason, “Let Private Sector Help NASA”, FAA Experiments With Integrating Drones in Civil Airspace, August 20th, 2009, Access Date\_7/19/11).

Stevens raises some valid points, but he’s also got a clear agenda — SpaceX and other firms like it are competitors and ultimately could do the job faster, cheaper and better than NASA. The Orion program is unlikely to make it to the moon any time soon based on current budgets projected in the future. The review committee says the goal of getting back to the moon by 2020 is currently about $30 billion short. And unless an extra $3 billion a year is put back in to the NASA manned space budget, the International Space Station is likely to be the only destination in space for the United States for the foreseeable future

### Obama- privatization; only way the space program will survive. Navarro, 10 (Peter, “Peter Navarro: Privatization in space wise, to a point”, a Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University, May 17th, 2010, Access Date\_7/19/11).

To his credit, Mr. Obama is entirely correct that America's future in space can only be secured by a vibrant, free-market commercial space industry liberated from annual budget scares, quadrennial presidential campaigns and congressional meddling. Such a commercial space sector can serve as an essential catalyst to create the jobs and technologies needed to drive our economy in the 21st century.

## Solvency – Government Support for Privatization

### President and government fully commitment to US space exploration. Borenstein, 10 (Seth, “Obama lays Out Furute Of American Space Exploration”, Huffington Post, April 15th, 2010, Access Date\_7/17/11).

CAPE CANAVERAL, Fla. – President Barack Obama declared Thursday he was "100 percent committed to the mission of NASA and its future" as he outlined plans for federal spending to bring more private companies into space exploration following the soon-to-end space shuttle program. "We want to leap into the future," not continue on the same path as before, Obama said as he sought to reassure NASA workers that America's space adventures would soar on despite the termination of shuttle flights. Obama acknowledged criticism, even from some prominent astronauts, for his drastic changes to the space program's direction. But, he said, "The bottom line is: Nobody is more committed to manned space flight, the human exploration of space, than I am. But we've got to do it in a smart way; we can't keep doing the same old things as before." He said that by 2025 he expects U.S. space exploration to reach beyond the moon and further into the solar system's reaches.

### Government wants privatization of space now. Carlson, 09 (Nicholas, “Obama Wants To Privatize Space Travel”, a deputy editor at Business Insider, August 29th, 2009, Access Date\_7/17/11).

The Obama administration wants to outsource whole swaths of the space program to the private sector, the Wall Street Journal reports. Mostly, these private firms would be tasked with transporting cargo and astronauts into space. NASA would stick around, but proponents of the plan see it turning into a "conduit" for tech developed outside the federal government. There are plenty of other private-sector firms set to take advantage of the new policy, including Richard Branson's Virgin Galactic and United Launch Alliance, a joint venture between Boeing and Lockheed Martin.

### Obama doesn’t care about space- wants it to be privatized. Palmer, 11 (Michael, “NASA looks to private sector for future of space program”, July 9th, 2011, Access Date\_7/17/11).

Benaroya, the Rutgers professor, wasn’t just dismayed about the end of the shuttle program, but also the reset that is taking place in the United States’ policy on space. President Obama last year canceled the 6-year-old Constellation Project, which aimed to put American astronauts back on the Moon by 2020. The $97 million program had hit some major planning problems. "NASA was always underfunded, always had its budget cut by $1 [billion] to $2 billion a year, so the Constellation project was always being delayed and downsized, so that it was years behind schedule," Benaroya said. "This president was not interested in space," he said. "He wanted to privatize it, which I support, but there are certain things which corporations cannot do. And sending men to the Moon is not what they can do, because we need five to 10 years of research to do it, and there is no profit to be had there."

### Government support still in tact. Milstein, 09 (Michael, “NASA Makes Space U-Turn, Opening Arms to Private Industry”, Popular Mechanics, October 1st, 2009, Access Date\_7/19/11).

Financial support from NASA represents an important vote of confidence that should help space entrepreneurs leverage even more money from private investors, says XCOR Aerospace CFO Randy Baker. XCOR could take astronaut trainees or scientists to the edge of space on its small, agile space planes for perhaps $250,000, compared to the many millions NASA spends on each launch. At the same time, however, Baker says the company's business plan does not hinge on government support.

### Push for privatizing from Obama. CBS News, 10 (“Obama defends privatization of space travel”, April 15th, 2010, Access Date\_7/19/11).

"The bottom line is: nobody is more committed to manned space flight, the human exploration of space, than I am," Obama said. "But we've got to do it in a smart way; we can't keep doing the same old things as before." He said that by 2025, he expects U.S. space exploration to reach beyond the moon and farther into the solar system's reaches. During his visit to the space center, Obama visited the launch pads where U.S. space voyages begin. He said the space program is not a luxury but a necessity for the nation. The Kennedy Space Center launched Americans into space and has inspired a nation for half a century, Obama said. NASA represents what it means to be American, Obama said: "reaching for new heights and reaching for what's possible."

### White House supports privatizing NASA. Wall Street Journal, 10 (“NASA’s plan to return astronauts to the moon”, January 25th, 2010, Access date\_7/19/11).

The White House has decided to begin funding private companies to carry NASA astronauts into space, but the proposal faces major political and budget hurdles, according to people familiar with the matter. The controversial proposal, expected to be included in the Obama administration’s next budget, would open a new chapter in the U.S. space program. The goal is to set up a multiyear, multi-billion-dollar initiative allowing private firms, including some start-ups, to compete to build and operate spacecraft capable of ferrying U.S. astronauts into orbit—and eventually deeper into the solar system.

### Obama wants to accomplish goals through privatization. CBS News, 10 (“Obama defends privatization of space travel”, April 15th, 2010, Access Date\_7/19/11).

The president sought to reassure NASA workers that America's space adventures would soar on despite the termination of shuttle flights. Obama acknowledged criticism, even from some prominent astronauts, for his drastic changes to the space program but insisted he is not abandoning space exploration. He sought to explain why he aborted former president George W. Bush's return-to-the moon plan in favour of a complicated system of public-and-private flights that would go elsewhere in space, with details still to be worked out. "We've been there before," Obama said of the nation's moon landings decades ago. "There's a lot more of space to explore." He said his administration would support continued manned exploration of space "not just with dollars but with clear aims and a larger purpose." Obama's plan is to increase NASA's budget by $6 billion over five years and shift the responsibility for space transportation to private companies, which would be encouraged to "compete to design and build and launch new means of carrying people and materials out of our atmosphere." They would be responsible not just for designing and building the rockets and spaceships, which they largely do already, but also for conducting flights to the International Space Station.

## Solvency - Colonization

### Privatization key to space colonization. Dinkin, 04 (Sam, “Space privatization: road to freedom”, The Space Review, July 26th, 2004, Access Date\_7/17/11).

With no privatization and no military protection, there will not be much colonization. Antarctica may be free of the intellectual pollution brought by property rights, but there are also no citizens, no development and very little in the way of commercial exports. Alaska, in contrast, hands out checks to its citizens rather than charging them taxes. Antarctica is also more inaccessible, so there may be another explanation for the disparity.Texarkana offers a starker side-by-side comparison of different law leading to different levels of commerce. The city has a street running down the center of town where one side is governed by Arkansas law and the other is governed by Texas law. The main difference between the two jurisdictions is the ability to collect a high rate of interest (Arkansas caps their interest rate at 5% above the federal funds rate). This minor limitation on commerce means that there are many more stores on the Texas side of the street.

### Privatizing- key to colonization. Britt, 05 (Robert, “Privatization”, March 23rd, 2005, Access Date\_7/17/11).

The new use of NASA funds is a welcome shift to many space experts. Looking back NASA's early successes in human spaceflight and looking forward to more of it, legendary physicist and space colonization visionary Freeman Dyson suggested the space agency has crucial roles to play in the future. "Keep the space science going," the 81-year-old Dyson advised the agency. And "build the infrastructure" and set policies that encourage private enterprise to enter space. Dyson worked on the Orion project in the late 1950s. Orion was a parallel program to Apollo. It planned to detonate nuclear devices to launch a spacecraft. "The thing could have flown," he said. The project was dropped because of the now-obvious nuclear fallout problem, he said. Dyson sees humans eventually colonizing space; "because it is there, Howeve, he says there must first be "huge advances in propulsion." He thinks space travel should be for pleasure and sport. Competition with the Chinese, who now have their sights on the Moon, will be good for NASA, Dyson said. "If the Chinese push us, we'll go faster," he said.

### Privatization- the only way the US will return to the moon. The Economist, 10 (“Private-sector space flight- Moon dreams-The Americans may still go to the moon before the Chinese”, February 18th, 2010, Access Date\_7/17/11).

There are others with lunar ambitions, too. Some 20 teams are competing for the Google Lunar X Prize, a purse of $30m that will be given to the first private mission which lands a robot on the moon, travels across the surface and sends pictures back to Earth. Space Adventures, meanwhile, is in discussions with almost a dozen potential clients about a circumlunar mission, costing $100m a head. The original Apollo project was mainly a race to prove the superiority of American capitalism over Soviet communism. Capitalism won—but at the cost of creating, in NASA, one of the largest bureaucracies in American history. If the United States is to return to the moon, it needs to do so in a way that is demonstrably superior to the first trip—for example, being led by business rather than government. Engaging in another government-driven spending battle, this time with the Chinese, will do nothing more than show that America has missed the point.

### Privatization key way to expand moon exploration. Discover Magazine, 10 (“Obama’s NASA Budget: So Long, Moon Missions; Hello, Private Spaceflight”, February 1st, 2010, Access Date\_7/18/11).

Some space buffs are also mourning the loss of Constellation’s ambitious goal of reaching the moon by the end of this decade. However, budget director Orszag insisted to reporters that the new plan doesn’t close off the route to human exploration of the moon and the solar system’s planets–it just pushes these efforts back to an unspecified date. Orszag claimed that “advance robotics and other steps that will help to inspire Americans and not just return a man or a woman to the Moon but undertake the longer range research that could succeed in human spaceflight to Mars”

## Solvency – Sustainability

### Obama says privatization- more sustainable future for NASA. Chang, 10 (Kenneth, “Obama Plan Privatizes Astronaut Launchings”, science reporter for the New York Times, covering chemistry, geology, solid state physics, nanotechnology, January 28th, 2010, Access Date\_7/18/11).

President Obama will end NASA’s return mission to the moon and turn to private companies to launch astronauts into space when he unveils his budget request to Congress next week, an administration official said Thursday. he shift would “put NASA on a more sustainable and ambitious path to the future,” said the official, who spoke on condition of anonymity. But the changes have angered some members of Congress, particularly from Texas, the location of the Johnson Space Center, and Florida, the location of the Kennedy Space Center.

### Sustainability for the space program comes from the private sectors involvement. Spotts, 05 (Peter, “Beyond NASA: The push to privatize spaceflight”, Christina Science Moniter, July 21st, 2005, Access Date\_7/18/11).

"We want to go about space exploration in a more sustainable way" than the Apollo program did, says Brant Sponberg, who heads NASA's awards program. "We want to bring along other sectors of America with us; this shouldn't be a NASA-only activity. My ultimate hope is that when we're sending robotic landers to the moon early next decade, there might be some robotic landers that don't have the NASA insignia on them." Slowly, that scenario is beginning to unfold. In May, for example, the Federal Aviation Administration published guidelines for granting permits to companies wanting to test reusable suborbital rockets. The move follows the FAA's February publication of draft guidelines governing crews and passengers in private spacecraft. The FAA's authority to regulate the industry - first via guidelines, later with binding regulations - came through the Commercial Space Launch Amendments Act, which was signed into law in December.

## Solvency – Space Policy

### Private sector involvement makes the space program possible. Stiltzkin, 11 (“NASA’s making way to the private sector for space transportation”, July 16th, 2011, Access Date\_7/17/11).

Yet despite the shutting down of the American space shuttle program, according to NASA chief Charlie Bolden, the future of American human spaceflight remains bright. He says that private spaceflight firms will pick up NASA’s slack before too long, ferrying humans to low-Earth orbit and back relatively cheaply and efficiently. Such companies would be such as SpaceX which had launched a spacecraft called “Dragon” which has already orbited the Earth in a test run. They also tested a new Falcon Heavy Rocket which is the first to break the $1,000-per-pound-to-orbit barrier, a feat that many in the space industry thought wouldn’t happen for quite some time.

### Privatization of space- key to US space policy. Kluger, 10 (Jeffery, “Astronauts Inc.: The Private Sector Muscles Out NASA”, a senior writer at TIME Magazine, and author of several books on science topics, December 17th, 2010, Access Date\_7/17/11).

If old NASA hands winced at this kind of giddy talk, they kept it to themselves — and wisely so. In the face of contracting federal budgets and an expanding private sector, the space agency of the golden years is being blown up and rethought — transformed from a government operation into a public-private partnership that, so its advocates say, will replace the politics, stodginess and glacial pace of Washington with the speed, nimbleness and accountability of the marketplace. That door had been creaking open for a while, but the Obama Administration — facing towering debts and a nation in no mood to spend big on an indulgence like space — has kicked it wide, and Musk is not the only one rushing through. The Orbital Sciences Corporation of Dulles, Va., is vying with SpaceX for government recognition and government contracts. So too are traditional aerospace giants like Lockheed and Boeing, whose rockets are not currently intended to carry astronauts but, they insist, could be redesigned to be safe for humans in short order and at a reasonable price.

### Incorporating the private sector- will increase space program progress. Matson, 10 (John, “Phased Out: Obama's NASA Budget Would Cancel Constellation Moon Program, Privatize Manned Launches”, Scientific American, February 1st, 2010, Access Date\_7/18/11).

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."

### Progress is being made with help from the private sector. Spotts, 05 (Peter, “Beyond NASA: The push to privatize spaceflight”, Christina Science Moniter, July 21st, 2005, Access Date\_7/18/11).

The measure represents a significant step forward, says Carole Flores, manager of the licensing and safety division in the FAA's office of the associate administrator for commercial space transportation. It allows for government oversight without forcing the companies involved to first endure a drawn-out process of crafting formal regulations. Ms. Flores says her division had been anticipating some form of involvement in the human-spaceflight business since Dennis Tito bought a trip aboard a Russian rocket and became the first space tourist to visit the International Space Station in 2001. Studies indicated tourism would be the prime market initially for space travel outside government exploration efforts. But "we had a hard time convincing some people that this was real," she says. Then last fall, Burt Rutan's SpaceShipOne became the first private manned craft to reach space. That put space tourism "right up in front of people," Flores says.

## Solvency – Space Industry

### Privatization will increase competitiveness in the space industry. Sampson, 11 (Tim, “Privatized space travel is way of the future, McCaskill says”, July 8th, 2011, Access Date\_7/17/11).

“I think you’re still going to see a very aggressive space program, it’s just going to be fashioned differently in terms of a public-private partnership,” McCaskill said. Barring any delays, the space shuttle Atlantis is scheduled to carry four U.S. astronauts to the International Space Station for the program’s final mission. The space shuttle has been the sole American space transport vehicle for 30 years. American will continue to maintain an orbital presence, with astronauts traveling to and from the International Space Station on the Russian Soyuz spacecraft. But with China’s recently announced plans to build its own independent space station by the end of the decade, many are worried that America will lose its dominance in space.

### Privatization a welcomed option- drives prices and competition. Christie, 10 (Chris, “The New Jersey Privatization Task Force”, Governor of New Jersey, May 31st, 2010, Access Date\_7/18/11).

Leaders across the political spectrum have embraced privatization because it introduces competition in the delivery of public services and challenges public monopolies. Implemented properly, competition drives down costs and creates incentives for performance and results. In well‐structured outsourcing initiatives, contractors have strong incentives to deliver on performance—for instance, a vendor’s bottom line would be hurt by the cancellation of an existing contract or by losing to a competitor when that contract expires and is rebid. A public agency exposed to competition for the first time might be spurred to improve its own performance. Introducing competition helps managers determine their true costs and promotes innovation, efficiency and greater effectiveness in serving customers’ shifting demands.

### Privatizing space ensures growth in the industry. Rubin, 10 (Courtney, “New NASA Policy Opens Up Space Market”, a contributing editor at Inc. a Scientific publication, February 17th, 2010, Access Date\_7/18/11).

Musk – who has funnelled about $100 million of his own money into SpaceX – publicly insists the company financially can survive four Falcon 9 failures. (Whether the company can withstand them from a PR standpoint is another question.) "There should be absolutely zero question that SpaceX will prevail in reaching orbit and demonstrating reliable space transport," Musk told employees after the third unsuccessful launch of Falcon 1 in 2008. "For my part, I will never give up and I mean never."

### Privatization good for job market. Discover Magazine, 10 (“Obama’s NASA Budget: So Long, Moon Missions; Hello, Private Spaceflight”, February 1st, 2010, Access Date\_7/18/11).

Commercial Spaceflight Federation president Bretton Alexander was understandably giddy at the prospect of private companies taking center stage. “At a time when job creation is the top priority for our nation, a commercial crew programme will create more jobs per dollar because it leverages millions in private investment and taps the potential of systems that serve both government and private customers,” he said

### Private sector can help grow the space industry. Johnson, 11 (Clay, “What would be the benefits of privatizing NASA?”, known for his role in advocating for open source information in the federal government, June 17th, 2011, Access Date\_7/18/11).

Just as the Department of Defense moved to push flight to the private sector in the mid 20th century, and moved to push the Internet to the private sector in the late 20th century, NASA is pushing the private sector to do more space "stuff" in this century. Organizations like SpaceX can move faster without the regulatory hurdles and federal procurement process that NASA has to deal with. They can also offer things like stock to employees and have an initial public offering which, for obvious reasons, a government agency should not. The movement of those specific functions to the private sector tends to be a good thing because you have a field of space tourism that I think many people (including myself) are looking forward to. At the same time, NASA still needs to provide taxpayer funded research around space because it doesn't behoove the commercial sector to do it.

## Solvency – Timeframe

### Now is the perfect time for the private sector to get involved. Sampson, 11 (Tim, “Privatized space travel is way of the future, McCaskill says”, July 8th, 2011, Access Date\_7/17/11).

The final space shuttle mission is set to blast off from the Kennedy Space Center on Friday, marking the end of an era for the nation’s space program and raising questions about the next step. NASA budget cuts have put the future of the space agency in doubt – at least in the short term. A return to the moon first proposed by President George W. Bush in 2004 has been eliminated and a replacement vehicle for the shuttle is still years away. Missouri Senator Claire McCaskill said this could open the door for private, government-subsidized aerospace companies to make their first forays beyond the Earth’s atmosphere. A number of private companies, most notably Virgin Galactic, have been developing private space travel for several years in hopes of ferrying mega-rich tourists into low Earth orbit in the near future.

### Timing is key with privatization. Navarro, 10 (Peter, “Peter Navarro: Privatization in space wise, to a point”, a Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University, May 17th, 2010, Access Date\_7/19/11).

While we wholeheartedly agree with the president's privatization goals, we remain skeptical of the implementation schedule and wary of the implications for national security. While we have long been big fans of the private-sector companies working with passion in this field, we must also keep it real. At least to date, the private space sector has demonstrated very limited capability to move either cargo or crews into orbit or to dock with anything. Moreover, none is human-rated for orbital space flight while there are very difficult challenges requiring large infrastructure and access to larger investment.

## Solvency – Tech

### Privatization is the only way for NASA to make any tech progress. Milstein, 09 (Michael, “NASA Makes Space U-Turn, Opening Arms to Private Industry”, Popular Mechanics, October 1st, 2009, Access Date\_7/19/11).

Following the Capitol Hill mantra that saving money requires spending it, NASA has been signing big-ticket contracts with private space companies to match up their research and development with agency priorities. In February, NASA committed $170 million to Orbital Sciences of Dulles, Va., to help it develop reliable, economical vehicles to send cargo--and, eventually, people--into low Earth orbit. The agency has a similar agreement with Elon Musk's rocketeering powerhouse Space X, plus technology-sharing deals (sans funding) with five other companies.

## Net Benefits – Costs

### Private sector costs less than NASA for moon missions. David, 05 (Leonard, “Private Sector, Low-Cost Lunar Plan Unveiled”, November 21st, 2005, Access Date\_7/17/11).

A newly released study has focused on how best to return people to the Moon, reporting that future lunar missions can be done for under $10 billion - far less than a NASA price tag. The multi-phased three-year study was done by a private space firm, SpaceDev of Poway, California, and concluded that safe, lower cost missions can be completed by the private sector using existing technology or innovative new technology expected to be available in time to support human exploration of the Moon in the near-future. SpaceDev announced the results of its International Lunar Observatories Human Servicing Mission study last week at a meeting conducted by Lunar Enterprise Corporation (LEC), a wholly owned subsidiary of Space Age Publishing Company of Hawaii's Island, Hawaii, and Palo Alto, California. The study was funded by LEC.

### Private sector can get into space for less than NASA. The Economist, 10 (“Private-sector space flight- Moon dreams-The Americans may still go to the moon before the Chinese”, February 18th, 2010, Access Date\_7/17/11).

WHEN America’s space agency, NASA, announced its spending plans in February, some people worried that its cancellation of the Constellation moon programme had ended any hopes of Americans returning to the Earth’s rocky satellite. The next footprints on the lunar regolith were therefore thought likely to be Chinese. Now, though, the private sector is arguing that the new spending plan actually makes it more likely America will return to the moon. The new plan encourages firms to compete to provide transport to low Earth orbit (LEO). The budget proposes $6 billion over five years to spur the development of commercial crew and cargo services to the international space station. This money will be spent on “man-rating” existing rockets, such as Boeing’s Atlas V, and on developing new spacecraft that could be launched on many different rockets. The point of all this activity is to create healthy private-sector competition for transport to the space station—and in doing so to drive down the cost of getting into space.

### Privatizing space will allow for profits to be made. Rubin, 10 (Courtney, “New NASA Policy Opens Up Space Market”, a contributing editor at Inc. a Scientific publication, February 17th, 2010, Access Date\_7/18/11).

SpaceX, PayPal founder Elon Musk's upstart aerospace company, last week began piecing together the first version of a new rocket that could someday launch American astronauts into the stratosphere. This is spacecraft on a shoestring: To avoid costly, custom-made parts, the 900-person, eight-year-old company relies on refurbishments of those already on the shelf. Among them: An Apollo-era 125,000 gallon liquid oxygen tank (price tag: $86,000, the price of the scrap metal). As a result, the estimated cost of one of Musk's launches is a relatively affordable $100 million. It's all part of Musk's plan to usher in the era of low-cost space travel – well-timed, because last week's NASA 2011 budget request included a $6 billion boost over five years to privatize human space flights. The budget also cancelled the beleaguered Constellation program to build new rockets aimed at returning astronauts to the moon by 2020. (NASA poured $9 billion into Constellation with only one semi-successful test launch and years of delay as a result.)

### Good move for USFG budget. Pasztor, 10 (Andy, “White House Decides to Outsource NASA Work”, The Wall Street Journal, January 24th, 2010, Access Date\_7/18/11).

The White House's budget is bound to spark a battle with Congress because NASA would have to kill off big chunks of its existing manned exploration program in order to finance some of these new initiatives in the coming years. The budget package, slated to be released in early February, is expected to stop short of proposing major cancellations. But it also isn't likely to specify how all the different programs can be adequately funded in the future. Under the White House proposal, the agency's top-line budget is expected to stay close to the $18.7 billion in the current fiscal year. Only a small portion—roughly $200 million—is likely to be slated for the initial phase of opening up NASA's manned space exploration program to private firms. However, that initiative is expected to cost a least $3.5 billion—and potentially much more—over the next five years.

### Private sector involvement makes space exploration more affordable. Milstein, 09 (Michael, “NASA Makes Space U-Turn, Opening Arms to Private Industry”, Popular Mechanics, October 1st, 2009, Access Date\_7/19/11).

For decades, NASA kept a tight fist around the construction and operation of the spacecraft that ferried its astronauts and hardware into orbit. Sure, an army of private contractors actually built the vehicles, but NASA oversaw the designs--and always kept the pink slips. Now, however, the agency seems to be shifting course, as NASA officials insist that the budding commercial spacecraft fleet represents the only way the United States can realize its dreams of solar-system conquest on schedule and at an affordable cost.

### Privatizing NASA saves money. Navarro, 10 (Peter, “Peter Navarro: Privatization in space wise, to a point”, a Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University, May 17th, 2010, Access Date\_7/19/11).

While spending $6 billion on Mr. Obama's privatization plan and at the same time funding the Constellation project sounds like big money, let's take it in the context of the space benefits that we already realize. We could go on and on about how our space program has "spun off" a host of civilian applications – from the Internet, light-emitting diodes, and artificial limbs to freeze-dried foods and memory foam mattresses. However, just consider that the combined NASA and military space budgets (estimated at $40 billion) come in at less than the annual fuel savings generated by use of the Global Positioning System (GPS) in interstate trucking.

## Net Benefits – Politics

### Privatization popular. Pasztor, 10 (Andy, “White House Decides to Outsource NASA Work”, The Wall Street Journal, January 24th, 2010, Access Date\_7/18/11).

The idea of outsourcing a portion of NASA's manned space program to the private sector gained momentum after recommendations from a presidential panel appointed last year. The panel, chaired by former Lockheed Martin Corp. Chairman Norman Augustine, argued that allowing companies to build and launch their own rockets and spacecraft to carry American astronauts into orbit would save money and also free up NASA to focus on more ambitious, longer-term goals.

## Net Benefits

### Privatizing space- economic, technological, and innovation benefits. Nelson, 11 (Steven, “Fiscal conservatives call for increased privatization of space”, February 8th, 2011, Access Date\_7/17/11).

Former Republican Rep. Robert S. Walker of Pennsylvania said, “If we really want to ‘win the future’, we cannot abandon our commitment to space exploration and human spaceflight. The fastest path to space is not through Moscow, but through the American entrepreneur.” Task Force chairman Rand Simberg, of the Competitive Enterprise Institute, said, “By opening space up to the American people and their enterprises, NASA can ignite an economic, technological, and innovation renaissance, and the United States will regain its rightful place as the world leader in space.”

### Privatization increasing competition- more economic inefficiencies. Cutter, 11 (W. Bowman, “Space Colonization”, Deputy Assistant to the President for Economic Policy, January 9th, 2011, Access Date\_7/17/11).

Some believe that the popularization of space will lead to greater economies in space travel. We agree with this theory based on free market principles. Greater demand will lead to more entrants into the 'market', creating competition which fuels efficiencies, innovation, and lower prices which in turn generates an even greater demand. Economics 101. NASA has recognized this potential competition for more than ten years. In 1994 they sponsored a symposium entitled "What is the Value of Space Exploration?"

### Space privatization- leads to great public returns. Dinkin, 04 (Sam, “Space privatization: road to freedom”, The Space Review, July 26th, 2004, Access Date\_7/17/11).

But suppose for a moment that we do have the opportunity to create a viable space economy. Gagnon continues, “Thus, after the taxpayers have paid all the R&D, private industry now intends to gorge itself on profits. Taxpayers won’t see any return on our ‘collective investment.’” They are seeing little return now on their collective investment. Public returns will be great indeed if space development is successful. If privatization results in profits, those profits can be taxed. If private suborbital, orbital, point-to-point, lunar and planetary development lowers the price of access for public science, exploration and commerce, then that is a benefit. If colonization is successful, the public will have an insurance policy against extinction. Successful colonization will also energize the spirit of humanity. Colonizing Mars will double the amount of land available to the species and potentially more than double solar system GDP as a commerce of ideas and builds up between the growing Mars population and Earth.

### Space privatization solves terrorism conflicts, moral, and war. Dinkin, 04 (Sam, “Space privatization: road to freedom”, The Space Review, July 26th, 2004, Access Date\_7/17/11).

Gagnon implies that privatization of off-Earth development will prepare the way for the next “war system.” This is not a disadvantage of privatization even if true. First, terrorists and rogue states will take war to the heavens whether there is public or private management of space so at best public management postpones the new war system. Second, energizing the human spirit with new challenges in space may actually result in a solar system with less conflict. Third, the next war system may provide security for Earth more economically than the existing Earth-based military.

### Benefits- new technology, and less money coming right from the government. CBS News, 10 (“Obama defends privatization of space travel”, April 15th, 2010, Access Date\_7/19/11).

"We will extend the life of the International Space Station likely by more than five years while actually using it for its intended purpose: conducting advanced research that can help improve the daily lives of people here on Earth, as well as testing and improving upon our capabilities in space," Obama said. "This includes technologies like more efficient life support systems that will help reduce the cost of future missions. And in order to reach the space station, we will work with a growing array of private companies competing to make getting to space easier and more affordable." The plan would see the government directing billions of dollars into research to eventually develop new government rocket ships for future missions: to an asteroid near the station, to the moon, to Martian moons and other points in space.

### Privatizing solves future US space dependency on Russia

Navarro, 10 (Peter, “Peter Navarro: Privatization in space wise, to a point”, a Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University, May 17th, 2010, Access Date\_7/19/11).

In contrast, nothing more is needed to highlight the failure of our socialist space model than this current NASA conundrum: With the space shuttle schedule for its last flight this fall and nothing in hand to replace it, America will be relegated to purchasing flights from an entrepreneurial Russian Space Agency. Even the most psychedelic visitor from the 1960s heyday of NASA moon shots would see this as a very bad trip.

### Privatizing key to US-China space relations. Navarro, 10 (Peter, “Peter Navarro: Privatization in space wise, to a point”, a Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University, May 17th, 2010, Access Date\_7/19/11).

While we have been winding down our space program, other countries – China, in particular – have been working on (and, with China, even testing) capabilities to weaponize space and seize a strategic position on the moon. To prevent this, we must present a credible deterrent with ongoing robust and responsive manned and unmanned space programs. That's why Constellation remains important, both as a concrete program now and as a bridge to a cooperative public-private space partnership.

# Politics Links

## Plan Unpopular - Space Exploration (generic)

### Congress recently slashed funding to space programs – it’s not important enough

Space Frontier Foundation 11 [July 8, 2011, “Congress Needs to Fund the Future”, http://spacefrontier.org/2011/07/08/fundthefuture/]

Today the US Space Shuttle lifted off successfully for the last time. Earlier this week, the U.S. House of Representatives’ Appropriations Subcommittee on Commerce, Science, and Justice threw quite a going away party by releasing its proposed budget for NASA for Fiscal Year 2012 (which begins this October 1st), and the news is not good. Because of strong pressure to reduce federal spending, the Subcommittee had several billion dollars less to divide up among various departments and agencies. So they had to cut NASA and some key programs that we space activists support: NASA’s ”top line” was reduced by almost $2 billion dollars (from $18.7B requested to $16.8B in the bill) Space Technology funding would be slashed from $1024 million requested to $375 million (almost 2/3 cut) Commercial Crew would be cut at least 60% from the request of $850m. Of course, these two programs are critical to America’s future in Space. We’ve spent $100B building the ISS but are outsourcing the launch of astronauts to Russia instead of developing safer, cheaper, and more plentiful U.S. commercial capabilities. And every single Augustine Report “option” included spending at least $1B a year on technology to transform how we explore and develop space.

### The GOP is opposed to any form of spending, even spending for space exploration

AFP 10 [Staff Writers Washington. Nov. 10, 2010. “Republicans could scale back US science budgets” Space Travel. http://www.space-travel.com/reports/Republicans\_could\_scale\_back\_US\_science\_budgets\_999.html ayc]

Even before Republicans made sweeping gains in the House of Representatives in last week's mid-term elections, Republicans and Democrats agreed to scale back federal spending in order to try and get the deficit, which amounts to almost 14 trillion dollars in national debt, under control. President Barack Obama has also ordered all federal agencies that are not linked to national security to reduce by five percent their budget requests for 2012 compared to the 2011 budget year beginning October 1, 2010. But if Republicans hold to their pledge, non-defense related federal research spending could dip more than 12 percent to around 58 billion dollars compared to 66 billion requested by the White House for 2011. According to an analysis by Clemins which shows what could occur if Republicans are able to make across-the-board cuts, the National Oceanic and Atmospheric Administration (NOAA) could see its budget slashed by 34 percent or 324 million dollars. The National Institutes of Health (NIH) could lose nine percent of its budget or 2.9 billion dollars, and the National Science Foundation (NSF) could see a 19 percent cut, or one billion dollars gone from its coffers. The US space agency NASA's spending could shrink by 15 percent or 1.6 billion dollars. According to John Logsdon, former director of the Space Policy Institute at the George Washington University, the recent elections have brought "increased uncertainty for the future of US space program." "The new Republican leaders in the House are talking about overall budget reduction and almost certainly NASA cannot avoid some of that," he told AFP. In Clemins' view, the situation may not be quite so dire for those who depend on federal funds for research, given that conservatives have made more moderate declarations since the election has passed. Republicans have "talked more about oversight" and "looking hard" at programs which might need cuts, Clemins said. And in a press conference on November 3, the day after the election, President Barack Obama said he was opposed to cuts in research and development in a sign that the White House is likely to oppose such actions by Republicans. "I don't think we should be cutting back on research and development, because if we can develop new technologies in areas like clean energy, that could make all the difference in terms of job creation here at home," Obama said

### GOP is going to cut the budget for anything science-related

Pappas 10 [Nov. 4, 2010. Stephanie – writer for LiveScience. “Republican Fiscal Plan Could Slash Science Budgets.”]

The Republican Party swept to victory in the midterm elections on a platform of small government and reduced spending. For science agencies that depend on federal funding, those promises could result in significant budget cuts, experts say. The GOP's 2010 agenda pledges to cut government spending to pre-stimulus, pre-bank bailout levels. According to a statement from the office of House Republican leader John Boehner (R–OH), the Republicans' goal is to cut non-military discretionary spending back to 2008 levels. The American Association for the Advancement of Science (AAAS) crunched the numbers and discovered that under the Republican plan, research and development budgets at non-military agencies would be cut by 12.3 percent for 2011 to $57.8 billion, from $65.9 billion requested by the Obama administration. The agencies hardest hit by the proposed rollback would be the ones that have seen the biggest increases in the past few years, Patrick Clemins, the director of the R&D Budget and Policy Program at AAAS, told LiveScience. In particular, Obama's emphasis on science and technology was a boon to the National Science Foundation (NSF), the Department of Energy (DOE) Office of Science, the National Oceanic and Atmospheric Administration (NOAA) and the National Institute of Standards and Technology (NIST). The NSF, which funds about 20 percent of all federally supported basic research in America, would lose 18.8 percent of its request 2011 budget under the Republican proposal, or $1 billion. The DOE's Office of Science would be set back $835 million, or 18 percent of its requested budget. Meanwhile, NOAA, which is involved in weather and climate monitoring as well as fisheries management and coastal and marine research, would lose $324 million, or 34 percent of what the Obama administration requested for its budget in 2011. NIST, whose mission is to advance measurement science, standards and technology, would lose $207 million, almost 30 percent of its budget request. Also facing cuts under the plan is the National Institutes of Health, which would lose 9.1 percent, or $2.9 billion of its requested 2011 budget. In the past seven years, total inflation-adjusted federal funding for research and development has remained flat even as the total federal budget has climbed, Clemins said. Different administrations shift money around based on their priorities (Obama has been interested in climate research and renewable energy, which is why agencies like NOAA and the DOE have benefited during his tenure), but total funding changes very little. Both parties agree on spending cuts, Clemins said. The Obama administration had already warned agencies to build 5 percent cuts into their proposed 2012 budgets relative to 2011. The question is simply how soon and to what extent those cuts will come. "It's just going to be a wait-and-see kind of thing," Clemins said. "Science funding is pretty well-supported by both sides of the aisle, but in these times of budget cuts it really comes down to priorities, and it's really unclear how high on the list research and development funding will be."

### Space spending triggers political fights

Perine 4/25 [Keith – staff writer at Congressional Quarterly, “Grounding an American Dream”, http://origin-www.congress.org/news/2011/04/25/grounding\_an\_american\_dream April 25, 2011]

Proponents also say NASA needs to keep its human spaceflight program so that the United States can keep being a leader in international space policy. “I think that part of the urgency, if you will, is not a political race, but the fact that the world is developing and other people are going to be operating and working in space**,** and if we want to have influence over how the international rules develop and how relationships in this high-tech world develop, then we have to be there,” says Scott Pace, director of George Washington University’s Space Policy Institute. Buteven though the public is half-hearted at best about the spaceflight program, it would be tough for lawmakers to end it completely. While the program has been allowed to languish, its bipartisan supporters in Congress feel more passionately about maintaining it than other lawmakers do about ending it. The Cold War is over, but NASA’s congressional backers still invoke the same kind of “us vs. them” argument, saying we can’t simply abandon manned spaceflight and allow other nations’ efforts, especially those of Russia and China, to proceed without us. “Space is America’s military high ground,” said Florida Republican Bill Posey. Much as it has for the last 40 years, that argument, an equal mix of national security and national prestige, will insulate NASA’s human spaceflight program from outright elimination. But a tough fiscal climate and a lack of sustained public interest in the program will leave the program where it has languished for decades: without a sustainable vision, and a shadow of its former self.

## Plan Unpopular – Moon

### Moon costs capital-political battles

CSM 10 [Christian Science Monitor, “NASA and Obama's budget: the politics and ideals of human space exploration” http://www.csmonitor.com/Commentary/the-monitors-view/2010/0416/NASA-and-Obama-s-budget-the-politics-and-ideals-of-human-space-exploration, April 16, 2010.]

The political battle over funding the moon project will play out in Congress over coming months. Some compromise may be possible. This debate will likely have little of the polarizing partisan tones of other issues on Capitol Hill. Rather, it pits key political states with many space-related jobs – Florida, Texas, California, and Colorado – against other states.

## Plan Unpopular - Human Space Flights

### Republicans don’t want to fund human space flights.

Daily Kos 6/14 [June 14, 2011, Science Matters, “GOP Debate: No Federal funding for human space flight”]

**The Republican presidential field sent a clear message to NASA workers in America: They don’t see a federal role in funding human space flight**, [video clip at 6:50 to 9:28].

Debate moderator John King of CNN asked the other six candidates in attendance whether they would continue federal funding for human space flight. Not a single candidate - Texas Rep. Ron Paul, former Massachusetts Gov. Mitt Romney, former Minnesota Gov. Tim Pawlenty, Minnesota Rep. Michele Bachmann, former Pennsylvania Sen. Rick Santorum and former Godfather’s Pizza CEO Herman Cain — raised their hand.

### Democrats hate the manned space program – it’s not necessary

Weldon 07 [Representative Dave. “Democrats Set to Cripple Manned Space Program - Democrats Kill Chance to Protect NASA From Budget Raid,” <http://www.spaceref.com/news/viewpr.html?pid=22546>, May 2, 2007]

"It's increasingly clear that Democratic leaders have our manned space program in their crosshairs," said Weldon. Weldon noted that at the hearing to introduce his proposal Rep. Dennis Cardoza (D-CA), who sits on the powerful Rules Committee, said he opposed the amendment because he was 'not convinced' of the need for human space exploration. Weldon originally introduced the amendment after the Democrats proposed an astounding 40% percent ($2 billion) funding increase for NSF this year alone. The proposed increase was made possible earlier this year when Democratscut a half-a-billion dollars from NASA funding. NASA and NSF are funded through the same budget account and compete for the same pot of money. **"**Democrats are on a glide path to cripple our manned Space program. It's time the space community saw this for what it is: an assault on our commitment to build the Shuttle replacement, return to the moon, and maintain our strategic advantage in space. It's also an assault on the civilian workers and contractors who are about to have their lives disrupted because Democrats can't divert NASA funding fast enough to their other priorities**."**

### Manned space flight is unpopular because of the expenses.

Simberg 4/21 [Rand – writer for the Washington Examiner. “’Shooting for the moon’ amid cuts?”. April 21, 2011 ayc]

There's a reason that "critics say" that. It's because it's pretty obviously true. Note also that human spaceflight has little to do with science at all, let alone space science. There may or may not be good reasons to do it, but science isn't, and never has been one of them. They also quote Citizens for Common Sense, who like many, continue to not understand the new policy: “**Manned spaceflight is prohibitively expensive, especially considering our budgetary woes**,” said Steve Ellis, vice president of Taxpayers for Common Sense, a budget watchdog group. “At one point, the administration was trying to lead NASA out of that, but congressional politics protecting parochial interests have forced the agency to waste money in the recent short-term continuing resolutions and are forcing a specific approach down NASA’s throat in the yearlong spending bill.”

## Obama Must Spend PC

### Obama must spend PC on space

Chang 09 [Kenneth – Science reporter at the New York Times. “Panel Calls Program of NASA Unfeasible”. Sept. 8, 2009]

“Whatever space program is ultimately selected, it must be matched with the resources needed for its execution,” the panel wrote, emphasizing the possibilities of pulling in participation and financing from other nations and turning to the commercial space industry to provide rockets at a lower cost than a program by the National Aeronautics and Space Administration. “NASA will be working with the administration to determine how best to shape our human space flight efforts for the future," said Michael Cabbage, a NASA spokesman. With growing federal deficits and bruising battles over health care, it is unclear how much political capital Mr. Obama might spend on expanding the budget for the space agency.In addition**,** Congress, which supported the current program proposed by President [George W. Bush](http://topics.nytimes.com/top/reference/timestopics/people/b/george_w_bush/index.html?inline=nyt-per) in 2004, might not accede with another overhaul of NASA. Administration officials have not publicly given any hints of what course it will probably pursue. Nicholas Shapiro, a White House spokesman, said the president was committed to human spaceflight. “Until the options are thoroughly considered,” Mr. Shapiro said, “it would be premature for anyone to draw conclusions from the committee’s work.”

### Obama spends political capital on space legislation

Faith 10 [G. Ryan – an independent technology consultant and Adjunct Fellow for Space Initiatives at the Center for Strategic and International Studies, (CSIS). “President Obama’s Vision for Space Exploration (part 2)”, The Space Review, <http://www.thespacereview.com/article/1616/1>]

One thing that President Obama can learn from the fate of his predecessor’s plan for space exploration is that continued, periodic political support at the Presidential level is of great importance—or is perceived to be within the space community—because of the sentiment that the national space exploration program is a tool to be used by and within the prerogative of the executive. Should international cooperation play a greater role in American plans in the near future, engagement by the President and State Department on behalf of NASA will be quite valuable.

### Exploration costs Obama political capital

Faith 10 [G. Ryan – an independent technology consultant and Adjunct Fellow for Space Initiatives at the Center for Strategic and International Studies, (CSIS). “President Obama’s Vision for Space Exploration (part 2)”, The Space Review, <http://www.thespacereview.com/article/1616/1>]

President Obama’s April 15th statement that the establishment of a base on the Moon would no longer be considered the primary near- to medium-term objective of the American human spaceflight program has generated some controversy. Instead, President Obama has made rendezvous with and landing on an asteroid in 2025 the next major goal for NASA. From there, NASA will continue with further deep space exploration, leading to a human mission to orbit Mars in the 2035 timeframe, with a landing to follow at some point thereafter. Those who have followed the deliberations of the Augustine Committee closely should not find this surprising, as the committee exhibited a preference for what it called the “Flexible Path to inner solar system locations, such as lunar orbit, Lagrange points, near-Earth objects and the moons of Mars, followed by exploration of the lunar surface and/or Martian surface.” There has been much discussion about whether either the older or newer approach presents viable objectives for space exploration. The newer Flexible Path approach has met with some resistance, owing in part to its perceived lack of concrete details and milestones, and, as a consequence, may be more difficult to sustain politically over the longer term**.**

### Advocating a new space policy risks a lot of capital

Bay 4/13 [Austin – prof @ Boston University. “Into the Fourth Era of Space Exploration”. April 13, 2011 ayc]

Within the last decade, we have entered what I call the Space Age's fourth phase, Space 4.0. Space 1.0 began with Robert Goddard's rocketry genius, meandered through World War II, and in the Cold War's first decade produced Sputnik and Telstar. Space 2.0 spanned the manned orbital and "moon race" era. It began with Gagarin and culminated with the magnificent Apollo missions. The American shuttle defined Space 3.0. NASA's space "truck" engaged a Swiss Army knife array of missions, from deploying satellites to experimental manufacturing to transporting astronauts to the International Space Station (ISS). Coincidentally, April 12, 2011, is the 30th anniversary of the first space shuttle flight (April 12, 1981). NASA intends to formally end Space 3.0 this year, when the last shuttle mission is scheduled to lift off. However, the transition to the age of commercialization and private space ventures -- Space 4.0, the age of the space entrepreneur -- is already well underway. In 2009, Apollo 11's 40th anniversary, COTS (Commercial Orbital Transportation Services) moved from NASA acronym to reality. SpaceX corporation's Falcon 1 missile launch provided future historians with the moment of indicative drama. On July 13, 2009, the privately financed and privately built Falcon 1 missile placed the Malaysian RazakSAT Earth Observation satellite in orbit. Other initiatives signal how varied -- and frenzied -- the next three decades will be from low-Earth orbit to the moon. "Space tourism" companies are booking jaunts to and from the ISS. A couple of years ago, another company, Orbital Sciences, tested its Cygnus Pressurized Cargo Module (PCM), which will deliver supplies to the ISS. Though the entrepreneurial era of transcontinental railroads connecting U.S. and Canadian coasts does capture a sense of this moment's expansive possibilities, Space 4.0 defies historical analogy. Today's near-space entrepreneurs run markedly different kinds of companies and operations than the rail barons. If the relative "high stakes" are comparable (for the North American transcontinental railroads were participants in nation-building), the risks involved and accepted are more immediate and substantial. The transition to 4.0 from 3.0 won't be smooth. Space 4.0 requires risk capital -- lots of it. NASA's future role is murky. NASA has been the coordinating brain and inspirational heart of America's space effort. As NASA's budget withers, having commercial services deliver cargo and personnel to and from orbit should free NASA to focus on deep-space projects -- the first steps to Space 5.0.

## Obama has PC

### Obama has more PC than congress

Memoli 7/14 [Michael A. - Director, Information Services Division at UBS Wealth Management. “For now, polling favors Obama in debt debate”. July 14, 2011. http://articles.latimes.com/print/2011/jul/14/news/la-pn-debt-limit-polls-20110714 ayc]

As Americans more closely monitor the negotiations in Washington over the debt ceiling, new polling suggests that President Obama may have a narrow advantage over Republicans in the debate over spending and taxes, though it may be fleeting. A new Quinnipiac survey released Thursday showed that, 48%-34%, voters would blame Republicans instead of Obama if the debt limit is not raised and the nation defaults. Voters also support his call for a "balanced package" that includes both new revenues and spending cuts. **The president's approval rating has remained remarkably stable even in the high-profile dispute with Republicans**. Quinnipiac found 47% of voters approved of his performance, unchanged from a June survey and up slightly from his pre-Bin Laden showing. Meanwhile the approval rating for congressional Republicans dropped to 26%, lowest since the party assumed majority status in January, and now below the similarly poor rating for their Democratic counterparts. "The American people aren't very happy about their leaders, but President Obama is viewed as the best of the worst, especially when it comes to the economy," Quinnipiac's Peter Brown said. Only 38% approve of how Obama is handling the economy, and 33% approve of his handling of the budget deficit. But 45-38%, voters trust Obama more than Republicans in Congress to handle the economy. The survey was conducted from July 5-11. Obama has since continued to use the presidential bully pulpit to press his case to the American people, including a morning news conference on Monday, a nationally televised interview Wednesday night, and interviews scheduled with local television affiliates Thursday. Another metric no doubt pleasing to the White House: by a two-to-one margin, voters say they blame President George W. Bush over Obama for the economic recession. Fifty-four percent say Bush is more to blame while 27% point the finger at Obama; the split is 49%-24% among self-identified independents. But while that may be a helpful in the near term, it may not help his reelection efforts. Seventy-one percent say the nation's economy is still in recession. Only 23% say the economy is getting better, 32% say it's getting worse, and 43% say it's about the same. Gallup's latest three-day tracking poll finds Obama's approval rating at 44%. Another Gallup survey shows him trailing a generic Republican candidate 47%-39% in the presidential election. The debt ceiling issue is a tricky one to poll. Quinnipiac found voters roughly divided on what would be worse -- raising the debt limit to allow more government spending, or not raising it and leading the government to default. Republicans have repeatedly rejected Democratic calls for new revenues in addition to spending reductions, but two-thirds of respondents in the Quinnipiac survey said an agreement should include tax increases on the wealthy and corporations. But asked differently in another new poll, this from Gallup, 50% said Congress should attempt to reduce the budget deficit either solely or mostly through spending cuts, while just 11% said only or mostly with tax increases. A Pew Research Center poll, conducted for the Washington Post, found that even as the deadline nears for lawmakers to reach a deal, voter attitudes have shifted only slightly. By a margin of 5%, voters say they are more concerned about the risks of raising the debt ceiling than the risks of not doing so. Asked the same question in May, only 7% fewer were concerned about the consequences of a default.

### Obama has PC – Osama death

Wolverton 6/13 [Joe – professor of American Government at Chattanooga State, “President Obama offers campaign advice-to the GOP”, <http://www.thenewamerican.com/usnews/politics/7832-president-obama-offers-campaign-advice-to-the-gop>, June 13, 2011.]

Although flush with political capital from the killing of Osama bin Laden, President Obama knows that television ads and staff salaries are paid with harder currency. This pragmatic realization is evident in the [story](http://www.nytimes.com/2011/06/05/us/politics/05obama.html?_r=1&ref=politics&pagewanted=print) published by the New York Times:

While Mr. Obama will not fully engage in campaign activity until next year, aides said, he is embarking on weekly economic-focused trips throughout the summer. Doing so will allow him to use his bully pulpit to show that he is focused on addressing joblessness, the issue that more than any other could shape his electoral prospects and that Republicans are using to assert that his policies have failed.

He will also continue to be the main draw in a fund-raising campaign that has a goal of taking in at least $750 million by Election Day, which would match his 2008 figure even though he does not face the long primary battle that he did four years ago. **“**I’m confident that the things that we can control, we will do a good job on,” said David Axelrod, the president’s senior political strategist, who returned to Chicago to help with the re-election effort.

## PC Unstable

### NASA is a political gamble

Dinerman 4/18 [Taylor - Taylor Dinerman is a well-known and respected space writer regarding military and civilian space activities, NASA’s Continuing Problems, The Space Review, http://www.thespacereview.com/article/1824/1, April 18, 2011]

That effort is complicated by the loss of the Glory spacecraft earlier this year on a Taurus XL launch vehicle made by Orbital Sciences Corporation. This firm is one of the two winners of the commercial space station resupply contracts that NASA hopes will lead to a manned taxi service into orbit. Unfortunately, Orbital Sciences plans to fulfill this contract using a rocket called the Taurus II. Spaceflight is, at the moment, an inherently unsafe business and failures are to be expected, but if the commercial space industry on which NASA is betting its future cannot do better than this, then the agency will be in even worse political shape than it is in already. Reps. Ralph Hall (R-TX) and Eddie Bernice Johnson (D-TX), the chair and the ranking member, respectively, of the House Space, Science, and Technology Committee, have expressed their disappointment—to put it mildly—with the 2012 proposed NASA budget. The administration’s proposal, according to both of them, ignores the NASA authorization bill that President Obama signed last year. Congressman Hall has promised, “I will continue to push NASA to adhere to congressional direction and follow the priorities that are now the law of the land.” US civil space policy is now subject to a bitter and prolonged tug-of-war between Congress and the administration. For future political scientists, the actions of Bolden and the White House’s science policy makers may turn out to be a textbook case in how not to reform a government program.

## No public interest---Space Exploration

### The public isn’t interested about space programs

The Artemis Project 04 [Artemis Society International, ©2004, “No Public Interest in Manned Space Flight” ayc]

We do hear from people who either just aren't interested in traveling to the moon or anywhere else. We don't understand why someone who isn't interested in the moon would invest time looking around the Artemis Project web site or listening to presentations at space conferences; but they do, so you will eventually run into someone who will complain that nobody wants to do this. The only answer we can provide here is to remind the plaintiff that others aren't under any obligation to share the same interests. While it's certainly true that public interest in government-sponsored space programs has continued to wane since the peak of the Apollo program, we cannot say the same for opportunities for people to travel in space themselves. Today, we have no history of market statistics because the market simply doesn't exist. If you are not one of the chosen few government astronauts or cosmonauts, you can't go. NASA gets 1500 applicants for every astronaut they hire, so we can see that there is a tremendous interest in those jobs. We assume, without any statistics to back us up, that most astronaut applicants are motived by the adventure of space flight, and would be very interested in other opportunities for space travel. We can reasonably attribute waning public interest in space as a spectator event to the necessary lackluster presentation of government-sponsored space programs. At best, the government can offer up heroes to be admired and worshipped by the public. Once in a while, that plays well as a political motivation for flying people in space. Unfortunately, this alienates the public at large from the experience, reinforcing the idea that space is the domain solely of artificially created heroes. While one can admire heroes, it is very difficult to share their experience, either in person or vicariously. Heroes satisfy a human need for symbols and icons, but they don't make for a very good story. Artificially created heroes who don't really do anything to create their own adventures are even more difficult to sell because they don't return any real value, or even promise of value, to the personal lives of the people in the audience.

### Majority don’t believe space achievements are important

Science Encyclopedia 11 [©2011, Public Opinion About Space Exploration - Is Space Exploration Important To Society? http://www.libraryindex.com/pages/1047/Public-Opinion-About-Space-Exploration-SPACE-EXPLORATION-IMPORTANT-SOCIETY.html ayc]

These responses were given in a poll that addressed specific incidents during the last century, rather than technological achievements developed over time. By contrast, a Gallup poll conducted earlier the same year (1999) found that only 39 percent of those asked agreed with a NASA claim that putting a man on the moon was the "single greatest technological achievement of all time." (See Figure 9.2.) **More than half (59 percent) of the respondents did not agree with the claim.** Gallup analysts speculate that most Americans probably consider the computer a greater technological achievement than the manned lunar landing. An ABC News poll conducted in August 1999 asked 506 adults about their greatest hope for humankind over the next millennium. The results showed that the greatest single hope was for world peace (38 percent) followed by cures for terminal illnesses (13 percent). The ability to travel farther into space was mentioned by only 4 percent of the respondents. This is the same percentage expressing hope for improved racial relations and less pollution.

# Space Disease DA

## Space Disease DA 1NC

### A. Uniqueness and Link -Space exploration causes a zoo of “super bug” bacteria strains –rapidly mutating and deadly to humans

O’Neil ‘8

(Ian, writer for science news agency Universe Today, “Germs Living in Space “Almost Three Times as Likely to Cause Disease,”” <http://www.universetoday.com/13133/germs-living-in-space-almost-three-times-as-likely-to-cause-disease/>, 3/11/08, DA: 7/13/11, MadSu)

In one experiment on board Space Shuttle Endeavor (STS-123) launched early this morning (at 2:28 am EST), the reaction of terrestrial bacteria to zero-G will be tested. When compared with test bacteria bred here on Earth, previous studies suggest that germs bred in space are far more potent and are more likely to cause illness to people in space. The Endeavor mission will continue this experiment in the aim to find some way to prevent these microscopic astronauts causing too many problems to the continuing missions on board the International Space Station and future space tourism companies. Until a solution is found, don’t go ordering fish off the in-flight menu on your next spaceship ride… Wherever humans go, a whole zoo of bacteria will follow. Most of the bacteria hitching a ride on our skin and inside our bodies live in symbiosis with us, but occasionallyÂ problem bugs like salmonella orÂ Escherichia coli (E-coli) can get out of control, causingÂ problems such as common food poisoning to more serious, life-threatening ailments such as tetanus, diphtheria, syphilis, cholera… (the list is pretty long.) So, as humans venture into space, it is inevitable that bacteria will come too – the whole symbiotic and parasitic jungle – exploring space with us. Bacteria will mutate, often very quickly, adapting to the environment surrounding the little microbes. Mutation is the difference between a bacteria being harmless to becoming deadly. Mutations help bacteria to survive and as an example, they can become antibiotic resistant. This is a huge problem in places where antibiotics are used very regularly (such as hospitals); genetic information is passed down the generations of bacteria (often doubling in population in a matter of minutes). If just one microbe has the genetic ability to survive a type of antibiotic, its number will multiply, creating a strain of “superbug” that can avoid being killed by antibiotics – one of the most basic examples of “natural selection”. Methicillin-resistant Staphylococcus aureus (MRSA) is one particular nasty strain of the otherwise benign Staphylococcus genus which has mutated to resist commonly used antibiotics. It is of paramount importance to understand how bacteria react to space conditions, so problems with potentially dangerous forms of bacteria, such as MRSA,Â can be avoided. Scientists have discovered that the fairly common salmonella bacteria, usually responsible for terrible food poisoning outbreaks here on Earth, is far more likely to cause serious disease in space and has a much faster rate of reproductionÂ in zero-G. The virilence of salmonella increases drastically in the absense of gravity. The findings from the 2006 Space Shuttle Atlantis mission showed that space-borne bacteria are three times more likely to cause harm to humans in space than humans on the ground, further work was obviously needed to address this potentially deadly barrier to the success of space missions. The project leader of these experiments, Dr. Cheryl Nickerson (at the Center for Infectious Diseases and Vaccinology, Arizona State University’s Biodesign Institute), hopes to find ways of blocking potentially deadly bacteria from multiplying so quicklyÂ in space and find out why zero-G is such a good environment for bacteria to grow. She headed the 2006 experiments on Atlantis. “We are very fortunate to get a follow up flight opportunity, because in spaceflight, you only get one shot for everything to go just right [...] We saw unique bacterial responses in flight and these responses are giving us new information about how Salmonella causes disease. NASA is giving us the opportunity to independently replicate the virulence studies of Salmonella typhimurium from our last shuttle experiment and to do a follow-up experiment to test our hypothesis about new ways this bacteria causes disease in this unique environment.” – Cheryl Nickerson. This is obviously a high priority experiment for NASA and the future of manned missions into space.

### B. Bacteria in space causes disease -multiplies 300% faster and resistant to antibiotics

Karin ‘10

(Janice, Senior technical writer for Nokia, “Disease May Derail Space Travel,” <http://thefutureofthings.com/news/9563/disease-may-derail-space-travel.html>, 5/23/10, DA: 7/17/11, MadSu)

The scientists used existing studies concerning astronaut immune systems and the results of two experiments (one in 2006 and one in 2008) where cultures of salmonella were grown simultaneously on Earth and on the space shuttle to allow direct comparisons. The cultures on the space shuttle grew faster and resulted in a 300% increase in mortality rate when injected into mice. Furthermore, the bacteria in space tended to grow a biofilm coating which has proven particularly resistant to antibiotics in the past. This accelerated rate of growth may be caused by fluid shear that creates an environment similar to that found in human intestines. Basically, the salmonella detects the force of surrounding fluids. The salmonella typically slips into the spaces between the villi in the intestines which protect it from the significant churn found in the center of the pathway. Researchers believe the low fluid shear of space is similar to the shear found within these pockets, a condition that sends the bacteria into overdrive as it prepares to enter the blood stream and cause infections. When combined with an observed decrease in the effectiveness of the human immune system in space, the virulence of bacteria growth could cause significant health issues for astronauts on long-term flights. Researchers are exploring the use of different growth medium to control the rate of bacteria virulence.

### C. Impact -Disease and viruses leave humanity in face of extinction

Daswani ‘96

(Kavita, freelance writer, “Leading the way to a cure for AIDs,” <http://www.scmp.com/portal/site/SCMP/.06f0b401397a029733492d9253a0a0a0?vgnextoid=f254f9e2dd1f1110VgnVCM100000360a0a0aRCRD&s=Archive>, 1/4/96, DA: 7/19/11, MadSu)

There is a much more pressing medical crisis at hand - one he believes the world must be alerted to: the possibility of a virus deadlier than HIV. If this makes Dr Ben-Abraham sound like a prophet of doom, then he makes no apology for it. AIDS, the Ebola outbreak which killed more than 100 people in Africa last year, the flu epidemic that has now affected 200,000 in the former Soviet Union - they are all, according to Dr Ben-Abraham, the 'tip of the iceberg'. Two decades of intensive study and research in the field of virology have convinced him of one thing: in place of natural and man-made disasters or nuclear warfare, humanity could face extinction because of a single virus, deadlier than HIV. 'An airborne virus is a lively, complex and dangerous organism,' he said. 'It can come from a rare animal or from anywhere and can mutate constantly. If there is no cure, it affects one person and then there is a chain reaction and it is unstoppable. It is a tragedy waiting to happen.' That may sound like a far-fetched plot for a Hollywood film, but Dr Ben-Abraham said history has already proven his theory. Fifteen years ago, few could have predicted the impact of AIDS on the world. Ebola has had sporadic outbreaks over the past 20 years and the only way the deadly virus - which turns internal organs into liquid - could be contained was because it was killed before it had a chance to spread. Imagine, he says, if it was closer to home: an outbreak of that scale in London, New York or Hong Kong. It could happen anytime in the next 20 years - theoretically, it could happen tomorrow. The shock of the AIDS epidemic has prompted virus experts to admit 'that something new is indeed happening and that the threat of a deadly viral outbreak is imminent', said Joshua Lederberg of the Rockefeller University in New York, at a recent conference. He added that the problem was 'very serious and is getting worse'. Dr Ben-Abraham said: 'Nature isn't benign. The survival of the human species is not a preordained evolutionary programme. Abundant sources of genetic variation exist for viruses to learn how to mutate and evade the immune system.' He cites the 1968 Hong Kong flu outbreak as an example of how viruses have outsmarted human intelligence. And as new 'mega-cities' are being developed in the Third World and rainforests are destroyed, disease-carrying animals and insects are forced into areas of human habitation. 'This raises the very real possibility that lethal, mysterious viruses would, for the first time, infect humanity at a large scale and imperil the survival of the human race,' he said. Dr Ben-Abraham and his colleagues have almost perfected a 'decoy virus vaccine'.

## Links

### Link –Generic/Mars Colonization -Space exploration exposes us to new bacterium and pathogens that we have no defense against

Mullen ‘3

(Leslie Mullen, the Astrobiology Magazine writer, “Alien Infection,” <http://www.astrobio.net/exclusive/570/alien-infection>, 8/25/03, DA: 7/19/11, MadSu)

When diseases like SARS, Mad Cow Disease and Monkeypox cross the species barrier and infect humans, they dominate news headlines. Just imagine, then, the reaction if potentially infectious pathogens were found in rock samples from Mars. As we look toward exploring other worlds, and perhaps even bringing samples back to Earth for testing, astrobiologists have to wonder: could alien pathogens cross the "planet" barrier and wreak havoc on our world? Even though there is no proof of bacterial or viral pathogens anywhere except Earth, there is already a worried advocacy group called the International Committee Against Martian Sample Return, and science fiction novels like "The Andromeda Strain" depict nightmare alien infection scenarios. The possibility of cross-planetary contamination has concerned NASA since the early days of the Apollo program, so, as a precaution, the astronauts were quarantined for three weeks after they left the moon. Chris Chyba, who holds the Carl Sagan Chair for the Study of Life in the Universe at the SETI Institute, says there are two types of potential alien pathogens: toxic and infectious. Toxic pathogens act as a poison on other organisms. Infectious pathogens are viruses or bacteria that are passed between organisms, causing sickness. Some viruses and microbes rely on specific biological systems in order to replicate and infect their host, so not all pathogens affect all organisms the same way. Chicken farmers, for instance, can remain untouched by a disease that decimates their flocks. It could be that a martian microbe would enter the human body, but is rendered harmless because it is incompatible with human physiology. "After living in the dirt of Mars, a pathogen could see our bodies as a comparable host; they could treat us 'like dirt,'" says John Rummel, NASA's Planetary Protection Officer. "But, to quote Donald Rumsfeld, we're dealing with the unknown unknowns. It could be that even if the microbes lived inside us, they wouldn't do anything, it would just be this lump living inside you." "After living in the dirt of Mars, a pathogen could see our bodies as a comparable host." -John Rummel Image Credit: SF Tomajczyk The conditions on Mars are much different than those in the human body, so an inert pathogen seems the most likely scenario -- especially since any life on Mars would have evolved without humans being present. Co-evolution is why some pathogens only affect certain organisms. Infectious pathogens evolve based on the reactions of their hosts. As the host develops defenses against a predatory pathogen, the pathogen has to devise new means of sustaining itself within the host (or risk its own extinction). Some toxins also developed through co-evolution. As predatory organisms seek food, their prey develop ever more sophisticated means to escape being eaten. Many organisms developed specially targeted toxins as part of this evolutionary arms battle. Rummel says that humans have evolved a complex defense system to prevent us from getting sick from a whole host of disease and pathogens. But non-specific microbes - where human physiology did not influence their evolution - may evade our defense mechanisms.

### Link –Generic -Bacteria travel with humans into space –increasingly more dangerous and adapt to environment to be more lethal

Bourzac ‘7

(Katherine Bourzac, Massachusetts Institute of Technology science editor for Technology Review, “Deadly Bacteria from Outer Space,” *The Technology Review* by MIT, <http://www.technologyreview.com/biomedicine/19425/>, 9/27/07, DA: 7/19/11, MadSu)

Spaceflight is known to have profound effects on human physiology, weakening astronauts' bones and muscles and impairing their immune systems. A new study shows that its effects on microorganisms may be just as dramatic: Salmonella grown onboard the space shuttle was many times deadlier than its terrestrial counterparts. The study suggests that NASA and other space agencies may need to worry that long manned missions will increase the virulence of microorganisms that astronauts inevitably carry with them. It has also given microbiologists insights into Salmonella that may lead to new therapies for infections on Earth. Researchers led by Cheryl Nickerson, associate professor at the Arizona State University Biodesign Institute, found that Salmonella grown during space-shuttle mission STS-115 in 2006 underwent major changes in the expression of 167 genes. When administered to mice back on Earth, the bacteria proved many times more deadly than an equivalent strain grown on the ground. The experiment was the first to study changes in the gene expression of a microorganism in space. The Arizona scientists provided evidence that one particular Salmonella gene regulates most of the molecular changes that the bacteria underwent. This global regulator, which seems to help the bacteria respond to stress by becoming more virulent, is a potential therapeutic target for future Salmonella treatments. The implications for human spaceflight are not as clear. "It doesn't seem like something NASA should worry about," at least not in the short term, says David Robertson, director of the Center for Space Physiology and Medicine at Vanderbilt University. But it's impossible to completely sterilize spacecraft, largely because humans carry so many bacteria around with them: bacterial cells in our bodies greatly outnumber our own. "The longer the journeys, the more we have to be concerned," says Robertson. A manned mission to Mars, which has been proposed by President Bush, would take about three years. The Salmonella were carried aboard the space shuttle Atlantis in a kind of suspended animation, sealed inside compartmentalized test tubes. One of the astronauts activated the bacteria cultures by pushing a plunger into a chamber that mixed the Salmonella with a growth medium. After 24 hours, the plunger was pushed into another chamber. Half the bacteria were then mixed with more growth medium to keep them alive until they returned to Earth; the other half were mixed with a chemical fixative that stopped their growth and preserved them so that their gene expression could be studied after the shuttle landed. Researchers on the ground performed the same experiment on the same strain of Salmonella, grown in an environment that mimicked the temperature, humidity, and other conditions aboard the space shuttle but had Earth gravity. Compared with these bacteria, those grown in space displayed major changes in the activity of 167 genes and in the production of 73 proteins. Lower concentrations of the space bacteria caused lethal infections in mice, and the space bacteria killed more mice sooner than those grown on Earth. Nickerson says that these changes may be due to mechanical stresses that microgravity imposes on the bacterial cells. In microgravity, cells in a test tube or in our bodies are in a "state of buoyancy, floating suspended," she says. This changes the flow of fluids over the surfaces of the cells, and hence the cells' behavior. It seems counterintuitive that researchers can learn about how bacteria behave in our bodies on Earth by putting them in an environment as artificial as a test tube on a spaceship, says Jeanne Becker, associate director of the National Space Biomedical Research Institute, in Houston. "Looking at it from the perspective of the bacteria," she says, "they want to be able to survive in a stressful environment"--whether it's microgravity, an assault by the immune system, or the presence of an antibiotic. The way bacteria respond to a stressful environment--by making more or less of a particular protein

### **Link –Space Bases-Bases in space contaminate and create new epidemics**

Gagnon ‘99

(Bruce K Gagnon, Coordinator of the Global Network Against Weapons & Nuclear Power in Space, “Space Exploration and Exploitation,” <http://www.space4peace.org/articles/scandm.htm>, 1999, DA: 7/17/11, MadSu)

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.

### Link –Moon-Space equipment cause contamination and spurs extra terrestrial bacteria

Pirich ‘9

(Pirich, Ronald; Weir, John; Leyble, Dennis; Digiuseppe, Michael, Nanophotonics and Macrophotonics for Space Environments III, “The effects of ionizing radiation, temperature, and space contamination effects on photonic coatings,” Volume 7467, 2009, DA: 7/16/11, MadSu)

Dust contamination is a serious problem for equipment and vehicles for space mission applications. The lunar regolith is chemically composed of several elements and compounds and lunar "weathering" has left the lunar soil with a relatively fine texture as illustrated by the grain-size distribution on soil taken from a mare region on Apollo 11. Previous investigations by NASA indicated a lunar regolith deposition rate of about 0.3 percent coverage per day, but the deposition rate is expected to be both geographically variable and also to vary from time to time. Dust gathers on photonic sensors inhibiting motion and data gathering. In addition, devices that require transparency to light for maximum efficiency such as solar photovoltaic power systems, video cameras and optical or infrared detectors will suffer from the dust accumulation. Another potential hazard is the unintentional capture of extraterrestrial bacteria or spores on the surfaces of the equipment, to the extent that can be anticipated, that might bring inadvertent and possibly catastrophic contamination of human habitats

## Impacts

### Impact-Disease leads to extinction –humanity has no immunization to any space-mutated bacteria

Powell 2k

(Corey, Bioinformatics Scientist Buck Institute for Age Research, Discover Magazine, “20 ways the world could end,” <http://discovermagazine.com/2000/oct/featworld>, October 2000 issue, DA: 7/18/11, MadSu)

If Earth doesn't do us in, our fellow organisms might be up to the task. Germs and people have always coexisted, but occasionally the balance gets out of whack. The Black Plague killed one European in four during the 14th century; influenza took at least 20 million lives between 1918 and 1919; the AIDS epidemic has produced a similar death toll and is still going strong. From 1980 to 1992, reports the Centers for Disease Control and Prevention, mortality from infectious disease in the United States rose 58 percent. Old diseases such as cholera and measles have developed new resistance to antibiotics. Intensive agriculture and land development is bringing humans closer to animal pathogens. International travel means diseases can spread faster than ever. Michael Osterholm, an infectious disease expert who recently left the Minnesota Department of Health, described the situation as "like trying to swim against the current of a raging river." The grimmest possibility would be the emergence of a strain that spreads so fast we are caught off guard or that resists all chemical means of control, perhaps as a result of our stirring of the ecological pot. About 12,000 years ago, a sudden wave of mammal extinctions swept through the Americas. Ross MacPhee of the American Museum of Natural History argues the culprit was extremely virulent disease, which humans helped transport as they migrated into the New World.

### Impact –Disease spread causes extinction

Steinbruner ‘98

(John D. Steinbruner, Professor of Public Policy at the School of Public Policy at the University of Maryland and Director of the Center for International and Security Studies, *Biological Weapons: A Plague upon All House,* Foreign Policy, No. 109 (Winter, 1997-1998), pp. 85-96, DA: 7/20/11, MadSu)

Of the thousands of pathogens that prey upon human beings, a few are now known to have the potential for causing truly massive devastation, with mortality levels conceivably exceeding what chemical or even nuclear weapons could produce. Nature provides the prototypes without requiring any design bureau or manufacturing facility. Medical science provides increasingly useful information which by its very nature is conveyed in open literature A. small home-brewery is all that would be required to produce a potent threat of major proportions. At least 17 countries are suspected of conducting biological weapons research-including several, such as Iran and Iraq, that are especially hostile to the United States. It is a considerable comfort and undoubtedly a key to our survival that, so far, the main lines of defense against this threat have not depended on explicit policies or organized efforts.I n the long course of evolution, the human body has developed physical barriers and a biochemical immunes stem whose sophistication and effectiveness exceed anything we could design or as yet even fully understand. But evolution is a sword that cuts both ways: New diseases emerge, while old diseases mutate and adapt. Throughout history, there have been epidemics during which human immunity has broken down on an epic scale. An infectious agent believed to have been the plague bacterium killed an estimated 20 million people over a four-year period in the fourteenth century ,including nearly one-quarter of Western Europe’s population at the time. Since its recognized appearance in 1981, some 20 variations of the HIV virus have infected an estimated 29.4 million worldwide, with 1.5 million people currently dying of AIDS each year. Malaria, tuberculosis, and cholera once thought to be under control-are now making a comeback. As we enter the twenty-first century,c hanging conditions have enhanced the potential for widespread contagion. The rapid growth rate of the total world population, the unprecedented freedom of movement across international borders, and scientific advances that expand the capability for the deliberate manipulation of pathogens are all cause for worry that the problem might be greater in the future than it has ever been in the past. The threat of infectious pathogens is not just an issue of public but a fundamental security problem for the species as a whole.

## AT

### AT: Treatments -No treatment for space diseases

Lord ‘7

(M.G., Editors Steven J. Dick and Roger D. Launius, National Space and Aeronautics Administration, NASA History Division, *Societal Impact of Spaceflight,* 2007, DA: 7/20/11, MadSu)

The most acute problem remains chronic exposure to cosmic rays. not only does chronic radiation exposure hurt people, it also degrades the drugs used to treat them.the antibiotics naSa currently uses on Shuttle missions (Bactrim, cipro, and augmentin) lose their potency after about two weeks in space, according to lakshmi putcha, a pharmacotherapeutics researcher at the Johnson Space center. 6 if Mars-bound astronauts equipped with these drugs in their current formulations became ill, she said,“We would have no way of treating them.”

### AT: Disease won’t come from space

### Empirics prove -SARs came from space

Meikle ‘3

(James, health correspondent for the Guardian, “Sars virus 'came from outer space,’” <http://www.guardian.co.uk/society/2003/may/23/sars.publichealth>, 5/23/03, DA: 7/17/11, MadSu)

It is not surprising that the World Health Organisation has had trouble fighting the Sars virus. According to one academic, it has probably came from out of this world. Professor Chandra Wickramasinghe, of the Cardiff Centre for Astrobiology - a body founded by Cardiff University and the University of Wales College of Medicine - has long held that many plagues have an extraterrestrial origin. He believes that huge amounts of micro-organisms land on Earth every day, including a tonne of bacteria. Given this, the chances would be that many surprise outbreaks of disease came from space. He and his colleagues argue, in a research letter to the Lancet medical journal, that a strong case can be made for Sars being one of many illnesses from space, from the plague of Athens in the fifth century BC to the influenza pandemic of 1917-19. Sars has killed more than 660 people and infected well over 7,000 during the past six months. "The virus is unexpectedly novel and appeared without warning in mainland China," Prof Wickramasinghe writes. "A small amount of the culprit virus introduced into the stratosphere could make a tentative fallout east of the great mountain range of the Himalayas, where the stratosphere is thinnest, followed by sporadic deposits in neighbouring areas. "If the virus is only minimally infective, as it seems to be, the subsequent course of its global progress will depend on stratospheric transport and mixing, leading to a fallout continuing seasonally over a few years." The WHO and other health bodies believe Sars is a coronavirus, related to a family of viruses that often cause colds. Many scientists are working to confirm the theory that Sars simply mutated from another virus here on Earth. However, a supposition that it might have come from animals has been undermined by a failure to make it take hold in pigs and chickens. Tests are now taking place involving other species.

### Empirics -Flu epidemic arose from space

Millar 2k

(Stuart, news editor for the Guardian, “Flu comes from outer space, claim scientists,” <http://www.guardian.co.uk/science/2000/jan/19/spaceexploration.medicineandhealth>, 1/19/00, DA: 7/17/11, MadSu)

It made the festive season a misery for many and threw NHS policy into crisis. But the flu may have worse in store, according to scientists who claim to have discovered an alarming explanation for the epidemic - a virus from outer space. Dismissing as dogma the conventional medical wisdom that flu is a virus passed by human contact, the distinguished astrophysicist Sir Fred Hoyle, and his colleague at Cardiff university, Chandra Wickramasinghe, warn that we may be on the brink of a global epidemic. In a report to be published in the journal Current Science, they claim the outbreak was caused by dust deposited high in the atmosphere by passing comets being forced down to earth by energy generated by cooler patches on the sun's surface, known as sunspots

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# Space Debris DA

## Space Junk DA---1NC

### Uniq & Link- Space debris has increased and ANY new exploration or developments in space makes collisions more likely, which creates more space debris

DUNCAN 6-3-2010(ROWE GRAHAM: a freelance science and technology journalist: Junk in space; Our world is surrounded by debris - and doing nothing is not an option: http://www.lexisnexis.com.turing.library.northwestern.edu/lnacui2api/results /docview /docview.do?docLinkInd=true&risb=21\_T12363130625&format=GNBFI&sort=RELEVANCE&startDocNo=1&resultsUrlKey=29\_T12363128982&cisb=22\_T12363130627&treeMax=true&treeWidth=0&csi=10939&docNo=1)

The curvature of the Earth, the deep, blackness of space and a peaceful, unfettered view of the stars. These are the first things Sir Richard Branson'sEnhanced Coverage LinkingSir Richard Branson's -Search using: Biographies Plus News News, Most Recent 60 Days pace tourists will see as they enter orbit, if his fledgeling business ever gets off the ground. But the next thing they are likely to notice are the hundreds of thousands of pieces of space junk that orbit the Earth and which could be hurtling towards them. It is not enough to contaminate our planet, it seems; humanity's propensity for polluting has now extended beyond our climate and is reaching out into space. Consisting of anything from small discarded components, such as bolts, to entire relics of spacecraft and satellites, this man-made orbital debris is rapidly turning space into a frontier in a whole new ecological battle. Of the 20,000 or so large objects now in orbit only 5 per cent are active spacecraft; apart from the Moon the rest is junk. And with an average speed of more than 22,000mph even very small pieces of debris have the potential to rip open anything in their path. Besides the space-faring passengers of Virgin Galactic, this poses a real threat to any orbiting spacecraft, satellite or probe unlucky enough to end up in the firing line. If the problem is left unchecked, the implications for the rest of us here on Earth are: increasing disruptions to our communications and weather services, satellite navigation devices taking a wrong turn and TV transmissions zoning out. The situation is already out of our control and experts agree that it is going to get worse - much worse. "Even if we did no launches for the next 200 years the amount of debris will still increase," says Dr Hugh Lewis, an astronautics engineer at the University of Southampton. For this, we have a sort of cascade effect to thank; the more stuff left tumbling around up there, the higher the chances of a collision. And with every collision comes the creation of more pieces of debris. Only last year a satellite used by the US Department of Defen ce was hit by an obsolete Soviet-era satellite, fragmenting into more than 1,500 large pieces of debris. And in 2007 China created 2,700 new fragments when it carried out some target practice on an old weather satellite, using a ballistic missile. At some point, nobody is quite sure when, the collision risk will become so high that launches will no longer be viable. At this point, Earth's orbit will, in effect, become an unusable graveyard of junk. At least, that's the doom-and-gloom scenario. According to a new study by Nasa it is not too late to act, and the solution may be within our grasp. Thanks to a network of Earth-based radar and optical telescopes it is possible to track any object in orbit that is larger than 10cm. And this is not limited to objects in a low Earth orbit , where the majority are. "We have some radars that can go all the way up to geostationary orbit," says Nicholas Johnson, Nasa's chief scientist for orbital debris. Using data from this surveillance network, Johnson and his colleagues have created a computer model to predict the trajectories and collisions of these objects for the next 200 years. The level of detail and accuracy in the model is unprecedented, he says, and includes even the new fragments created by the Chinese missile test. Their conclusion? Removing just five pieces of debris a year will allow us to prevent any further build-up of space junk. Remove more and we will start to see a reduction. Putting aside the practicalities of finding ways to grasp and remove orbital debris, as solutions go this seems fairly reasonable and possibly even achievable. What's more, the situation is helped because the main source of debris has almost disappeared. "Prior to the Chinese missile test the majority came from old spacecraft spontaneously exploding," Johnson says. In the early decades of spaceflight, before debris was even considered, there was a more nonchalant attitude to spacecraft design. Components such as lens covers or explosive bolts, used to release sections of craft, were jettisoned without a further thought. Similarly, when satellites had served out their life they were allowed to just drift. Over the years, residual fuel left on board or corroded batteries short circuiting has caused some of these to explode. "There have been around 200 of these," says Lewis. Today , most of the spacecraft likely to explode have done so. And for future generations, a set of international guidelines have been adopted to ensure that no more debris is created. Components now have to be tethered, fuel tanks purged and batteries discharged. In addition to this, any spacecraft facing retirement needs to be placed in an orbit that will ensure it burns up in our atmosphere within 25 years. As for missile attacks, or target practice on satellites, even China appears to be mending its ways. "The Chinese incident was extremely unfortunate," says Johnson. "But to China's credit they now understand that and we don't anticipate that kind of event will be repeated." To show it had fallen into line, when China tested another missile test in January it went out of its way to point out that the rocket would not produce any orbital debris or pose a risk to satellites. So, if new debris can be prevented and it is just a question of clearing up the mess left behind by five decades of aerospace engineers lacking foresight, what are the options? A number of "active debris removal solutions" have been proposed, ranging from the use of giant space nets to capture debris and drag it to an altitude where it will de-orbit, to the idea of firing water into the path of debris to increase its drag and hasten descent. Outer-space litter-picking is no small task. Not only do these objects come in all shapes and sizes and travel at speeds of up to 35,000mph, they are completely out of control. "They all go in different directions," says Johnson. "They are like angry bees in a beehive." According to Lewis, technology is not really the issue - we already have a tried-and-tested means of rendezvous and capture in the form of the space shuttle, which has a big cargo bay, a robotic arm and the ability to manoeuvre as and when required. "You could say that the shuttle was precisely designed for this," he says. "The problem is it's very expensive to launch and can normally only reach a certain altitude." Cost is a major hurdle and it is still unclear, whatever solution prevails, who is going to pay for the clean-up. Various ideas are on the table, including creating a pool of money or setting up an insurance-type scheme. "It is a question that has yet to be answered," says Lewis. One thing that seems certain is that regardless of which organisation takes on the salvage operation, it will only go after the big stuff. And that will leave a gaping hole in the defence against space debris. A lthough it makes perfect sense to try to remove large objects that can do significant damage, these represent a small percentage of the total debris. Nasa estimates that there are more than 500,000 objects larger than 1cm orbiting the earth. It cannot track them continuously but it is possible to detect them periodically and extrapolate from there. To get an idea of how many even smaller bits of debris there are - down to 1mm - it is necessary to examine damage to spacecraft and components when they return to Earth. This approach is less accurate than tracking but it is has led to the belief that there are tens, perhaps hundreds, of millions of these very small pieces in orbit. To put this in perspective, when Nasa started to upgrade some of the shielding on the International Space Station (ISS), in 2007, it carried out a n assessment of the risks posed by orbital debris and small meteorites. It calculated that without new, tougher shielding, there was a 55 per cent chance that a piece of debris would breach the existing shielding and penetrate the ISS by 2016. "The catastrophic risk, which means a loss of crew, was 9 per cent," says Lewis. Even after the shielding upgrade the risks seem unnervingly high, with a catastrophic risk of 5 per cent and a penetration risk of 29 per cent - 5 per cent short of Nasa's requirements. It was not surprising, then, that when the Columbia space shuttle disintegrated during re-entry in February 2003, one of the first causes considered was an orbital debris strike. "That tells you that they think of this as a fairly significant risk," Lewis says. But Johnson plays down these risks, arguing that the ISS is in a relatively low orbit, where there is less debris. Because of this, collision avoidance manoeuvres are only necessary roughly once a year. Even so, Johnson admits that small debris does pose a threat. "The ISS has the greatest amount of shielding of any spacecraft deployed. But it can only shield against objects up to about 1cm." So since only objects bigger than 10cm can be tracked - or at best 5cm at very low orbits - this leaves a n alarming gap. In light of this, Nasa is trying to improve its tracking capabilities, says Johnson. But this is small comfort to everyone else, as not every spacecraft carries a lot of armour. For the vast majority of satellites and spacecraft, even debris smaller than 1cm poses a risk. Without active debris removal, these risks are set to increase steadily over time. And despite the 25-year removal guidelines, it is inevitable that new debris will end up in orbit. "Not all spacecraft will be removed because they may suffer a failure," says Lewis. For example, geostationary satellites suffer only a 2 per cent failure rate. "Not all operators will follow the guidelines. It's not legally enforceable," says Lewis. How you define the point at which Earth's orbit will become unusable very much depends on your perception of what risks are acceptable. From Nasa's perspective, there is still plenty of time. "We're talking about hundreds of years of doing nothing before it gets to be a serious issue," says Johnson. But Nasa's idea of "safe" is unlikely to tally with that of the average space tourist. What's more, even if it does take 200 years to get to this stage, a tipping point will arrive long before that. A round 2055 we will start to see a shift in the main cause of debris. Exploding obsolete satellites will cease to be the main source of junk and collision debris will take over. "That's the critical point in our future," says Lewis. "In fact some people say we have already passed another critical point." This is the well-known space industry phenomenon called the Kessler syndrome. Ignoring the creation of new debris through collisions, this is the scenario in which the rate of objects being sent into orbit exceeds the rate at which they are being removed by atmospheric decay. In simple terms, it is the point at which we are putting more junk into space than we are taking out. Based on such a rudimentary definition, we are already in the Kessler syndrome. "This is a big problem. Everybody in the space community should be concerned," says Lewis. Fortunately, it is not too late to act. But if there is a lesson to be learnt from climate change on Earth, it is that delay can be costly. "If we wait too long while doing nothing, then we get to the point where we can't do anything."

### IL/Impact-Space debris makes space unusable and destroys our satellite network: Turns the case

Jeremy 10(8-25-10: Keep space tidy: the space debris problem: http://makewealthhistory.org /2010/08/25/keep-space-tidy-the-space-debris-problem/)

Having written about the Atlantic trash patch earlier this week, I thought I’d highlight another little known pollution problem: space debris. In 2008 the European Space Agency released this image of the known pieces of debris orbiting the earth. Of the millions of fragments out there, about 18,000 are larger than 10cm and trackable, and that includes rocket parts, discarded equipment and over 5,000 obsolete satellites. It grows every year, as new satellites are launched and old ones are retired. Each rocket sent into orbit also leaves a trail of discarded booster sections, as this ESA graph shows. The image not shown to scale of course, but let’s zoom in a little to see just how ‘congested’ it gets. This is the result of half a century of space technology, and it’s beginning to ring alarm bells in the space industry. The Office for Outer Space Affairs, one of the UN’s lesser known bodies, keeps a Online Index of Objects Launched into Outer Space. This year they warned that coverage of the World Cup could be disrupted as satellites could be knocked out at any time. Their warning about ensuing riots may have been a little dramatic, but it’s hard to blame them for taking any opportunity going to highlight a danger that’s so far away and invisible. Space junk doesn’t pose any real danger to us on the surface, as any object drawn into the earth’s gravitational pull would burn up on re-entry. The big problem is our satellite systems. Last year two of them collided, instantly creating 1,500 more objects to hit. Not helping matters, China blew up a satellite with a missile in 2007, apparently to see if they could. That one act accounts for about a quarter of the debris, but before we harangue China, we might also want to remember the US Military’s ‘Needles Project‘. Conceived as a Cold War back-up communication device, scientists are still discovering little clusters of the millions of copper needles that were released into orbit in 1963. Moving at almost five miles a second, anything larger than a speck of paint is enough to destroy a satellite, and it could become a chain reaction. As a US Defense Department review explained in May, the debris from one collision triggers a second, which causes a third, until everything in that orbit is destroyed. A worst case scenario would be a collapse in GPS systems, international communications, satellite television, and weather monitoring, and space rendered unusable for generations. As you might expect, the people most concerned are the ones who depend most heavily on satellite technology, and the US military is a key player in finding a solution. There are solutions – debris could be knocked out of orbit from a ground-based laser or a roving robot, causing it either to burn up in the earth’s atmosphere or spin out to a higher and safer altitude. There are no cheap or easy answers. Like the oceans, it’s easy to think of space as being vast and boundless and there for our every unthinking use, but everything has a limit. I don’t think we need to lie awake worrying about space debris, but I think it symbolises our careless attitude to the earth rather well.

### Impact-Without satellites, the US military will collapse

Baldor 2-21-2011(Lolita C: Writter for the Associated Press: Pentagon strategy stressesthe importance of satellites- http://www.lexisnexis.com.turing.library.northwestern.edu/lnacui2api/results/docview/docview.do?doc LinkInd=true&risb=21\_T12363249253&format=GNBFI&sort=RELEVANCE&startDocNo=1&resultsUrlKey=29\_T12363228917&cisb=22\_T12363249256&treeMax=true&treeWidth=0&csi=8075&docNo=12)

The U.S. military needs to better protect its satellites and strengthen its ability to use them as weapons as the uncharted battlefield of space becomes increasingly crowded and dangerous, Pentagon leaders say. A new military strategy for space, as mapped out by the Pentagon, calls for greater cooperation with other nations on space-based programs to improve the United States' ability to deter enemies. "It's a domain, like air, land and sea," said Gen. Kevin Chilton, who led U.S. Strategic Command until he retired late last month. "Space is not just a convenience. It's become a critical part in every other [battlefield] domain." The United States, Chilton said, needs to make sure that it protects and maintains the battlefield capabilities it gets from space, including global-positioning data, missile warning system information, and communications with fighters or unmanned drones that are providing surveillance or firing missiles against the enemy. As the United States and other countries depend more on their satellites for critical data, those assets become greater targets for their enemies. "It's prudent to anticipate that, at this point, we will not go into a future conflict with a sophisticated adversary and not expect to be challenged in the space domain," Chilton said in an interview. While the newly released strategy stresses the peaceful use of space, it also underscores the importance of satellites in waging war and deterring war."We need to ensure that we can continue to utilize space to navigate with accuracy, to communicate with certainty, to strike with precision and to see the battlefield with clarity," said William Lynn, deputy defense secretary. Lynn and other Pentagon leaders say space has become more congested, competitive and contested, and the United States needs to keep pace on all fronts. Gen. James Cartwright, vice chairman of the Joint Chiefs of Staff, said the United States and other nations must develop rules of the road for space that lay out what is acceptable behavior and movement. At a forum put on by the Center for Strategic and International Studies, Cartwright said nations need to have guidelines that govern the approximately 22,000 man-made objects orbiting Earth, including about 1,100 active satellites. For example, he said, there is nothing that requires objects to pass left to left, or that says which country should move its satellite if two objects are on a collision course. While avoiding crashes is an important goal, officials said nations also need to ensure that their communications and other signals passing through the satellites are not in conflict. The strategy offers little detail about offensive operations in space. But defense officials say that China, Iran and other countries have demonstrated their abilities to take action in space. In January 2007, China startled world leaders when it took out a defunct weather satellite with a warhead launched on board a ballistic missile. China's actions made it the first country to destroy a satellite with a ground-based missile. The United States and Russia had shot down satellites, but the United States did it in 1985 with an air-launched missile and the Soviets with a hunter satellite. The China shoot-down alarmed officials, who said it signaled the beginning of space wars and would set off a race to militarize space.

## Space Junk DA---2NC Overview

**In the squo, space debris is an increasing problem for all space programs. On frequent occasions, satellites are narrowly missed by a piece of space debris that would destroy the satellite; furthermore, every additional [insert what the plan sends up into space] we launch into space, the likelihood of that collision increases. Additionally, our Jeremy 10 card indicates that for every collision, thousands of new pieces of space debris is created. The impact is that debris will become so concentrated that space will not be usable and also our satellite network will be destroyed.**

### Magnitude- The impact to the disadvantage is the collapse of military readiness due to the lack of satellites- that’s Baldor 2011. Additionally, with the increase in space debris, space will be rendered useless, thus all of the impacts to the case will be inevitable.

### Probability-Collision is extremely probable: Potential risks happen at least once a week.

Gaudin 09(Sharon March 23: Frequently writes about dangers of space- NASA says satellite collision, Chinese test behind flood of space debris: http://www.computerworld.com/s/article/9130236/NASA\_says\_satellite\_collision\_Chinese\_test\_behind\_flood\_ of\_space\_debris)

A February collision of Iridium and Russian communication satellites and the destruction in 2000 of a Chinese satellite are the likely sources of much of the space debris that have been hurtling precariously close to the International Space Station in recent weeks, according to NASA. The crews of the space station and the space shuttle Discovery yesterday had to maneuver the two crafts out of the path of a four-inch piece of the Chinese satellite that was moving quickly toward them. NASA officials feared that the debris would have come too close for comfort to the locale of today's already dangerous spacewalk by two NASA astronauts. The Discovery docked with the International Space Station last Tuesday. This is the third time in little more than a week that space junk has come close enough to the space station to pose a potential risk to the crew and the orbiter. The space station crew was on alert early last week before a four-inch piece of a defunct Russian satellite ultimately flew harmlessly by on Tuesday morning. And late the week before, the two U.S. astronauts and one Russian cosmonaut aboard the station were forced to seek shelter in the attached Soyuz TMA-13 Capsule when a piece of an old rocket motor came dangerously close. "There's definitely more debris up there," NASA spokesman Bill Jeffs said today. "That collision means more debris will make its way down to the lower orbit [where the space station is]. It's adding a lot of particles up there." Last month, the Iridium communication satellite collided with a Cosmos 2251 Russian government communication satellite. Jeffs said the Russian satellite was believed to be nonoperational at the time of the crash, which knocked out the Iridium satellite. The collision happened about 491 miles over Siberia. The orbit of the space station -- and for the duration of the current mission, the orbit of the space shuttle as well -- is about 220 miles above the Earth. That means as the debris slowly falls into lower orbits, it will increasingly litter the space around the space station. Jeffs pointed out that debris can litter space for decades after the break up of a rocket or satellite. For instance in January 2007, China shot down one of its own satellites as part of an antisatellite test, said Jeffs. Debris from that could easily be problematic for the space station one day, even though the satellite was destroyed two years ago. The piece of debris that forced the maneuvering of the shuttle and station yesterday was from a Chinese satellite that was launched in 1999 and broke up in 2000, NASA said. "There's just more debris up there," said Jeffs, adding that the U.S. Strategic Command is constantly tracking it.

### Timeframe- It could be tomorrow: The second the affirmative’s plan of sending [whatever they send] is implemented, the probability of collisions would exponentially increase.

## Uniqueness---General

### Space debris forces avoidance maneuvers

Vergano 7-10-11 (Dan: Writer for US today- Floating debris poses risk to space station: <http://www.usatoday.com/tech/science/space/2011-07-10-space-shuttle-docking_n.htm>)

A small piece of space debris may pass dangerously close to the International Space Station, mission managers reported Sunday, requiring an orbit boost to preserve a planned space walk on the final mission of the space shuttle Atlantis. The shuttle docked flawlessly to the station Sunday morning in its final rendezvous with the orbiting outpost. Among the tasks ahead for the mission is a spacewalk Tuesday to remove a failed pump from the station, planned to occur during the passage of the orbital debris, preliminarily estimated to happen at 12:59 p.m. ET. "In all likelihood, we will not need to initiate debris avoidance," space shuttle deputy program manager LeRoy Cain said at a briefing at Johnson Space Center. If necessary, the maneuvering rockets on the space shuttle latched to the station would be briefly fired to move the orbiting lab out of harm's way, without disrupting crew activities. "It's not uncommon," Cain said. "There is a lot of junk in orbit." The space station crew was forced to take refuge last month following a close pass by a piece of debris. Such debris is often paint chips or small parts of discarded rockets and satellites. Because objects in orbit travel very fast, where the space station passes around the Earth at about 17,000 miles per hour, even a collision with something as small as a screw is a safety concern. Mission managers will know today what the odds are that the debris tied to a destroyed 1970 Russian "Cosmos" satellite may pass within the roughly 12-mile-by-12-mile and 1-mile thick safety region around the station. The debris threat raised the only clouds on the final shuttle mission since its takeoff on Friday despite rain squalls. "I'm pleased to report the rendezvous and docking was absolutely flawless," Cain said. The 11:07 a.m. ET docking followed a series of small rocket firings that raised the shuttle to the station's 240-mile altitude. After a back flip that allowed station cameras to inspect heat shield tiles, shuttle commander Chris Ferguson perfectly docked the space shuttle for the last time. "It's great to be here," Ferguson said at the docking, Atlantis' 12th connection to the orbiting lab. In all, space shuttles have docked 37 times to the 460-ton station, largely built from trusses and modules hauled to space by Atlantis and its now-retired sister space shuttles. "It was a powerful moment," said shuttle flight director Kwatsi Alibaruho, of the final shuttle docking. "I know the significance of that was felt by the astronauts on board." Astronauts embraced their space station counterparts from the U.S, Russian and Japanese space agencies after opening connecting hatches. The visit increases the station's population to 10 men and women. The combined crew today will remove the Rafaello supply module from the shuttle and dock it to the station, temporarily adding a supply closet stuffed with 8,000 pounds of supplies to the orbiting lab. "They will be busy; I promise you that," Cain said. Along with experiments and the planned Tuesday spacewalk, 160 hours of the shuttle astronauts' remaining eight days will be devoted to moving supplies onto the station. Food, clothing and equipment carried to orbit should keep the orbiting lab stocked until the end of 2012.

### **Thousands of pieces of Junk in space: Can do serious damage**

Hsu 12-23-10(Jeremy: Journalist who covers science, technology, and space: Space Junk Rivals Weapons as a Major Threat- http://www.space.com/10537-space-junk-rivals-weapons-major-threat.html)

What began as a minor trash problem in space has now developed into a full-blown threat. A recent space security report put the problem of debris on equal footing with weapons as a threat to the future use of space. Hundreds of thousands of pieces of space junk — including broken satellites, discarded rocket stages and lost spacewalker tools — now crowd the corridors of Earth orbit. These objects could do serious damage to working spacecraft if they were to hit them, and might even pose a risk to people and property on the ground if they fall back to Earth and are large enough to survive re-entering the atmosphere.

## Uniqueness---Untraceable

### Millions of untraceable debris in space that could destroy any satellite

### **NASA 10**(October 23: Space Debris and Human Spacecraft- <http://www.nasa.gov/mission_pages> /station/news/orbital\_debris.html)

Space debris encompasses both natural (meteoroid) and artificial (man-made) particles. Meteoroids are in orbit about the sun, while most artificial debris is in orbit about the Earth. Hence, the latter is more commonly referred to as orbital debris. Orbital debris is any man-made object in orbit about the Earth which no longer serves a useful function. Such debris includes nonfunctional spacecraft, abandoned launch vehicle stages, mission-related debris and fragmentation debris. There are more than 20,000 pieces of debris larger than a softball orbiting the Earth. They travel at speeds up to 17,500 mph, fast enough for a relatively small piece of orbital debris to damage a satellite or a spacecraft. There are 500,000 pieces of debris the size of a marble or larger. There are many millions of pieces of debris that are so small they can’t be tracked. Even tiny paint flecks can damage a spacecraft when traveling at these velocities. In fact a number of space shuttle windows have been replaced because of damage caused by material that was analyzed and shown to be paint flecks. “The greatest risk to space missions comes from non-trackable debris,” said Nicholas Johnson, NASA chief scientist for orbital debris. With so much orbital debris, there have been surprisingly few disastrous collisions. In 1996, a French satellite was hit and damaged by debris from a French rocket that had exploded a decade earlier. On Feb. 10, 2009, a defunct Russian satellite collided with and destroyed a functioning U.S. Iridium commercial satellite. The collision added more than 2,000 pieces of trackable debris to the inventory of space junk. China's 2007 anti-satellite test, which used a missile to destroy an old weather satellite, added more than 3,000 pieces to the debris problem.

### NASA cannot trace millions of pieces of debris

Lieutenant Colonel Imburgia 11 (Joseph S., B.S., United States Air Force Academy, Judge Advocate in the USAF and is legal exchange officer to the Directorate of Operations and International Law, “Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreements to Clean Up Junk”, 5-1-11,http://findarticles.com/p/articles/mi\_hb3577

In March 2010, the United States was tracking 2,841 fragments from the ASAT mission that measured greater than five centimeters in diameter, plus another 500 fragments that had not yet been cataloged. (83) NASA estimates the population of debris larger than one centimeter from the explosion to be greater than 150,000. (84) Worse yet, scientists speculate that the explosion increased the space debris population by millions of undetectable pieces of debris. (85) By the end of 2008, less than 2 percent of the ASAT mission's debris population had reentered the atmosphere. (86) Consequently, the debris population far exceeds NASA's initial predictions, and unless something is done to remove it, Earth will have to deal with the resultant wreckage for years, perhaps even thousands of years, to come. (87) According to NASA's Nicholas Johnson, due to the altitude at which the satellite was destroyed, much of the debris will be "in orbit for 100 years or more.... Some will come down earlier, but the majority will be up there for a very long time." (88)

## Uniqueness---Brink

### **The cascade effect is happening in a little more than a decade**

Lieutenant Colonel Imburgia 11 (Joseph S., B.S., United States Air Force Academy, Judge Advocate in the USAF and is legal exchange officer to the Directorate of Operations and International Law, “Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreements to Clean Up Junk”, 5-1-11,http://findarticles.com/p/articles/mi\_hb3577

The "cascade effect" is "the greatest fear of those who study the problem of orbital debris." (50) Even before the February 2009 satellite collision, many scientists agreed "that the number of objects in orbit had surpassed a critical mass," (51) the point at which "orbital debris would collide with other space objects, which in turn would create new debris that would cause [a chain reaction of] even more collisions." (52) This "chain reaction" is often referred to as the cascade effect. (53) Some experts believe that once space debris collisions begin, they will be impossible to stop. (54) The fear is that these cascading "collisions will eventually produce an impenetrable cloud of fragmentation debris that will encase Earth[, making] space travel ... 'a thing of the past' and ... obstruct[ing] our dream of colonizing outer space." (55) Experts warn that if the cascade effect occurs, space will be unusable for centuries due to the time it will take for all of the debris to eventually disintegrate in Earth's atmosphere. (56) If space debris is not immediately countered by preventative and removal measures, the cascade effect could occur in little more than a decade. (57) In February 2008, Dr. Geoffrey Forden, a Massachusetts Institute of Technology physicist and space programs expert, stated that the United States is "in danger of a runaway escalation of space debris." (58) He argued that the danger of a cascade effect is a greater threat to U.S. space assets than the threat of anti-satellite (ASAT) weapons. (59) NASA scientists have warned about the threat of the cascade effect since the late 1970s. (60) In the decades since, experts have worried that collisions caused by the cascade effect "would expand for centuries, spreading chaos through the heavens" (61) and multiplying space "debris to levels threatening sustainable space access." (62) "Today, next year or next decade, some piece of whirling debris will start the cascade, experts say."

## Link

### An increase in the number of objects in space makes Kessler’s syndrome more likely

### **Clark 10**(Stuart Sept. 11: Who you gonna call? Junk busters!- Astronony Journalist- http://www.lexisnexis.com.turing.library.northwestern.edu/lnacui2api/results/docview/docview.do?docLinkInd=true&risb=21\_T12376992676&format=GNBFI&sort=BOOLEAN&startDocNo=1&resultsUrlKey=29\_T12376992679&cisb=22\_T12376992678&treeMax=true&treeWidth=0&selRCNodeID=139&nodeStateId=411en\_US,1&docsInCategory=11&csi=158275&docNo=3)

Orbit is overcrowded, call in the junk busters We'll soon be cut off from space if we don't deal with the debris in orbit, warns Stuart Clark EARTH'S rings have never looked so beautiful, you think as you look up at the pallid sliver of light arcing through the night sky. Yet unlike Saturn's magnificent bands of dust and rubble, Earth's halo is one of our own making. It is nothing but space junk, smashed-up debris from thousands of satellites that once monitored our climate, beamed down TV programmes and helped us find our way around. This scenario is every space engineer's nightmare. It is known as the Kessler syndrome after Donald Kessler, formerly at NASA's Johnson Space Center in Houston, Texas. Back in 1978, he and colleague Burton Cour-Palais proposed that as the number of satellites rose, so would the risk of accidental collisions. Such disasters would create large clouds of shrapnel, making further collisions with other satellites more likely and sparking a chain reaction that would swiftly surround the Earth with belts of debris. Orbits would become so clogged as to be unusable and eventually our access to space would be completely blocked. On 10 February 2009 it started to happen. In the first collision between two intact satellites, the defunct Russian craft Kosmos-2251 struck communications satellite Iridium 33 at a speed of 42,100 kilometres per hour. The impact shattered one of Iridium 33's solar panels and sent the satellite into a helpless tumble. Kosmos-2251 was utterly destroyed. The two orbits are now home to clouds of debris that, according to the US military's Space Surveillance Network (SSN), contain more than 2000 fragments larger than 10 centimetres. The collision may also have produced hundreds of thousands of smaller fragments, which cannot currently be tracked from Earth. Such debris is a serious worry. With satellites travelling at tens of thousands of kilometres per hour, any encounter with debris could be lethal. "Being hit by a 1-centimetre object at orbital velocity is the equivalent of exploding a hand grenade next to a satellite," says Heiner Klinkrad, head of the space debris office at the European Space Agency in Darmstadt, Germany. "Iridium and Kosmos was an early indication of the Kessler syndrome." Space junk isn't just made up of dead satellites. It also includes spent upper-stage rockets, used to loft the satellites into orbit, and items that have escaped the grasp of butterfingered astronauts, such as the glove Ed White dropped in 1965 as he became the first American to walk in space, and the tool kit that slipped from Heide Stefanyshyn-Piper's hand during a 2008 space walk. Protective covers and the explosive bolts used to separate them from uncrewed spacecraft have also been left to float away, along with a few lens caps for good measure. Some of these objects re-enter the atmosphere and burn up, but most are still up there. The SSN has catalogued 12,000 objects in Earth orbit that are at least 10 centimetres in size, about three-quarters of which are space junk. For objects bigger than 1 centimetre, the estimates are frightening: there are anything from hundreds of thousands to millions of them, mostly in unknown orbits and each capable of smashing a satellite to smithereens. Every rocket launch creates yet more space debris, edging us ever closer to the Kessler syndrome becoming a reality.

### An increase of satellites, shuttles, or rockets going into space will increase the likelihood of collision, which snowballs.

DREXLER 09(Eric March 3: The Space Debris Collision Problem: Engineer in molecular nanotech: http://metamodern.com/2009/ 03/03/the-space-debris-collision-problem/)

A few weeks ago, a US and Russian satellite collided, spreading debris around near-Earth space. The video below shows an animation based on a state-of-the-art model of the event and the resulting clouds of ultra-high-speed projectiles. Collisions like this can be expected to occur with increasing frequency. The Economist just ran an editorial calling for countries to take care not to make a mess with abandoned satellites, spent rockets, exploding fuel tanks, and other junk. One might almost think that these measures would solve the problem. They won’t. Every collision creates debris that raises the frequency of further collisions. The graph above from a 2006 article in Science , Risks in Space from Orbiting Debris, shows the projected increase of 10 cm+ space debris according to a model that was run with the optimistic assumption that nothing has been launched since 2004, and that this complete moratorium on adding junk in orbit will continue forever. This ends the steep climb, but doesn’t reverse it. The effect of launching more satellites and associated junk — and of China’s messy anti-satellite missile test in 2007, and of the collision last month — is to speed the onset of a more-or-less exponential growth process. There are currently more than 9,000 pieces of substantial size, with a total mass of over 5 million kg, and each piece is moving far faster than the highest-velocity bullet. This is a particular problem for large targets with people in them, like the Shuttle and space station. According to the Science article, no one has a good idea what to do about this problem. Actually collecting the stuff would require, for example, the ability to produce many thousands of small, inexpensive, automated spacecraft at low cost. (So many problems, when examined from the right angle of view, hinge on manufacturing — the ability to make things.)

### Emperics prove that the more satellites, shuttles, or rockets in the air, collisions increase

Iannotta & Malik 09 (Becky and Tariq Feb 11th: Writers for space.com: U.S. Satellite Destroyed in Space Collision- http://www.space.com/5542-satellite-destroyed-space-collision.html)

Johnson said outdated spacecraft, rocket stages and other components break apart in space every year, but there have only been three relatively minor collisions between such objects in the last 20 years. Never before have two intact satellites crashed into one another by accident, he added. The debris created in Tuesday?s collision is being tracked to assess its risk of damaging other satellites and the International Space Station, which is currently home to two American astronauts and one Russian cosmonaut. The space station flies at an altitude of about 220 miles (354 km), well below the impact point between the Russian and U.S. satellites 490 miles (790 km) up. Johnson said that only a very minor portion of debris from the two clouds is expected to descend across the space station?s orbital path. ?We believe that the increased risk above the normal every day background risk is very, very small,? Johnson said NASA?s orbital debris experts are also assessing the threat to other spacecraft. The agency?s Earth Observing System satellites, which orbit at 438 miles (705 km), ?are of highest interest for immediate consideration,? NASA said in its e-mail alert, a copy of which was forwarded to Space News, a sister publication to SPACE.com. Drey told SPACE.com that the first hint of the collision came when Iridium officials contacted a U.S. Strategic Command support office to report that they had lost contact with one of their satellites. ?Shortly after, our space surveillance center reported that they had observed multiple new objects in low orbit,? Drey said. The U.S. Space Surveillance Network continuously tracks more than 18,000 separate man-made objects and debris at any given time, he added. Tuesday?s collision is the latest in a series of satellite woes in recent weeks. Last month, the nascent Eutelsat W2M telecommunications satellite failed in orbit just five weeks after it launched into space. Another communications satellite, ASTRA 5A owned by SES Luxemburg, also failed and was adrift in orbit. The loss forced its operators to warn the owners of neighboring satellites to be prepared for the remote possibility of having to maneuver their spacecraft to avoid a collision with Astra 5A. NASA?s Orbital Debris Program Office also released an update last month on Russia?s Soviet-era satellite Cosmos 1818 stating that the spacecraft appeared to spew a cloud of debris on July 4, 2008 that may be the result of leaking reactor coolant from a debris strike or fragmentation.

### **The growth in use of space increases space debris**

Lieutenant Colonel Imburgia 11 (Joseph S., B.S., United States Air Force Academy, Judge Advocate in the USAF and is legal exchange officer to the Directorate of Operations and International Law, “Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreements to Clean Up Junk”, 5-1-11,http://findarticles.com/p/articles/mi\_hb3577

The fundamental dilemma with "space debris" is that "[g]rowth in the debris population increases the probability of inter-debris collision[s]" that have the potential to create even more debris. (66) This problem is only exacerbated by the increased demand for space use by both the public and private sectors. The decades to follow will only result in increased use of space and, therefore, increased space debris. (67) From 2004 to 2010, the annual growth rate of tracked debris increased every year except 2008. (68) At the beginning of 2010, Earth's orbit held 2,347 more space debris objects measuring more than ten centimeters in size than it held at the beginning of 2009, a 15.6 percent increase. (69) The greatest annual increase in space debris to date occurred in 2007. (70) At the beginning of 2008, Earth's orbit held 2,507 more space debris objects measuring more than ten centimeters than it held at the start of 2007. (71) This marked a 20.12 percent increase in the space debris population in just one year. (72) A large portion of this increase is attributable to China and Russia, as discussed in the following subparts. 1. China's 2007 Intentional Obliteration of an Old Weather Satellite On January 11, 2007, China launched a small ballistic missile with a kinetic kill vehicle 537 miles into space to destroy its aging weather satellite, the Fengyun-1C. (73) The resulting explosion and destruction sent thousands of destructive pieces of debris from both the satellite and the missile into various orbital planes around Earth, "ranging in altitude from 3,800 km [2,361 miles] on the high end down to about 200 km [124 miles] at the lowest." (74) Worse yet, because the fragmentation debris was ejected in a variety of initial directions and high velocities, the debris orbits rapidly spread out in a toroidal debris cloud (75) that eventually surrounded the globe. (76) After only six months, the debris cloud from the Fengyun-1C ASAT mission had already rapidly dispersed into various orbits around Earth. (77) By January 2009, the debris cloud had completely surrounded Earth. (78)

## Impacts

## **Turn**

### Space Junk will make Space Unusable: Turns the Case

Atkinson 08(Nancy April-11: Space Debris Illustrated: The Problem in Pictures: writes mainly about space exploration and astronomy. She is the Senior Editor and writer for Universe Today: http://www.universetoday.com/13587/space-debris-illustrated-the-problem-in-pictures/)

Space junk, space debris, space waste — call it what you want, but just as junk and waste cause problems here on Earth, in space spent booster stages, nuts and bolts from ISS construction, various accidental discards such as spacesuit gloves and cameras, and fragments from exploded spacecraft could turn into a serious problem for the future of spaceflight if actions to mitigate the threat are not taken now. The European Space Operations Centre has put together some startling images highlighting this issue. Above is a depiction of the trackable objects in orbit around Earth in low Earth orbit (LEO–the fuzzy cloud around Earth), geostationary Earth orbit (GEO — farther out, approximately 35,786 km (22,240 miles) above Earth) and all points in between. Between the launch of Sputnik on 4 October 1957 and 1 January 2008, approximately 4600 launches have placed some 6000 satellites into orbit; about 400 are now travelling beyond Earth on interplanetary trajectories, but of the remaining 5600 only about 800 satellites are operational – roughly 45 percent of these are both in LEO and GEO. Space debris comprise the ever-increasing amount of inactive space hardware in orbit around the Earth as well as fragments of spacecraft that have broken up, exploded or otherwise become abandoned. About 50 percent of all trackable objects are due to in-orbit explosion events (about 200) or collision events (less than 10). Officials from the space shuttle program have said the shuttle regularly takes hits from space debris, and over 80 windows had to be replaced over the years. The ISS occasionally has to take evasive maneuvers to avoid collisions with space junk. And of course, this debris is not just sitting stationary: in orbit, relative velocities can be quite large, ranging in the tens of thousands of kilometers per hour. For the Envisat satellite, for example, the ESA says the most probable relative velocity between the satellite and a debris object is 52,000 kilometers per hour. If a debris objects hits a satellite, the ISS or the Shuttle, at those speeds it could cause severe damage or catastrophe. Above is a depiction of debris in polar orbit around Earth. From the image below, it’s evident how explosions of spacecraft causes even more scattered debris. Even after the end of the mission, batteries and pressurised systems as well as fuel tanks explode. This generates debris objects, which contribute to the growing population of materials in orbit, ranging from less than a micrometer to 10 centimeters or more in size. About 40% of ground-trackable space debris come from explosions, now running at four to five per year. In 1961, the first explosion tripled the amount of trackable space debris. In the past decade, most operators have started employing on-board passive measures to eliminate latent sources of energy related to batteries, fuel tanks, propulsion systems and pyrotechnics. But this alone is insufficient. At present rates, in 20 or 30 years, collisions would exceed explosions as a source of new debris. The ESA says it is crucial to start immediately to implement mitigation measures. This image shows a simulation of the the 2112 GEO environment in the case when no measures are taken. In the top panel, with mitigation measures, a much cleaner space environment can be observed if the number of explosions is reduced drastically and if no mission-related objects are ejected. The bottom panel shows the “business-as-usual” scenario, without any mitigation measures taken. However, to stop the ever-increasing amount of debris, more ambitious mitigation measures must be taken. Most importantly, spacecraft and rocket stages have to de-orbited and returned to Earth after the completion of their mission. They’ll burn up in the atmosphere, or splash down in uninhabited ocean areas. In the case of telecommunication and other satellites operating in the commercially valuable geostationary zone, they should boost their satellites to a safe disposal orbit, as shown below. There are other measures, like reducing the number of mission-related objects and controlling the risk for reentry, but these are the basics. The issue is that such mitigation measures cost fuel and operational time, and therefore they increase cost. In the commercial world, this may competitiveness, unless there is an international consensus to accept such costs.

### Space Junk prevents the use of rockets and space shuttles

IPS Radio and Space Services 7-15-2011(Australian Weather Agency: Overview of Orbital Space Debris: http://www.ips.gov.au/Educational/4/2/1)

It used to be thought that space was a very large and limitless place, and indeed it is, but those areas of space in which man has been orbiting satellites for over 40 years are now becoming crowded. Crowded not so much with useful satellites, but crowded with non-functional satellites, final stage launch rocket bodies, and with multitudes of smaller objects that have resulted from numerous satellite deteriorations and fragmentations. Collectively, this material is now referred to as Orbital Space Debris. It is supplemented by natural space debris (ie meteoroids) that also passes through Earth orbit. The smaller pieces of orbital space debris now exceed the population of meteoroids in Earth orbit and are becoming an increasing threat to orbiting spacecraft. The larger the spacecraft and the longer it stays in orbit, the greater is the chance that it will be hit by a piece of orbital space debris. The diagram below indicates the sources and sinks that cause changes in the orbital space debris population. The initial and continuing source of space debris is the launch of satellites. Not only the satellites themselves add to the population of orbiting space objects, but often the last stages of the rockets that are used to place them in orbit also remain aloft for many years. As satellites get old they deteriorate under the influence of the space environment. Outgassing can not only release gases, but may also take other materials with them, as the gas beneath a surface slowly makes it way into the surrounding environment. The strong solar UV in space can cause the deterioration of many materials. Paint and other surface materials may be expelled in flakes. More catastrophic than age related deterioration are satellite fragmentation events. These may result from collisions with other (external) objects, or they may be explosive, as when remnant fuel in an old spacecraft undergoes an exothermic reaction (ignites). Both of these type of events can produce an astounding number of small fragments that become a new source of space debris. On the debit side, the removal of orbiting space debris may be due to a deliberate action or the result of natural orbital decay. In low Earth orbits, a satellite is subject to atmospheric drag, and this will eventually cause it to re-enter the Earth's atmosphere. Unless the object is particularly large, it will completely ablate during this process, and there will be no visible remnant that reaches the ground. If the object is felt to pose a threat to life and infrastructure on the ground, then it is sometimes possible to cause a controlled re-entry with a fuelled de-orbit burn. Other spacecraft, such as the Space Shuttle may sometimes be directed to directly retrieve an ageing spacecraft of particular significance. In the past this has been only for satellite refurbishment, but in the future it might be due to environmental concerns. Orbital space debris is of increasing concern to all space agencies around the world, and is becoming the subject of legal discussions. The areas of concern are: Monitoring the orbital space debris environment Satellite design to minimise orbital space debris Satellite operations to minimise orbital space debris Modelling of orbital space debris and its effects Hypervelocity facilities to measure debris impact effects Satellite design to minimise the effects of space debris impacts Consideration of active measures to reduce space debris Legal implications of orbital space debris Space tracking stations around the world can detect space debris down to the centimetre level. Long duration exposure experiments in space can inform us about the space debris population of micron size. Ground meteor radars are currently being investigated to determine whether they can provide useful

### Space Junk makes collisions of shuttles, rockets, and satellites likely

Softpedia.com 10(Feb 3rd: Space-Debris Crisis Now Degenerating- http://news.softpedia.com/news/ Space-Debris-Crisis-Now-Degenerating-135823.shtml)

Data from US military networks, and from independent German radar measurements show that the European Space Agency's (ESA) huge Envisat satellite passed incredibly close to the spent upper stage of a Chinese rocket last month. Telemetry data showed that the two spacecraft zipped past each other separated by a distance of just 160 feet (50 meters), which had space experts on the edge of their seats. The recent incident again underlines the deteriorating condition of our planet's orbit, which is becoming increasingly clogged with debris from all sorts of space missions, Space reports. If the Chinese rocket had collided with the European satellite, the result would have been devastating. Envisat is one of the largest spacecraft in orbit, weighing in at around eight tons. The rocket stage weighs about 3.8 tons, so a combined mass of more than 11 tons would have been pulverized into fast-traveling shards. Such small pieces of metallic debris, which move with incredible speed, can cause a devastating chain reaction in orbit. If they impact other satellites, they have the ability to destroy them as well, creating even more shards and debris, and fueling the vicious circle. In order to avoid this scenario, European experts maneuvered their satellite using some of the propellant left onboard. According to ESA official Heiner Klinkrad, who is the head of the Space Debris Office, in Darmstadt, Germany, a collision between the two objects would have spelled “mayhem.” He explains that the altitude at which the two are currently flying is already littered with debris as it is, and that further impacts could reduce the chances of any other spacecraft passing through and onward into space. At the same distance from the Earth's surface, a Russian Cosmos spacecraft collided with an American satellite early last year, producing a vast amount of debris. The other shards present in this particular orbit were generated by the Chinese anti-satellite test that was conducted in 2007. “The future environment is expected to worsen without additional corrective measures,” NASA Johnson Space Center chief scientist for orbital debris Nicholas Johnson says. He adds that five spacecraft belonging to the American space agency had to undergo collision-avoidance maneuvers last year. These included the Tracking and Data Relay Satellite (TDRS-3), Cloudsat, the Earth Observing Mission 1, Aqua, and Landsat 7. What's more worrying, he adds, is that the International Space Station (ISS) and some shuttle missions also had to steer clear of incoming metallic fragments. “A penetrating object hitting the ISS, and possibly causing a casualty onboard […] I think that would be the most dramatic case we could have,” Klinkrad shares, adding that medical evacuations from the ISS are incredibly difficult to even plan, let alone perform. Currently, there are two Americans, two Russians, and one Japanese aboard the orbital facility.

### Space Junk threatens satellites.

PowerMediaPlus.com 08(April 16th, Space Debris Causes Concern: http://www.powermediaplus.com/news/archive.aspx?newsTypeID=1&newsID=3413)

Scientists believe the large amount of space debris orbiting around Earth could create a chain reaction of colliding space junk which could threaten parts of the world’s satellite network. According to scientists addressing the American Physical Society conference this week, last year’s successful Chinese missile test that destroyed one of its own aging satellites has substantially added to space debris around Earth. The threat is that debris would begin slamming into other debris, creating a cascading effect called super-criticality, the Los Angeles Times reports. Geoffrey Forden, a Massachusetts Institute of Technology physicist and an expert on the Chinese space program, told the Times the danger from space debris is more of a worry than the threat that China could intentionally cripple U.S. space assets with anti-satellite weapons. Forden argued that the U.S.'s redundancy in space satellite systems makes it almost "invulnerable" to that kind of attack. On the other hand, "we are in danger of a runaway escalation of space debris." Because there is already so much debris--more than 150 million pieces, most of them less than two inches across--even if nothing more is added, the amount will still increase by a factor of three in the next 200 years because of fragmentation from collisions. That could be a low figure if more anti-satellite tests take place. Destruction of a single ten-ton satellite can contribute up to 15 million pieces of junk. Even now, a satellite orbiting Earth passes within sixty miles of a piece of junk several thousand times a day and has a 1 percent chance each year of getting hit, according to the Times. The U.S. began to recognize the threat from space junk about a decade ago, David Wright, a senior scientist with the Union of Concerned Scientists in Cambridge, Massachusetts, told the Times. Since then, it has been taking measures to reduce the amount of new debris. Those efforts had largely succeeded until the Chinese demonstration. "We're fortunate we haven't really screwed things up yet," Wright said. "But the Chinese test brought home how quickly this could get out of hand."

## Military Readiness

### The US Military is absolutely dependent on Satellites to function effectively

Lieutenant Colonel Imburgia 11 (Joseph S., B.S., United States Air Force Academy, Judge Advocate in the USAF and is legal exchange officer to the Directorate of Operations and International Law, “Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreements to Clean Up Junk”, 5-1-11,http://findarticles.com/p/articles/mi\_hb3577

These gloomy prognostications about the threats to our space environment should be troubling to Americans. The United States relies on the unhindered use of outer space for national security. (151) According to a space commission led by former Secretary of Defense Donald Rumsfeld, "[t]he [United States] is more dependent on space than any other nation." (152) According to Robert G. Joseph, former Undersecretary for Arms Control and International Security at the State Department, "space capabilities are vital to our national security and to our economic well-being." (153) Therefore, a catastrophic collision between space debris and the satellites on which that national security so heavily depends poses a very real and current threat to the national security interests of the United States. Since "the [1991] Gulf War, the [United States] military has depended on satellites for communications, intelligence and navigation for its troops and precision-guided weapons." (154) Satellites are also used for reconnaissance and surveillance, command and control, and control of Unmanned Aerial Vehicles. (155) According to the United States Space Command's Fact Sheet: Satellites provide essential in-theater secure communications, weather and navigational data for ground, air and fleet operations and threat warning. Ground-based radar and Defense Support Program satellites monitor ballistic missile launches around the world to guard against a surprise missile attack on North America. Space surveillance radars provide vital information on the location of satellites and space debris for the nation and the world. Maintaining space superiority is an emerging capability required to protect our space assets.

### Heg good. US decline would be historically unprecedented and result in major conflict and global war

Robert A. Pape, ’09 ( Professor of political science at the University of Chicago. “Empire Falls,” The National Interest, January 2009 - February 2009)

THE UNITED States has always prided itself on exceptionalism, and the U.S. downfall is indeed extraordinary. Something fundamental has changed. America’s relative decline since 2000 of some 30 percent represents a far greater loss of relative power in a shorter time than any power shift among European great powers from roughly the end of the Napoleonic Wars to World War II. It is one of the largest relative declines in modern history. Indeed, in size, it is clearly surpassed by only one other great-power decline, the unexpected internal collapse of the Soviet Union in 1991. Most disturbing, whenever there are major changes in the balance of power, conflict routinely ensues. Examining the historical record reveals an important pattern: the states facing the largest declines in power compared to other major powers were apt to be the target of opportunistic aggression. And this is surely not the only possible danger from relative decline; states on the power wane also have a history of launching preventive wars to strengthen their positions. All of this suggests that major relative declines are often accompanied by highly dangerous international environments. So, these declines matter not just in terms of economics, but also because of their destabilizing consequences.

## Economy

### Satellites are key to the electric power industry, which is key to the economy.

### **Hertzfeld et al 03**(Henry R, Ray A. Williamson Avery Sen: PAPER DELIVERED AT INTERNATIONAL ASTRONAUTICAL CONFERENCE: WEATHER SATELLITES AND THE ECONOMIC VALUE OF FORECASTS: EVIDENCE FROM THE ELECTRIC POWER INDUSTRY- http://www.gwu.edu/~spi/assets/docs/Weather.pdf)

Weather forecasts of all types have economic significance to the electric power industry, as well as to virtually all other industries. This pa- per has focused on the electric power industry because of its importance as an integral part of the economic infrastructure as well as its very large size. Although national data on benefits are not available, the available case studies coupled with the expert opinions of those working in the industry indicate that the impact of improved weather forecasts may add up to hundreds of millions of dollars of avoided costs per year. This study indicates that using weather data to forecast the power grid load (demand) accurately allows utilities to trade on the day-ahead market more effectively, manage the start-up and shut- down of generating plants more efficiently, and plan with greater assurance for future capital expenditures. Improvements in the two to five- day weather forecast may result in the greatest impact on the load forecast and consequently on the economic impact to these utilities. These shorter-term improvements in weather forecast- ing ability will result from improving week- ahead and ten-day-ahead weather forecasts. There is much room for improvement in the ac- curacy of terrestrial weather forecasts and in providing forecast users with better models, cus- tomized to specific uses. Although most of the literature focuses on the temperature forecast because it is the primary variable in electric load forecasting, other weather data, such as humidity and precipitation are also valuable and will pro- vide industry with economic benefits. Further, the electric power industry will benefit from greater spatial detail in weather data. Satellites can be particularly helpful in this realm.

### Nuclear war

Mead 2009(Walter Russell/, 2/4/, a great American citizen, Only Makes You Stronger, The New Republic, p. <http://www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2>)

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

## Global Warming

### Satellites are key to solving global warming

### Science Daily 07(April 28th: Satellites Shed Light On Global Warming- http://www.sciencedaily.com/releases/2007/04 /070427120347. htm

As climate change continues to make headlines across the world, participants at the 2007 Envisat Symposium this week are hearing how Earth observation satellites allow scientists to better understand the parameters involved in global warming and how this is impacting the planet. The cryosphere is both influenced by and has a major influence on climate. Because any increase in the melt rate of ice sheets and glaciers has the potential to greatly increase sea level, researchers are looking to the cryosphere to get a better idea of the likely scale of the impact of climate change. In addition, the melting of sea-ice will increase the amount of solar radiation that will be absorbed by ice-free polar oceans rather than reflected by ice-covered oceans, increasing the ocean temperature. Average temperatures in the Antarctic Peninsula have risen over the last 50 years by half a degree Celsius a decade and are having an impact on the ice shelves and glaciers. Innsbruck University's Professor Helmut Rott has been observing the accelerated retreat and break-up of the Larsen Ice Shelf on the Antarctic Peninsula in the face of this warming through radar images acquired by ESA’s ERS and Envisat satellites. The retreat has been accelerating since 1992 and has culminated in two collapse events: Larsen-A in January 1995 and Larsen-B in March 2002. Envisat captured the disintegration of the 200-metre-thick Larsen-B Ice Shelf, which researchers estimate had been stable since the last ice age 12 000 years ago. "This retreat was triggered by climate warming, which caused prolonged summer melt seasons and the formation of extended melt water streams and ponds on the ice shelf surfaces," Rott said. The sections of Larsen-A, which disintegrated almost completely in January 1995, and Larsen-B that broke away were 200 to 350 metres thick. According to Rott, only 1403 square kilometres of Larsen-B remain and will soon break away completely. After the collapse event in 2002, the outlet glaciers from the Antarctic Peninsula that previously nourished the ice shelf retreated many kilometres above the previous grounding line. Altogether about 250 square kilometres of grounded ice have been lost at the outlet glaciers of former Larsen-A and Larsen-B ice shelves. The remoteness, darkness and cloudiness of Earth’s Polar Regions make them difficult to study. An instrument known as the Advanced Synthetic Aperture Radar (ASAR) allows Envisat to produce high-quality images of ice sheets because it is able to pierce through clouds and darkness. In addition to mapping ice boundaries, Rott used repeat-pass ASAR image data to map the flow velocities of glaciers. All the glaciers, where the buttressing ice had disappeared, have accelerated significantly. The retreat of grounded ice and the accelerated ice export due to increased velocity result in strongly negative mass balance of the glaciers. "The velocity of the glaciers increased up to eight-fold compared to the speed when the ice shelf buttressed the glaciers," Rott said. "The total estimated mass loss of glaciers above the disintegrated ice shelf sections since 2002 has been equivalent to about 2 percent of total sea level rise, which, although not a significant percentage, demonstrates the vulnerability of ice shelves to climatic warming and the importance of ice shelves for the stability of glaciers up-stream." "The disintegration processes observed at Larsen Ice Shelf are very relevant for estimating the future response to climatic warming of the much larger ice masses of West Antarctica, which contain freshwater equivalent to several metres of sea-level rise," Rott added. “Faster waves in a warmer ocean may result in complex repercussions on the climate system” Satellites have been extremely beneficial to scientists in understanding oceanic planetary waves, which are internal waves that have major effects on large-scale ocean circulation and thus on climate. These very long waves travel slowly across the oceanic basins influencing the major oceanic currents and are believed to play a role in the complex ‘planetary clock’ that triggers one of the major climatic anomalies – El Niño. "These waves are an important means of ocean adjustment to forcing. In a sense they ‘set the rhythm’ for some aspects of the interactions between oceans and climate. Faster waves in a warmer ocean, as an effect of climate change, may result in complex repercussions on the climate system, many of which could turn out to accelerate the change," Dr Paolo Cipollini of the National Oceanography Centre in the UK said. Cipollini illustrated the role satellite instruments have played in understanding these elusive waves. He pointed out that although they were theorised to have existed as far back as the 1930s, it was not until the advent of the satellite-borne radar altimeter that oceanographers were able to offer proof of their existence by mapping the sea surface height and seeing them move by following the measurements of the surface. Radar altimeters work by sending thousands of separate radar pulses down to Earth per second then recording how long their echoes take to bounce back to the satellite platform. The sensor times its pulses' journey down to under a nanosecond to calculate the distance to the planet below to a maximum accuracy of two centimetres. ESA has had radar altimeters in orbit since July 1991, when ERS-1 was launched, which was followed by ERS-2 in 1995 and Envisat in 2002 and will continue to launch radar altimeters with CryoSat planned for 2009 and Sentinel-3 planned for 2012. According to Cipollini, these waves have been recently observed to alter the colour of the sea, therefore they are believed to have some effect on phytoplankton – the tiny chlorophyll-pigmented algal cells that populate the oceans in huge numbers and play a leading role in the global carbon cycle and the primary production of nutrients. Current research is investigating these relationships by exploiting the powerful union of multiple views of the ocean made possible by different instruments like those in the Envisat suite, such as the Radar altimeter, Along Track Scanning Radiometer (ATSR) and Medium Resolution Imaging Spectrometer (MERIS). Envisat carries 10 instruments aboard and generates data on Earth’s land, oceans, ice and atmosphere. By comparing and contrasting information on ocean colour, surface temperature and sea level, scientists are exploring the many subtle ways in which these near-invisible waves are capable of affecting phytoplankton, as they may be providing them with an input of nutrient-rich water from the deep ocean as well as moving them around. These findings are then compared with the effect of waves in models, helping to make the models more realistic, which means better predictions for the future. Cipollini cited a recent modelling study by Canadian researchers that shows planetary wave speed is expected to increase considerably during this century as a side effect of climate change induced warming of the oceans, which may have a number of far-reaching effects on ocean dynamics. "It is no surprise, then, that scientists are eager to better understand these phenomena - and satellites provide both the indispensable validation of the theoretical hypotheses and the stimulus for new ideas,"

### Warming is real and causes extinction

Henderson 2006

[Bill, environmental scientist, “Runaway Global Warming Denial.” Countercurrents.org August 19,. [http://www.countercurrents.org/cc-henderson190806.htm](https://webmail.whitman.edu/horde/services/go.php?url=http%3A%2F%2Fwww.countercurrents.org%2Fcc-henderson190806.htm)]

The scientific debate about human induced global warming is over but policy makers - let alone the happily shopping general public - still seem to not understand the scope of the impending tragedy. Global warming isn't just warmer temperatures, heat waves, melting ice and threatened polar bears. Scientific understanding increasingly points to runaway global warming leading to human extinction. If impossibly Draconian security measures are not immediately put in place to keep further emissions of greenhouse gases out of the atmosphere we are looking at the death of billions, the end of civilization as we know it and in all probability the end of man's several million year old existence, along with the extinction of most flora and fauna beloved to man in the world we share.

## A2

## A2: Other countries Solve

### US is critical to solve Space Debris

Dinerman 9 [Taylor Dinerman: Part-time consultant of US Dept. of Defense, May 4, 2009, Unilateral orbital cleanup , <http://www.thespacereview.com/article/1365/1>]

It is often claimed that the US depends more on space activities than any other nation. It certainly spends more than anyone else. So while the degree of America’s dependence on satellites for military, commercial, and civil purposes may be legitimately questioned, its interest in seeing the near-Earth space environment kept as free of debris as possible is all too obvious. Over the years there have been many ideas floating around on how to deal with this problem. While international agreements, such as the 2007 Debris Mitigation Guidelines or proposals to share space situational awareness information, may be marginally useful, they will never, by themselves, remove a single speck of space junk from our planet’s neighborhood. When it comes to actually doing something about the problem the task and most of the cost will almost inevitably fall to the Americans.

## A2: Uniqueness overwhelms the Link

### Space debris can be solves: Russian pod

### **Heimbuch 10**(Jaymi, 11-29-10: Russia Investing $2 Billion in Space Debris Removal: Writer for Tree Hugger.com and received her degree in English from California Polytechnic State University: http://www.treehugger.com/author/jaymi-heimbuch-san-francisco-c-1/)

We've seen some crazy ideas for getting rid of space debris, a problem that sounds absurd in itself but is actually a real issue for

satellites and even astronauts in the International Space Station. However, Russia is set on a concept that they think is worth serious investment -- about a $2 billion investment. Energia, Russia's space corporation, is planning to build a "pod" that will knock junk out of orbit and back down to earth. According to Fast Company, the pod will have a nuclear power core to keep it running for about 15 years while it orbits the earth knocking defunct satellites out of orbit so that it can either burn up in the atmosphere or drop into the ocean (hopefully not on somewhere populated...). The pod will be constructed by 2020 and the company hopes it will be in operation by 2013. One of the company's representatives, Victor Sinyavsky, states "The corporation promised to clean up the space in ten years by collecting about 600 defunct satellites on the same geosynchronous orbit and sinking them into the ocean subsequently," Space Daily reports. This seems like a more legitimate idea than others we've heard of, including shooting junk with water or using giant nets. Silly as it sounds, concepts for removing space debris are getting serious attention as the area around our planet is increasingly clogged with everything from old satellites to spacecraft parts.

**Also extend our Duncan Card from the 1nc that we are not yet at the tipping point of absolute failure and that space debris can still be solved.**

### US Lasers key to solving current debris- only short-term

Braconnier 11 [Deborah Braconnier: PhysOrg, NASA proposes laser use to move space junk, March 18, 2011,

http://www.physorg.com/news/2011-03-nasa-laser-space-junk.html]

Currently, the low Earth orbit (LEO) is filled with over 9,700 pieces of debris and 1,500 old rocket bodies that are tracked by the U.S. military. When these pieces collide in space, more debris pieces are created. While many of these pieces are small, when you realize that they are traveling at a speed equivalent to 17,000 miles per hour, they pose a serious threat to space travel and the launching of new satellites. In 1978, a NASA scientist predicted what is now known as the "Kessler syndrome." The idea behind this syndrome being that with the increase in space debris, the increase in collisions, and the generation of more debris could eventually render space exploration and the use of satellites impossible. Through the years, many proposals have been discussed to remove this space junk, such as rendezvousing with large objects and bringing them back to earth. However, this proposal is complex and comes with a high price tag. Another study in 1996 suggested using powerful beams to destroy surface material on debris and propel it towards Earth. The concern with this idea is that other countries involved in space exploration could see this as a possible threat to their functional satellites. Mason and his team at NASA Ames Center and Stanford University have discovered a possible method utilizing much less expensive lasers and providing only enough power to nudge the debris and not cause any damage. By utilizing a laser beam of five to ten kilowatts, scientists believe that constantly focusing this beam on a piece of debris would exert enough push to change its orbit. The concerns by other countries of this being a threat would be eliminated as this beam would not be capable of creating a force strong enough to alter large functional satellites. While this would be done on a case by case basis, the question as to whether this would be able to provide a long term solution still needs to be answered. Scientists have said they need to conduct a population model on the debris system to determine if this could be enough of a solution to stop, or at least slow down, the Kessler syndrome.

## A2: Collisions Already Happening

1. **Just makes the link stronger: With collisions happening in the status quo, the likelihood of future collisions is bound to go up.**
2. **Their cards are nonunique: They are talking about a Russian and US satellite that collided in 09 or a European crash that happened almost 15 years ago. None of their evidence is specific to now**

## A2: Won’t hit SBSP or other Satellites OR SBSP solves

### Space debris is the largest problem for satellites in space

### **Online Journal of Space Communication 10**(Winter: Legal Challenges Facing Solar Power Satellites- http://spacejournal.ohio.edu/issue16/betancourt.html)

Space debris is the largest environmental problem for satellites in outer space. There are over 19,000 pieces of trackable debris in Earth orbit; the number of un-trackable pieces is much higher.[53] Collisions with even small orbital debris can cause catastrophic damage. The global community has taken steps to deal with this growing problem. The Inter-agency Space Debris Coordination Committee (IADC) is one of the most important international sources of space debris policy.

**Their evidence only takes into account the traceable debris, not the millions of small pieces of debris that could hit the satellite.**

**Extend our Duncan evidence which cites inside of the card that the government would miss the small debris that could hit the satellites if they were to attempt to clean or avoid the debris.**

**The aff is on the wrong side of the timeframe debate: Even if SBSP would eventually solve space debris, it is the process of getting the satellites up that would destroy the SBSP and the other satellites.**

## A2: Launches Inevitable

1. **Again, the aff loses the timeframe debate: By the time any of these countries are prepared to launch any of their projects, the plan would have been passed and implemented, or space debris would have started to be cleaned up.**

**Russia:**

**Russian space program sucks: Not ready for a new launch any time soon**

Englund 7/5 (Will, staff writer for the Washington Post, “As US halts space shuttle, others continue with launches and exploration,” Washington Post, 7/5/11. <http://www.washingtonpost.com/national/health-science/as-us-halts-space-shuttle-others-continue-with-launches-and-exploration/2011/06/27/gHQAmKe2yH\_story.html>)

The Russian space program, which suffered in the 1990s — remember the Mir space station, which was killed off in 2001 and allowed to fall into the sea? — is more robust today. But with a budget of about $3 billion, it still suffers from an aging workforce and struggles to hire talented staff. An ambitious plan to build a new launch center in eastern Siberia (Russia currently uses the Baikonur site, in Kazakhstan) and introduce a new line of rockets and a new spacecraft by 2018 looks as though it may be delayed. Russia is also working on developing a reusable rocket, which it believes would make it the leader in space for the next 50 years. Some Russian scientists believe that spaceflight can’t advance much further without new means of propulsion, most likely from nuclear-powered engines. Russia has always emphasized manned flight but is currently putting a satellite system in place to rival the GPS system.

**India won’t be ready until 2016**

Lakshmi 7/5 (Rama, staff writer for the Washington Post, “As US halts space shuttle, others continue with launches and exploration,” Washington Post, 7/5/11. <http://www.washingtonpost.com/national/health-science/as-us-halts-space-shuttle-others-continue-with-launches-and-exploration/2011/06/27/gHQAmKe2yH\_story.html>)

In 2008, India launched its first unmanned moon mission, Chandrayaan-1, which catapulted the country into the big league. Spurred by China’s growing space ambitions, India has focused on launching its first manned space mission in 2016. India’s space program was dealt a setback in December, when a rocket carrying a communications satellite exploded soon after liftoff. This was India’s second launch failure in 2010. In addition to its dream of a manned mission to the moon, India is planning an unmanned lunar mission, Chandrayaan-2, in 2013 with collaboration from the Russian space agency. This will pick up samples of soil and rocks for chemical analysis

## A2: Cascade Effect Now

1. **Their cards are non-unique: Our Duncan evidence from 10: After both the Chinese ASAT test and the Russian collision, cites that we are not yet at the tipping point and we will only be there if another major crash does occur**
2. **Our Duncan evidence also cites that in the status quo, removal is possible, but once the cascade tipping point has been reached, we will lose the ability to clean up the space debris.**
3. **Again, the aff is on the wrong side of the timeframe debate: Even if clean up is the only way to solve, the plan will cause accidental collisions and lead to the true cascade point.**

# Russian Aerospace DA

## 1NC

### Status quo decline of American space programs has given Russia aerospace leadership

SRAS, 10 [School of Russian and Asian Studies, think tank composed of a team of consultants and advisers dedicated to education and educational opportunities in Russia and Eurasia, “Russia May Become 'Absolute' Leader in Space Exploration,” February 10, 2010 , <http://www.sras.org/russia_may_become_absolute_leader_in_space_exploration>, DA 7/16/11]//RS

The U.S. administration's decision to abandon ambitious space exploration programs, including a manned Lunar mission in 2020, is giving Russia a chance to strengthen its position in manned space flight projects, Yuri Kara, a member of Russia's Tsiolkovsky Cosmonautics Academy, told Interfax-AVN. "In my opinion, Russia has received an amazing carte blanche in order to take over the 'flag' of the leadership in space exploration from the United States," Kara said. On Monday, President Barack Obama announced in his 2011 budget request that he would cancel U.S. plans to send humans back to the moon, saying the project was too expensive. In the next 5-7 years, Russia will be the only country capable of delivering crewmembers to the International Space Station. But Russia should also start working on a manned mission to Mars, the expert said. "Today, Russia needs to focus its efforts on the Mars program. The time has come for it to become the absolute space leader," Kara said. In this case, "other states will join" space exploration projects implemented by Russia, he said. "I am not speaking about Russia's monopoly on this area. But it [Russia] has been playing a leading role and, consequently, it will be able to determine the configuration of the future Mars mission," he added.

### US Space power trades off with Russian aeronautics industry

AP, 4/12 [Vladimir Isachenkov, Medvedev: Space will remain a key Russian priority,” <http://www.mail.com/scitech/news/339676-medvedev-space-will-remain-key-russian-priority.html>, DA 7/19/11]//RS

MOSCOW (AP) — Russia must preserve its pre-eminence in space, President Dmitry Medvedev declared Tuesday on the 50th anniversary of the first human spaceflight by cosmonaut Yuri Gagarin. The statement followed warnings by another cosmonaut that Russia risks losing its edge in space research by relying solely on Soviet-era achievements and doing little to develop new space technologies. Gagarin's 108-minute mission on April 12, 1961, remains a source of great national pride, and Russia marked the day with fanfare resembling Soviet-era celebrations. Schools had special lessons dedicated to Gagarin, billboards carried his smiling face and national television channels broadcast a flow of movies and documentaries about the flight. "We were the first to fly to space and have had a great number of achievements, and we mustn't lose our advantage," Medvedev said during a visit to Mission Control outside Moscow. On Monday, Svetlana Savitskaya, who flew space missions in 1982 and 1984 and became the first woman to make a spacewalk, harshly criticized the Kremlin for paying little attention to space research after the 1991 collapse of the Soviet Union. "There's nothing new to be proud of in the last 20 years," said Savitskaya, a member of Russian parliament from the Communist Party. Russia has used the Soyuz and Progress spacecraft, whose designs date back to the 1960s, to send an increasing number of crew and cargo to the International Space Station. Russia's importance will grow even more after the U.S. space shuttle Atlantis closes out the U.S. program this summer, leaving the Russian spacecraft as the only link to the station. But Savitskaya and some other cosmonauts have warned that Russia has done little to build a replacement to the Soyuz and could quickly fall behind America after it builds a new-generation spaceship. Boris Chertok, the former deputy to Sergei Korolyov, the father of the Soviet space program, says it has become increasingly difficult for Russia's space industries to hire new personnel. "Salaries in space industries are much lower than average salaries in banks and commercial companies," Chertok, 99, told reporters last week. "We need (more) people of Korolyov's caliber." Korolyov, a visionary scientist as well as a tough manager, led the team that put the world's first manmade satellite in orbit on October 4, 1957. He then spearheaded a massive effort to score another first with Gagarin's mission. "Our competition with America was spurring us to move faster to make the first human spaceflight," Valery Kubasov, a member of Korolyov's design team who later became a cosmonaut, told The Associated Press. Gagarin's accomplishment shocked the United States, prompting it to declare the goal of putting a man on the moon.”

### Strong Russian space industry good- solves proliferation, brain drain, and economic growth

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

In the midst of the 1993 debate over the wisdom of bringing Russia into the space station partnership, Sagdeev and his Maryland colleague Michael Nacht wrote: In the post-cold-war world, space policy is foreign policy. Russian participation could advance U.S. goals in the former Soviet Union and strengthen President Boris Yeltsin. First, it would provide hard currency for the Government. Second, Russia is struggling to cling to the vestiges of its superpower status, and hardliners, in their fight against reforms, have played on the people's fear of diminished international standing. Remaining active in space exploration could help Russia maintain technological prestige while it reduces its nuclear arsenal. The project would allow Russia's talented scientists and engineers to escape from the confines of the military and intelligence apparatus. They could show American experts the full range of their skills and technology. This could open the doors to legitimate financial opportunities at a time when many are tempted by lucrative projects that would enhance the military capabilities of third world despots.3

### Proliferation causes extinction- small scaled conflicts have a greater risk of escalating and going nuclear

Utgoff, 2 [Victor Utgoff, PhD, Deputy Director for the Strategy, Forces, & Resources Division of the Institute for Defense Analysis former senior member of the National Security Council staff PhD from Purdue University, Summer, Survival, Vol. 44 #2, P. 87-90, DA 7/16/11]

Widespread proliferation is likely to lead to an occasional shoot-out with nuclear weapons and that such shoot-outs will have a substantial probability of escalating to the maximum destruction possible with the weapons at hand. Unless nuclear proliferation is stopped, we are headed toward a world that will mirror the American Wild West of the late 1800s. With most, if not all, nations wearing nuclear "six-shooters" on their hips, the world may even be a more polite place than it is today, but every once in a while we will all gather on a hill to bury the bodies of dead cities or even whole nations

### Economic downturn causes isolationism and nuclear war

Friedberg, 8 [Aaron Friedberg, Professor of Politics and IR at Princeton, and Gabriel Schoenfeld, Visiting Scholar at the Witherspoon Institute, “The Dangers of a Diminished America,” Wall Street Journal, October 21, 2008, <http://online.wsj.com/article/SB122455074012352571.html/>, DA 7/18/11]

One immediate implication of the crisis that began on Wall Street and spread across the world is that the primary instruments of U.S. foreign policy will be crimped. The next president will face an entirely new and adverse fiscal position. Estimates of this year's federal budget deficit already show that it has jumped $237 billion from last year, to $407 billion. With families and businesses hurting, there will be calls for various and expensive domestic relief programs. In the face of this onrushing river of red ink, both Barack Obama and John McCain have been reluctant to lay out what portions of their programmatic wish list they might defer or delete. Only Joe Biden has suggested a possible reduction -- foreign aid. This would be one of the few popular cuts, but in budgetary terms it is a mere grain of sand. Still, Sen. Biden's comment hints at where we may be headed: toward a major reduction in America's world role, and perhaps even a new era of financially-induced isolationism.  Pressures to cut defense spending, and to dodge the cost of waging two wars, already intense before this crisis, are likely to mount. Despite the success of the surge, the war in Iraq remains deeply unpopular. Precipitous withdrawal -- attractive to a sizable swath of the electorate before the financial implosion -- might well become even more popular with annual war bills running in the hundreds of billions.  Protectionist sentiments are sure to grow stronger as jobs disappear in the coming slowdown. Even before our current woes, calls to save jobs by restricting imports had begun to gather support among many Democrats and some Republicans. In a prolonged recession, gale-force winds of protectionism will blow.  Then there are the dolorous consequences of a potential collapse of the world's financial architecture. For decades now, Americans have enjoyed the advantages of being at the center of that system. The worldwide use of the dollar, and the stability of our economy, among other things, made it easier for us to run huge budget deficits, as we counted on foreigners to pick up the tab by buying dollar-denominated assets as a safe haven. Will this be possible in the future?  Meanwhile, traditional foreign-policy challenges are multiplying. The threat from al Qaeda and Islamic terrorist affiliates has not been extinguished. Iran and North Korea are continuing on their bellicose paths, while Pakistan and Afghanistan are progressing smartly down the road to chaos. Russia's new militancy and China's seemingly relentless rise also give cause for concern.  If America now tries to pull back from the world stage, it will leave a dangerous power vacuum. The stabilizing effects of our presence in Asia, our continuing commitment to Europe, and our position as defender of last resort for Middle East energy sources and supply lines could all be placed at risk.  In such a scenario there are shades of the 1930s, when global trade and finance ground nearly to a halt, the peaceful democracies failed to cooperate, and aggressive powers led by the remorseless fanatics who rose up on the crest of economic disaster exploited their divisions. Today we run the risk that rogue states may choose to become ever more reckless with their nuclear toys, just at our moment of maximum vulnerability.  The aftershocks of the financial crisis will almost certainly rock our principal strategic competitors even harder than they will rock us. The dramatic free fall of the Russian stock market has demonstrated the fragility of a state whose economic performance hinges on high oil prices, now driven down by the global slowdown. China is perhaps even more fragile, its economic growth depending heavily on foreign investment and access to foreign markets. Both will now be constricted, inflicting economic pain and perhaps even sparking unrest in a country where political legitimacy rests on progress in the long march to prosperity.  None of this is good news if the authoritarian leaders of these countries seek to divert attention from internal travails with external adventures.

### Russian aerospace industry collapse causes asteroid collision --- causes mass death

Russian Press Digest, 10 [RusData Line, “Russia is developing equipment for exploration of a potentially dangerous asteroid,” May 19, 2010 ]

Russian scientists are promising to develop a cosmic device for exploration of a celestial body which, according to certain astronomers, presents a certain threat to life on Earth. On Tuesday, director of the Space Research Institute, RAS, academician Lev Zeleny, told journalists that the leading domestic enterprise in the rocket and space industry - Lavochkin Scientific Production Association, is creating a device for the exploration of the asteroid Apophis. "In 2029, the trajectory of Apophis will be at a fairly close distance from the Earth, and during the second cycle of movement, in 2036, there is a probability that it will collide with our planet," cautioned academician Zeleny. According to him, the damage resulting from such a collision will be three times more severe than the destruction that was caused by the Tunguska meteorite. Scientists believe that the space object that caused the explosion near the Podkamennaya Tunguska River on June 30, 1908, was 50 meters in diameter and could have weighed 1-2 million tons. For comparison: the size of Apophis, discovered in 2004, is 270 by 60 meters, and the asteroid's total weight, according to various estimates, amounts to anywhere from 26 to 45 tons. The likelihood that the giant cosmic "cobblestone" will collide with the Earth in 2029 is negligible: according to official estimates, published by NASA, the probability of a collision is 1 in 250,000. However, Apophis will "come near" our planet; according to the latest estimates, in 2029, the asteroid will pass the Earth's surface at a distance of 28,900 kilometers (give or take 200-300 km). Such proximity could have an effect on the orbit of a small celestial body. Deviation from the previous route could result in the Apophis to once again pass the Earth at a dangerously close distance 7 years later, in 2036. According to NASA, in the event the "celestial guest" collides with the Earth, an explosion with the force of more than 500 megatons is possible (for comparison: the effects of the Tunguska meteorite's landing are estimated at about 10 megatons, which is equivalent to an explosion of a hydrogen bomb). Scientists, who based their estimates on a maximum possible size of the asteroid - 390 meters - concluded that if such a celestial body were to enter the Earth's atmosphere at a speed of 12.6 km/s, then the collision would form a crater on the Earth's surface of almost 6 km in diameter and trigger an earthquake, measuring 6.5 on the Richter scale, within a 10 km radius. If the asteroid falls into an ocean, it would result in an enormous tsunami; and, if a densely populated area is stricken, the destruction will affect several hundreds of kilometers. However, scientists note that even such a pessimistic scenario does not assume that this will be a global-scale catastrophe, similar to the one which led to the distinction of the dinosaurs - Apophis is simply too small for this. According to the hypothesis of a Nobel Prize laureate, Luis Alvarez, the "stone" that caused a nuclear winter 65 million years ago was about 10 km in diameter. "People's lives are in danger. It is better we spend a few hundred million dollars and create a system that will allow us to avoid a collision, than sit and wait for this to happen and thousands of people lose their lives," Anatoly Perminov, head of Russia's Federal Space Agency Roscosmos, warned the public in January of this year. However, astronomers say that one should not expect the end of the world to come in 2036; the probability Apophis will collide with Earth is very small, but, as was noted by academician Lev Zeleny, this is not a "zero probability". In order to obtain some more precise data on the behavior of the asteroid it was suggested to place a special beacon on Apophis. This, according to Mr. Zeleny, should be accomplished in 2029 as the asteroid approaches the Earth. "The beacon will make it possible to obtain very precise trajectory measurements of the asteroid, which will allow making a more precise forecast as to whether or not it will collide with the Earth 7 years later as well as taking the necessary measures to divert it from its dangerous course," explained the director of the Space Research Institute, RAS. The topic of protection of the Earth from the asteroid threat has not only been discussed within the scientific community for a long time, but has also become a part of the mass culture - take the Hollywood production, Armageddon, as an example, which was filmed six years prior to the discovery of Apophis in 1998. In the movie, an American expedition lands on an asteroid, as it approaches the Earth, and destroys it with a nuclear explosion. Scientists are offering measures for eliminating the uninvited celestial guest that are no-less-effective and, at a first glance, equally science-fictional. For example, the space device could deploy a "solar sail" - a thin light-reflecting film - on the asteroid. It is believed that the pressure of electromagnetic rays could alter the asteroid's speed and direction. Experts of the European Space Agency proposed changing the trajectory of Apophis with the use of a special "orbit evacuator". The asteroid should be approached by a space ship, which will hover above it at the nearest possible proximity, which will be made possible by engines powered by solar batteries. The "cosmic traction engine" will pull the asteroid, while slightly accelerating is movement, and eventually bring the celestial body to a safer orbit. The development of such a "traction ship" or a "cosmic traction device" has been promised by the British corporation, EADS Atrium. In turn, the Lavochkin Scientific Production Association, which has not only produced artificial Earth satellites Lunokhod-1, and devices for the exploration of Venus and Mars, but also intercontinental cruise missiles, could use its designs. However, as was noted last December by the head of Roscosmos, Anatoly Perminov, there are no plans to destroy the asteroid. "No nuclear explosions, everything will be done based on the laws of physics," stressed the head of the space agency.

## \*\*\*Uniqueness Wall\*\*\*

## Russia has monopoly

### Russia holds a monopoly in spaceflight- Termination of NASA’s space shuttle program Hotz, 7/7 [Robert Lee Hotz, Special correspondent for the Wall Street Journal, “Shuttle's Last Flight Leaves Russia With Space Monopoly,” DA 7/17/11]//RS

Circling the Earth every 90 minutes, the International Space Station is the most expensive project ever assembled in space. Within days, it will hang by a single, costly thread. And Russia, the U.S.'s historic rival in space, is holding it. The last U.S. space shuttle is scheduled to blast off Friday. After that, the U.S. and other nations will rely on vintage Russian spacecraft to ferry their astronauts to the $100 billion station. **Russia will hold a monopoly over manned spaceflight, and tensions already are rising**. The Russians are in the process of nearly tripling the cost of using their Soyuz crew capsules for transport to the orbiting base, and other countries have little choice but to pay up.

### NASA has given Russia permanent space advantage- the spaceflight “gap” is infinity

Spudis, 6/25 [Paul D. Spudis, Senior Staff Scientist at the Lunar and Planetary Institute, Deputy Leader of the Science Team of the Department of Defense, winner of the NASA Distinguished Public Service Medal from the President, “NASA Shifts Into Neutral,” June 25, 2011, Air & Space Smithsonian, <http://blogs.airspacemag.com/moon/2011/06/nasa-shifts-into-neutral/>, DA 7/20/11]//RS

By moving forward on their mission to convert the U.S. fleet of Space Shuttles into museum pieces, the administration has shifted NASA into neutral. America’s multi-billion dollar investment in the International Space Station (ISS) and our access to space is in jeopardy. As a result of the termination of the Shuttle program, we have no means to assure ISS health and safety or the continuation of manned-space for the coming decade. True, the “retirement” of the Shuttle is an event long-planned — announced in 2004 as part of the Vision for Space Exploration (VSE). But contrary to common belief, the VSE plan to retire Shuttle was not because it is “too dangerous to fly” or “outdated technology.” Rather, its retirement was intended to free up that portion of the NASA budget it consumes, with that money going to the development of new space vehicles for human missions beyond low Earth orbit—the limit of Shuttle’s reach. In 2004, it was understood that the old and new systems would not seamlessly overlap in time, but in the past eight years, the “gap” of time between the last flight of the Shuttle and the first flight of whatever system succeeds it has increased alarmingly from months to years and now finally, to infinity. The spaceflight “gap,” once seen as risky, now looms before us a black hole of uncertainty. Our country is set to eliminate the one proven system remaining under our control that can access both space and the ISS. The only thing clear about the administration’s current plan is the confusion surrounding it.

## Russian Aerospace Growing

### Russia’s aerospace industry continues to expand- Aeroflot’s market share expected to exceed 40%

Makhrov, 7/8 [Anton Makhrov, “Catch me if you can,” July 8, 2011, <http://rbth.ru/articles/2011/07/08/catch_me_if_you_can_13131.html>, DA 7/17/11]//RS

Aeroflot, Russia’s largest airline, has had more makeovers in recent years than it has Tupolev jets. It has hired employees, shed employees, and gotten rid of gas-guzzling Russian jets. The airline changed its look and the look of its flight attendants, rejecting its residual Soviet sensibility. Finally, it focused on its much-maligned safety record that, perhaps unfairly, struck fear in the heart of the most cavalier Western businessmen. But its newest incarnation is the most fascinating of all. Aeroflot appears to be swallowing up some small carriers, assets that were supposed to comprise the backbone of Aeroflot’s rival, Rosavia. The upstart was created three years ago, when aviation authorities thought a state-owned rival to Aeroflot would offer some healthy competition. Russia's airline market The top three. Aeroflot: around 15 percent market share, UTtair: 13 percent, and Sibir: 12.5 percent. Aeroflot is Russia’s largest passenger airline. More than 11 million passengers used it in 2011. RAS revenue for the year was 114 billion rubles, with a net profit of 12 billion rubles. Brand Finance estimates Aeroflot’s brand value at 1 billion. Aeroflot is poised to expand its domestic market presence in the space of the next few months as it welcomes up to six carriers into its fold that are currently under state control. Aeroflot’s new assets are slated to include GTK Rossiya, Kavminvody, Orenburg Airlines, Vladivostokavia, Saratov Airlines, and Sakhalin Air Routes. According to Aeroflot representatives, the airline has already built the new assets into its strategic development plan. “Once it acquires the state-owned assets, Aeroflot will get approximately an additional 15 percent of the Russian air transportation market. What we now estimate as Aeroflot’s 26 percent market share will exceed 40 percent once the merger is complete. As an added bonus, the airline will improve occupancy rates at its international routes, which generate the bulk of its profits,” said Andrei Rozhkov, an analyst with the investment firm IFC Metropol.

## Relations high

### US-Russia relations high now- Obama & Medvedev “reset” the relationship

Good, 6/21 [Allison Good, correspondent for the Times Picayune, “U.S. and Russia are strengthening their relationship, Ambassador says,” June 21, 2011, <http://www.nola.com/business/index.ssf/2011/06/us_and_russia_are_strengthenin.html>, DA 7/18/11]//RS

The Obama administration has experienced a positive reset in U.S.-Russian relations both politically and economically, U.S. Ambassador to the Russian Federation John Beyrle said during a speech in New Orleans on Tuesday. "This relationship has been reset over the last two to three years," Beyrle said at an event at the World War II Museum sponsored by the World Trade Center of New Orleans and other organizations. "We're on the threshold of a new and better period of relations." Beyrle noted recent U.S.-Russia accomplishments such as the signing of the START Treaty to reduce nuclear arms in both countries, increasing Russian support for NATO troops in Afghanistan and increased cooperation and coordination within the United Nations Security Council to curb Iran's nuclear program. The ambassador also emphasized that relations with Russia are not only politically advantageous for the United States, but also economically essential. "Good political relations are not enough, and we need more solid foundations of trade and business. Our prosperity is closely intertwined with Russia, since it's a major market for U.S. goods and services," he said during the luncheon program, which was called "The Current State of U.S.-Russia Relations."

## AT: No Russian aerospace innovations

### Russia is innovating- 40% increase in space research spending announced

De Carbonnel, 4/10 [Alissa de Carbonnel, contributing writer for the Moscow Times, “Analysis: Stagnation Fears Haunt Russian Space Program,” April 10, 2011, Reuters, <http://www.reuters.com/article/2011/04/10/us-russia-space-gagarin-idUSTRE73910C20110410>, DA 7/17/11]//RS

WHAT NEXT? Addressing concerns about Russia's role, Prime Minister Vladimir Putin said on Thursday the country could take pride in handling over **40 percent of global space launches** but must not be confined to the role of a "ferryman." "Now Russia is returning to researching the planets of the solar system," he said. Russia's space agency will receive $753 million to ferry 12 U.S. astronauts to the space station from 2014-2016, NASA announced last month. Russia raked in some $2.5 billion from NASA and partner agencies for 42 seats on Soyuz craft from 2007. Russia has increased space spending by some 40 percent per year during the last five years, according to Euroconsult, a consulting body that tracks the industry. It has earmarked 200 billion roubles ($7 billion) for space programmes from 2010-2011. Some of the money will fund a new launch facility in Vostochny in far eastern Russia, where the first launches are anticipated in 2015 and the first manned launch in 2018. "Gagarin's flight set the bar. We were always the leaders in space exploration and we must uphold this status," the current commander of the International Space Station, Dmitry Kondratyev, said in a pre-launch interview.

## \*\*\*Link Wall\*\*\*

## Link- General

### Unique link- The end of the American space program has given Russia aerospace leadership

Greene, 7/15 [David Greene, Harvard Graduate in Government and NPR’s lead correspondent in Moscow, “In Russia, Space Ride For U.S. Spurs Nostalgia, Hope,” July 15, 2011, <http://www.npr.org/2011/07/15/137843724/in-russia-space-ride-for-u-s-spurs-nostalgia-hope>, DA 7/16/11]//RS

The U.S. shuttle program will end after space shuttle Atlantis returns to Earth on July 21. Retired NASA astronaut Leroy Chiao captured this reality on All Things Considered: "After this mission, we will no longer have the ability to send American astronauts into space ourselves," Chiao said. "And arguably, we will no longer be the leaders in human space flight until we get that capability back." Arguably, **the leader in space flight will**, for now, **be Russia**. American astronauts will rely solely on the Russian Soyuz spacecraft to reach orbit. After years of space rivalry between the two sides, this might seem like a time for Russians to feel pride. But not all Russians see it that way

### Unique link- Status quo decline of American space programs has given Russia aerospace leadership

SRAS, 10 [School of Russian and Asian Studies, think tank composed of a team of consultants and advisers dedicated to education and educational opportunities in Russia and Eurasia, “Russia May Become 'Absolute' Leader in Space Exploration,” February 10, 2010 , <http://www.sras.org/russia_may_become_absolute_leader_in_space_exploration>, DA 7/16/11]//RS

The U.S. administration's decision to abandon ambitious space exploration programs, including a manned Lunar mission in 2020, is giving Russia a chance to strengthen its position in manned space flight projects, Yuri Kara, a member of Russia's Tsiolkovsky Cosmonautics Academy, told Interfax-AVN. "In my opinion, Russia has received an amazing carte blanche in order to take over the 'flag' of the leadership in space exploration from the United States," Kara said. On Monday, President Barack Obama announced in his 2011 budget request that he would cancel U.S. plans to send humans back to the moon, saying the project was too expensive. In the next 5-7 years, Russia will be the only country capable of delivering crewmembers to the International Space Station. But Russia should also start working on a manned mission to Mars, the expert said. "Today, Russia needs to focus its efforts on the Mars program. The time has come for it to become the absolute space leader," Kara said. In this case, "other states will join" space exploration projects implemented by Russia, he said. "I am not speaking about Russia's monopoly on this area. But it [Russia] has been playing a leading role and, consequently, it will be able to determine the configuration of the future Mars mission," he added.

### Plan causes an imbalanced partnership with Russia- Symbolism of inequality kills cooperation

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

One rationale offered for bringing Russia into the space station partnership was to help it maintain its self-image as a great power. One participant noted that "the Putin Administration has recently reaffirmed Russia's commitment to continued space cooperation. Apparently, much more than its predecessor, **the new government views this hi-tech cooperation as an important trapping of Russia's great power status**. ISS cooperation was a major topic of discussion between President Clinton and President Putin at their meeting during the UN Millennium General Assembly in New York in September 2000." Also, "There is consensus about the importance of symbolism. One particularly important symbolic dimension is the buzzword of equality. This is especially important [to Russia] now, under Putin. It is an asset for Russia under Putin to be an equal partner with the United States on the space station, and it does provide leverage to contribute to positive outcomes. . . . The space station may provide a way to channel the desire for equality into positive avenues.”

### NASA space program decline has forced the US to depend on Russia- the plan’s unilateral actions kills the new “spirit of cooperation”

O’Flynn, 10 [Kevin O’Flynn, special correspondent to Russia Now, “Russia makes space for U.S.,” March 24, 2010, <http://rbth.ru/articles/2010/03/24/240310_space.html>, DA 7/17/11]//RS

On April 2, new Soyuz crew members, two Russians and one American, are scheduled to launch from the Baikonur Cosmodrome in Kazakhstan. Circling the planet, **the crew will engage in intense cooperation unknown on the ground**. Down on earth, Russian-American space cooperation has increased, but there is also unease as the power of the players is shifting. Russia will fuel space exploration once again, while the U.S. vision appears dampened. America is relying more and more on the Russian federal space program for key assistance. As the United States reprioritizes its programs, the country will rely on Russia to take its astronauts into space. NASA has long spent more money on more programs than Russia’s space agency. But President Barack Obama has slashed NASA’s dreams of going to the moon again. Building new spacecraft for the exploration of Mars is again a flight of fancy. At the same time, the Russian space industry is feeling the warm glow of state backing once again. There has been concerted investment in recent years, an investment that fits in well with the Putin doctrine of trying to restore Russian pride through capacity. And while both countries feel they are the front runners, their dominance could be challenged in the next decade by India and China as they fund their own programs. The Russian government has increased spending on the space industry by a remarkable 40 percent for each of the past five years, spending $2.8 billion in 2009, Euroconsult reported. “It’s like night and day,” said Igor Lissov, editor of News of Cosmonautics (Novosti Kosmonavtiki), comparing funding today with funding in the penurious 1990s. President Putin launched an initial $10 billion program for the space industry between 2006 and 2015. When Putin congratulated space industry workers in 2008 on Cosmonauts' Day (April 12), he called on them to pursue “really ambitious projects.” The U.S. Constellation human-flight program that Obama has all but abandoned was designed, according to President George W. Bush, to “establish an extended human presence on the Moon” that would then lead to flights to Mars. Obama cut it from the 2011 budget as the effects of the financial crisis continue to be felt and program expenditure soared. The government said that though NASA has already spent $9 billion on it, the program is “fundamentally unexecutable.” Instead, America will look to private companies to invest in future spacecraft. In the meantime, U.S. astronauts will hitch a lift on Russian spacecraft, a move that has NASA supporters crying foul. In the wake of recent criticism, Obama announced he will make a visit to Cape Canaveral, Fla., the home of NASA, in April. Russian and American space watchers wonder if this may herald another policy shift. For now, the United States will rely solely on the Russian space program as the U.S. Shuttle retires from service. No private companies have so far secured investment for spacecraft, so this arrangement will likely continue for much longer. Russian academic Yury Zaitsev told Interfax news agency that he thought the United States would be dependent on Russia to transport its astronauts until at least 2020. “In order to bring a craft to the standards of quality and safety for a piloted flight, you need years and years,” he said. NASA has signed a $306 million contract with the Russian Federal Space Agency (Roscosmos) for U.S. astronauts to fly to the International Space Station in 2012. While it is hard for some to get used to the power shifts, others support the new spirit of cooperation, a far cry from the start of the space race when new flights and feats in space were spurred by Cold War fear and one-upmanship as well as scientific endeavor.

### US space funding trades off with funding for Russia’s Aerospace industry

De Carbonnel, 4/10 [Alissa de Carbonnel, contributing writer for the Moscow Tiimes, “Analysis: Stagnation Fears Haunt Russian Space Program,” April 10, 2011, Reuters, <http://www.reuters.com/article/2011/04/10/us-russia-space-gagarin-idUSTRE73910C20110410>, DA 7/17/11]//RS

SPACE 'STAGNATION' In the 1960s, Gagarin's flight seemed to leap off the pages of fantasy novels, inspiring dreams of Martian colonies and imminent deep-space travel. But much of that initial rapture has now faded, leaving nostalgia among many in Russia for the days when the struggle between the two nuclear-armed superpowers fueled and financed the pursuit of new horizons in science. U.S. astronauts and Russian cosmonauts "were never enemies in space, but when we began cooperating on the ground they cut the funding," said veteran cosmonaut Georgy Grechko, 79. "Even the Americans would call us and say 'launch something new, so they'll give us money.'" With competition eclipsed by cooperation, Russia's space agency has survived over the past two decades by hiring out the third seat aboard the Soyuz to foreigners. "Cooperation is good, but as the example of the international space station shows, it also leads to stagnation," Russian space policy analyst Yuri Karash said, according to state-run news agency RIA. Gubarev said Russia had fallen so far behind it could achieve little better than a supporting role today in the most cutting-edge projects. "In the meantime, America will take its time out and build an entirely new spacecraft, so that five or six years down the line our Soyuz will be entirely redundant," he said. "No serious money is spent on breakthrough projects." Experts say China could soon challenge both Russia and the United States in space. "The most important role will be played by our Russian Soyuz craft now. But we cannot discount the Chinese, who are following their own path and doing all this independently," Shamsutdinov told Reuters. NASA officials have voiced worries that the current budget financing will not be enough to fund a new rocket and capsule system for deep space travel. NASA's proposed budget for fiscal 2011 is $18.7 billion, some five times higher than Russia's. Russian industry insiders say President Barack Obama's decision to halt work on NASA's next-generation Orion capsule threatens to take the wind out of a parallel Russian effort to design a replacement for the Soyuz that can fly beyond the International Space Station's low 354-km (220 mile) orbit. "A little residual competition is a good thing," Sergei Krikalev, 52, who heads Russia's cosmonaut training center after chalking up a record 803 days in space, told Reuters.

### The plan will be a slap in the face to Russia- already had talks to begin with a small scale venture

Cook, 90 [Carol L. Cook, Professor of Aerospace Sciences at Yale University, “The Aerospace Industry: Its History and How it Affects the U.S. Economy,” <http://teachers.yale.edu/curriculum/search/viewer.php?id=new_haven_90.07.06_u>, DA 7/17/11]//RS

**Soviet Ministry of Aviation executives**, visiting the U.S. for a university-sponsored management education program, **said they are interested in pursuing joint ventures with U.S. Aerospace firms.** It appears that any joint venture between Soviet and U.S. jet engine firms would have to begin on a small scale with cooperative research on a technical problem such as noise reduction. Only after this type of effort would it be possible to consider larger ventures. But, this is a beginning. Thus, it is becoming perfectly clear that the U.S. cannot just sit back and hold the Aerospace market. The U.S. is going to have to become more competitive itself if it wants to keep the Aerospace Industry as one of its largest, most important industries.

### US space growth trades off with Russia’s- Current US space policy favors Russia’s growth

Blount, 9 [P.J. Blount, head correspondent for the University of Mississippi Law School on the legal aspects of human activities using aerospace technology, “Human Spaceflight Committee Report: Seeking a Human Spaceflight Program Worthy of a Great Nation,”

October 22, 2009, <http://rescommunis.wordpress.com/2009/10/22/human-spaceflight-committee-report-seeking-a-human-spaceflight-program-worthy-of-a-great-nation/>, DA 7/19/11]//RS

One means of reducing the funding demands of major human spaceflight programs is to join in partnerships with other nations that share common space goals. Thus far, three nations have by themselves placed astronauts in space: the U.S., Russia and China. International programs offer the added advantage of providing access to advanced technology not available in the U.S., an increasingly common circumstance (e.g., Russian-designed, hydrocarbon-(RP-1)- fueled liquid rocket motors). Such arrangements also facilitate cost sharing. The principal disadvantage of international programs (excluding business-to-business arrangements based on enforceable contracts) is that nations are sovereign entities and, as such, can unilaterally change their plans—which can be very disruptive. Much of the international community, probably justifiably, faults the U.S. with regard to this practice. But perhaps an even greater impediment to U.S. involvement in international cooperative programs is the U.S. International Trafficking in Arms Regulations (ITAR). The Committee deems these laws to be outdated and overly restrictive for the realities of the current technological and international political environment.

## Link—US Spacecraft/ human-capable launch vehicle

### Unique link- NASA already announced Russia will have space leadership for several years unless we do the plan

Boucher, 9 [Marc Boucher, Special correspondent for space developments for the Canada Ref news agency , “Canada in the US Human Spaceflight Plans Committee Report,” October 22, 2009, <http://spaceref.ca/missions-and-programs/canadian-space-agency/canada-in-the-us-human-spaceflight-plans-committee-report.html>, DA 7/19/11]//RS

How will U.S. crew be transported to the ISS after Shuttle retirement? The U.S. will depend on Russian launches until a new U.S. spacecraft and human-capable launch vehicle become operational. For several years the U.S. will pay Russia to transport our astronauts to the ISS. Further, under existing international agreements, the U.S. is responsible for transporting astronauts from Canada, Japan, and the European Space Agency to the ISS, so the U.S. will presumably also be paying Russia for their transport. This period is now expected to extend for seven years.

## \*\*\*Relations Internal Link Scenarios\*\*\*

## Economy & Democracy

### Good US-Russian relations key to American economy and democracy promotion- jobs, tourism, trade

Good, 6/21 [Allison Good, correspondent for the Times Picayune, “U.S. and Russia are strengthening their relationship, Ambassador says,” June 21, 2011, <http://www.nola.com/business/index.ssf/2011/06/us_and_russia_are_strengthenin.html>, DA 7/18/11]//RS

While trade between the United States and Russia has doubled over the past four years, the scope of economic cooperation between Russia and New Orleans has also expanded. "Our exports to Russia from New Orleans grew exponentially between 2006 and 2010," said Mayor Mitch Landrieu. "There's a great partnership between New Orleans and Russia." American companies have taken the reset to heart, added Beyrle. "U.S. companies are now well-established in Russia and are creating jobs," he explained, citing the recent activities of Ford, General Motors, and high-tech entities such as Microsoft, Cisco and Boeing. Democratic development in post-Soviet Russia has also had positive implications for United States tourism. "Russia is now more open and increasingly connected with the world," the ambassador said. "Russians recently discovered the American South, and now there are direct flights to and from Houston and Atlanta." Beyrle, however, noted that there are still significant obstacles overshadowing the U.S.-Russia economic relationship. "Russia is still a tough place to do business because there are bureaucratic obstacles and corruption is an enormous problem," he continued. "For example, the United States is constantly fighting protectionist lobbies that want to keep American beef and poultry out of Russia." American initiatives to improve trade relations with Russia include working to support Russia's membership in the World Trade Organization. According to Beyrle, this will "allow the United States to benefit from the free movement of goods and services." The United States is also concerned with the uneven democratic development in post-Soviet Russia and popular calls for more governmental accountability. "The road ahead for Russia is not completely clear," the ambassador said. "It is our interest as Americans to support their transition to democracy." Despite these impediments, Beyrle emphasized, the U.S.-Russia relationship remains an important cornerstone of American foreign policy and trade. "This relationship has been and remains fundamentally important to our national interests as Americans," he said.

### Economic downturn causes isolationism and nuclear war

Friedberg, 8 [Aaron Friedberg, Professor of Politics and IR at Princeton, and Gabriel Schoenfeld, Visiting Scholar at the Witherspoon Institute, “The Dangers of a Diminished America,” Wall Street Journal, October 21, 2008, <http://online.wsj.com/article/SB122455074012352571.html/>, DA 7/18/11]

One immediate implication of the crisis that began on Wall Street and spread across the world is that the primary instruments of U.S. foreign policy will be crimped. The next president will face an entirely new and adverse fiscal position. Estimates of this year's federal budget deficit already show that it has jumped $237 billion from last year, to $407 billion. With families and businesses hurting, there will be calls for various and expensive domestic relief programs. In the face of this onrushing river of red ink, both Barack Obama and John McCain have been reluctant to lay out what portions of their programmatic wish list they might defer or delete. Only Joe Biden has suggested a possible reduction -- foreign aid. This would be one of the few popular cuts, but in budgetary terms it is a mere grain of sand. Still, Sen. Biden's comment hints at where we may be headed: toward a major reduction in America's world role, and perhaps even a new era of financially-induced isolationism.  Pressures to cut defense spending, and to dodge the cost of waging two wars, already intense before this crisis, are likely to mount. Despite the success of the surge, the war in Iraq remains deeply unpopular. Precipitous withdrawal -- attractive to a sizable swath of the electorate before the financial implosion -- might well become even more popular with annual war bills running in the hundreds of billions.  Protectionist sentiments are sure to grow stronger as jobs disappear in the coming slowdown. Even before our current woes, calls to save jobs by restricting imports had begun to gather support among many Democrats and some Republicans. In a prolonged recession, gale-force winds of protectionism will blow.  Then there are the dolorous consequences of a potential collapse of the world's financial architecture. For decades now, Americans have enjoyed the advantages of being at the center of that system. The worldwide use of the dollar, and the stability of our economy, among other things, made it easier for us to run huge budget deficits, as we counted on foreigners to pick up the tab by buying dollar-denominated assets as a safe haven. Will this be possible in the future?  Meanwhile, traditional foreign-policy challenges are multiplying. The threat from al Qaeda and Islamic terrorist affiliates has not been extinguished. Iran and North Korea are continuing on their bellicose paths, while Pakistan and Afghanistan are progressing smartly down the road to chaos. Russia's new militancy and China's seemingly relentless rise also give cause for concern.  If America now tries to pull back from the world stage, it will leave a dangerous power vacuum. The stabilizing effects of our presence in Asia, our continuing commitment to Europe, and our position as defender of last resort for Middle East energy sources and supply lines could all be placed at risk.  In such a scenario there are shades of the 1930s, when global trade and finance ground nearly to a halt, the peaceful democracies failed to cooperate, and aggressive powers led by the remorseless fanatics who rose up on the crest of economic disaster exploited their divisions. Today we run the risk that rogue states may choose to become ever more reckless with their nuclear toys, just at our moment of maximum vulnerability.  The aftershocks of the financial crisis will almost certainly rock our principal strategic competitors even harder than they will rock us. The dramatic free fall of the Russian stock market has demonstrated the fragility of a state whose economic performance hinges on high oil prices, now driven down by the global slowdown. China is perhaps even more fragile, its economic growth depending heavily on foreign investment and access to foreign markets. Both will now be constricted, inflicting economic pain and perhaps even sparking unrest in a country where political legitimacy rests on progress in the long march to prosperity.  None of this is good news if the authoritarian leaders of these countries seek to divert attention from internal travails with external adventures.

### Democracy solves extinction- empirically proven

Diamond, 95 [Larry Diamond, Professor at the Hoover Instituion, Stanford University, “Promoting Democracy in the 1990s,” 1995, http://www.carnegie.org//sub/pubs/deadly/diam\_rpt.html ]

Nuclear, chemical and biological weapons continue to proliferate. The very source of life on Earth, the global ecosystem, appears increasingly endangered. Most of these new and unconventional threats to security are associated with or aggravated by the weakness or absence of democracy, with its provisions for legality, accountability, popular sovereignty and openness. The experience of this century offers important lessons. **Countries that govern themselves in a truly democratic fashion do not go to war with one another**. They do not aggress against their neighbors to aggrandize themselves or glorify their leaders. Democratic governments do not ethnically "cleanse" their own populations, and they are much less likely to face ethnic insurgency. Democracies do not sponsor terrorism against one another. They do not build weapons of mass destruction to use on or to threaten one another. Democratic countries form more reliable, open, and enduring trading partnerships. In the long run they offer better and more stable climates for investment. They are more environmentally responsible because they must answer to their own citizens, who organize to protest the destruction of their environments

### Failure of democratization in Russia causes nuclear war- they will abandon nuclear peace

Muravchik, 1 [Joshua Muravchik, Resident Scholar at the AEI, “Democracy and Nuclear Peace,” July 14, 2001, http://www.npec-web.org/Syllabus/Muravchik.pdf, DA 7/19/11]//RS

That this momentum has slackened somewhat since its pinnacle in 1989, destined to be remembered as one of the most revolutionary years in all history, was inevitable. So many peoples were swept up in the democratic tide that there was certain to be some backsliding. Most countries' democratic evolution has included some fits and starts rather than a smooth progression. So it must be for the world as a whole. Nonetheless, the overall trend remains powerful and clear. Despite the backsliding, the number and proportion of democracies stands higher today than ever before. This progress offers a source of hope for enduring nuclear peace. The danger of nuclear war was radically reduced almost overnight when Russia abandoned Communism and turned to democracy. For other ominous corners of the world, we may be in a kind of race between the emergence or growth of nuclear arsenals and the advent of democratization. If this is so, the greatest cause for worry may rest with the Moslem Middle East where nuclear arsenals do not yet exist but where the prospects for democracy may be still more remote

### Democracy solves extinction and all your impacts

Carnegie Commission, 95 [Carnegie Commission, October 1995, <http://wwics.si.edu/subsites/ccpdc/pubs/di/1.htm>, 7/16/11]

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## Economy- Brain Drain

### Bad US-Russia relations causes brain drain- disengagement of Russian enterprises

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

Another reason for continuing cooperation was suggested: "it is important for U.S. decisionmakers to recognize that even the short-term cutoff of ISS cooperation could have severe costs, undermining changes that have not yet become consolidated and incurring other risks. . . . It can be argued convincingly that U.S. withdrawal of support or conditioning of funding for cooperative space projects on the proliferation-related behavior of other Russian entities not involved in the project but under some form of state control (as some critics have suggested) would be counterproductive to U.S. policy aims. Specifically, not engaging these Russian companies would greatly exacerbate proliferation problems (by reversing market forces that make the United States their currently preferred partner), cause the ISS to suffer scientifically (from the loss of Russia's considerable experience and expertise in manned space flight), and remove one of the few positive signs of long-term cooperation in the current U.S.-Russian relationship (which has suffered greatly in the past two years due to NATO expansion, U.S./NATO bombing of Yugoslavia, and U.S. national missile defense tests and attempts to revise the ABM Treaty). Alienating firms currently involved in cooperative projects may push Russian space know-how into the willing arms of India or China, possibly encouraging the formation of new alliances in space activities. Thus, while enterprises directly involved in the ISS should be held to a very high nonproliferation standard, the United States should exercise restraint in considering blanket sanctions that punish innocent as well as guilty enterprises, just because both are nominally under Russian state control."

### Brain Drain causes an economic downturn- Loss of one scientist costs $300,000

Melkova, 1 [Vlada Melkova, Writer for the Russian Journal, “Russia’s Brain Drain,” October 30, 2001, The Russian Journal, <http://www.russiajournal.com/node/11365>, DA 7/18/11]

Many Russian professionals are heading for greener pastures outside of the country or are working in areas other than their original academic specialization, in search of higher income. But this is neither good for Russian technology or education. The notion of a "brain drain" is not new in Russia. Even in Soviet times, top professionals sometimes immigrated to the West or moved to socialist or developing countries to work in economics or science. But at certain periods, the flow increases. Analysts believe the "brain drain" significantly increases under the conditions of continuing instability in Russia. According to data provided by the Ministry of Science, the loss of one scientist costs the country an estimated **$300,000**. Over the past 10 years, some 16,000 Russian scientists have obtained permanent foreign work contracts and left the country. Although the rate was higher in the early 1990s — 2,000 a year — it is still high, at 1,000 emigrating annually. Only about 20 percent of those departing professionals have returned. Yelena, PR manager for the Pravda PR company, quit her job in Russia because she’s emigrating to Canada. "I loved my job and got a very good salary, but I never felt secure in Russia. Lack of economic stability and the August crisis (I was fired back then, together with everyone at our PR department, and was unemployed for a long time) made me take this step and apply to the Canadian Embassy. I heard that Canada needs mostly technical occupations, like engineers and programmers, but my educational level (which includes training in the United States) and solid work experience encouraged me to try. I don’t have regrets about my decision, and I hope I’ll find a better and more secure life in Canada." Yuri Boryev, president of the Aesthetic Academy, said: "Those leaving are people who can easily find a job abroad, mostly scientists: mathematicians, physicists, biologists. Not only young people, but also the middle-aged and even older. Our educational level is still high, and this level will remain, at least for the next 15 years." This happens," he continued, "because professors, Ph.D.’s of the RAS (Russian Academy of Sciences), get five to eight times less than a secretary in a commercial firm, or sometimes even the same as a janitor." He added that, quite often, Russian specialists are exploited abroad and their achievements credited to foreign companies and research centers. However, he continued that he’s "not against training abroad. It is a very positive thing, as you get access to advanced laboratories, facilities, you can enrich your experience, and apply the knowledge when you come back to Russia. However, such examples are rare. More frequently, we see massive emigration instead." Dmitry Lavrov, deputy director of Russia’s research institute Information Technologies, said "Forty years ago, when we were getting ready for the first space flight, we didn’t have any ‘brain-drain’ problem. It was prestigious to work in this sphere [high technologies]. Financially, there was no difference; but those who worked for state’s science, were respected. There’s also a tendency to draw a line between (and give preference to) technical specialties. They get a priority over humanitarian ones, although not a single exact science can develop without the humanities." Natalia Zlydneva, professor of the Slavic Studies Institute at the Russian Academy of Science, said that scientists and academics who go abroad often get slighted. "Our professionals do not have the same scientific atmosphere there, and often do not get adequate work." However, those who choose to stay in Russia also risk having to do lower-level work: Professors have to tutor high- school students, mathematicians become computer programmers, foreign language teachers start holding "Russian for foreigners" courses. For many, this is a way to survive, but it is damaging professionally and, as a result, won’t benefit Russian society. "Science is a world apart from the market economy, and you can’t use same skills [in both areas]," she said.

### Russian economic collapse causes global nuclear war- internal conflicts cause loose nukes

David, 99 [Steven David, Professor of Political Science at Johns Hopkins University, “Internal War: Causes and Cures,” July 1999, <https://muse.jhu.edu/journals/world_politics/related/v049/49.4er_brown.html>, DA 7/17/11]

If internal war does strike Russia, economic deterioration will be a prime cause. From 1989 to the present, the GDP has fallen by 50 percent. In a society where, ten years ago, unemployment scarcely existed, it reached 9.5 percent in 1997 with many economists declaring the true figure to be much higher. Twenty-two percent of Russians live below the official poverty line (earning less than $ 70 a month). Modern Russia can neither collect taxes (it gathers only half the revenue it is due) nor significantly cut spending. Reformers tout privatization as the country's cure-all, but in a land without well-defined property rights or contract law and where subsidies remain a way of life, the prospects for transition to an American-style capitalist economy look remote at best. As the massive devaluation of the ruble and the current political crisis show, Russia's condition is even worse than most analysts feared. If conditions get worse, even the stoic Russian people will soon run out of patience. A future conflict would quickly draw in Russia's military. In the Soviet days civilian rule kept the powerful armed forces in check. But with the Communist Party out of office, what little civilian control remains relies on an exceedingly fragile foundation -- personal friendships between government leaders and military commanders. Meanwhile, the morale of Russian soldiers has fallen to a dangerous low. Drastic cuts in spending mean inadequate pay, housing, and medical care. A new emphasis on domestic missions has created an ideological split between the old and new guard in the military leadership, increasing the risk that disgruntled generals may enter the political fray and feeding the resentment of soldiers who dislike being used as a national police force. Newly enhanced ties between military units and local authorities pose another danger. Soldiers grow ever more dependent on local governments for housing, food, and wages. Draftees serve closer to home, and new laws have increased local control over the armed forces. Were a conflict to emerge between a regional power and Moscow, it is not at all clear which side the military would support. Divining the military's allegiance is crucial, however, since the structure of the Russian Federation makes it virtually certain that regional conflicts will continue to erupt. Russia's 89 republics, krais, and oblasts grow ever more independent in a system that does little to keep them together. As the central government finds itself unable to force its will beyond Moscow (if even that far), power devolves to the periphery. With the economy collapsing, republics feel less and less incentive to pay taxes to Moscow when they receive so little in return. Three-quarters of them already have their own constitutions, nearly all of which make some claim to sovereignty. Strong ethnic bonds promoted by shortsighted Soviet policies may motivate non-Russians to secede from the Federation. Chechnya's successful revolt against Russian control inspired similar movements for autonomy and independence throughout the country. **If these rebellions spread and Moscow responds with force, civil war is likely**. Should Russia succumb to internal war, the consequences for the United States and Europe will be severe. A major power like Russia -- even though in decline -- does not suffer civil war quietly or alone. An embattled Russian Federation might provoke opportunistic attacks from enemies such as China. Massive flows of refugees would pour into central and western Europe. Armed struggles in Russia could easily spill into its neighbors. **Damage from the fighting, particularly attacks on nuclear plants, would poison the environment of much of Europe and Asia.** Within Russia, the consequences would be even worse. Just as the sheer brutality of the last Russian civil war laid the basis for the privations of Soviet communism, a second civil war might produce another horrific regime. M**ost alarming is the real possibility that the violent disintegration of Russia could lead to loss of control over its nuclear arsenal**. No nuclear state has ever fallen victim to civil war, but even without a clear precedent the grim consequences can be foreseen. Russia retains some 20,000 nuclear weapons and the raw material for tens of thousands more, in scores of sites scattered throughout the country. So far, the government has managed to prevent the loss of any weapons or much material. If war erupts, however, Moscow's already weak grip on nuclear sites will slacken, making weapons and supplies available to a wide range of anti-American groups and states. Such dispersal of nuclear weapons represents the greatest physical threat America now faces. And it is hard to think of anything that would increase this threat more than the chaos that would follow a Russian civil war.

## Proliferation

### Plan kills US-Russian relations- spacy policy underlies all cooperation

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

Yet, to one participant, "If nothing else, good relations in the area of space policy help provide us with a cushion when they are failing in other areas. . . . Moscow’s military as well as its space program are in very dire straits. **Both would seem to be close to cardiac arrest.** Having said that, I think our interactions with the Russians in both of these areas are critical to our future bilateral relationship. It would be easy to dismiss the Russians as serious players given their internal situation- an attitude often heard around Washington. To a large degree, we have to carry the ball for them. . . . So why should we continue to pick up the tab? Why should the American taxpayer continue to subsidize the Russian space program - or our military to military contacts? It seems to me that there are two answers to this question. First, when it comes to the space program we are dealing with a very high visibility program. If we ignore the Russian space program, we run the risk of wounding their pride in a very serious way. They don?t need to be told that they are down and out. They know it better than we do. My experience with Russians tells me that they are experts when it comes to knowing the extent of their technological inferiority vis-a-vis the West - or put differently, just how far they are behind us. But by keeping them involved in the space program we are at least giving them a psychological fig leaf."

### Bad US-Russia relations causes proliferation- disengagement of Russian enterprises

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

Another reason for continuing cooperation was suggested: "it is important for U.S. decisionmakers to recognize that even the short-term cutoff of ISS cooperation could have severe costs, undermining changes that have not yet become consolidated and incurring other risks. . . . It can be argued convincingly that U.S. withdrawal of support or conditioning of funding for cooperative space projects on the proliferation-related behavior of other Russian entities not involved in the project but under some form of state control (as some critics have suggested) would be counterproductive to U.S. policy aims. Specifically, not engaging these Russian companies would greatly exacerbate proliferation problems (by reversing market forces that make the United States their currently preferred partner), cause the ISS to suffer scientifically (from the loss of Russia's considerable experience and expertise in manned space flight), and remove one of the few positive signs of long-term cooperation in the current U.S.-Russian relationship (which has suffered greatly in the past two years due to NATO expansion, U.S./NATO bombing of Yugoslavia, and U.S. national missile defense tests and attempts to revise the ABM Treaty). Alienating firms currently involved in cooperative projects may push Russian space know-how into the willing arms of India or China, possibly encouraging the formation of new alliances in space activities. Thus, while enterprises directly involved in the ISS should be held to a very high nonproliferation standard, the United States should exercise restraint in considering blanket sanctions that punish innocent as well as guilty enterprises, just because both are nominally under Russian state control."

### US- Russian relations key to prevent an arms race- Russia can’t agree on a missile defense option and will pull out of START

Washington, 7/4 [Tom Washington, correspondent for the Moscow News, “Russia’s ultimatum to NATO,” July 4, 2011, <http://rbth.ru/articles/2011/07/04/russias_arms_race_ultimatum_to_nato_13108.html>, DA 7/17/11]//RS

NATO has a year to toe Russia’s line on the contentious European missile defense system, and if not the arms race it has been threatening will kick off. That is the stark ultimatum that President Medvedev is to present to the alliance today in Sochi. The Russia – NATO Council meets today in the future Olympic town today and Medvedev and secretary general Anders Fogh Rasmussen are due to have their own head to head. Boiling point “There has been a lot simmering away and we have something to say to our partners,” Dmitry Rogozin, Russian envoy to NATO, told Kommersant. “We are witnessing artificial hold-ups to the discussions on the missile defense shield. Russia has several courses of action and it is worth noting that the president will lay them out to the alliance’s leaders.” Russia and NATO disagree over the form of a proposed missile defense shield, nominally targeted against Iran and North Korea. The US has said that it wants two different detector systems that share information but Moscow wants further integration and legal guarantees that the system will not be used against Russia. Plans to build bases in Poland and Romania have not eased tensions. “For us the most important thing is that the creation of a missile defense shield in Europe does not undermine our nuclear deterrent force. If no option that satisfies us is found then we will take other measures,” Rogozin said. Another arms race Russia’s retaliation to perceived NATO intransigence would come in three phases. First, it would be forced to create an aerospace defense system, which combines missile defense and warning systems and a space control system. Continued stubbornness from the West would then lead to strategic offensive weapons, which would be deployed on Russia’s western border, to form powerful strike missile groups. Last of all, Moscow would cut loose from the Strategic Arms Reduction Treaty (START), in which American President Obama has invested so much political capital. This would not depend upon who was in the Kremlin after 2012.

We control magnitude- START affects 95% of the world’s nuclear weapons   
Shultz et al 8 [George P. Shutlz, former secretary of state, William J. Perry, former secretary of defense, Henry A. Kissinger, former secretary of state, and Sam Nunn, former chairman of the Senate Armed Services Committee, January 15, 2008, <http://online.wsj.com/public/article_print/SB120036422673589947.html>]

The accelerating spread of nuclear weapons, nuclear know-how and nuclear material has brought us to a nuclear tipping point. We face a very real possibility that the deadliest weapons ever invented could fall into dangerous hands. The steps we are taking now to address these threats are not adequate to the danger. With nuclear weapons more widely available, deterrence is decreasingly effective and increasingly hazardous. One year ago, in an essay in this paper, we called for a global effort to reduce reliance on nuclear weapons, to prevent their spread into potentially dangerous hands, and ultimately to end them as a threat to the world. The interest, momentum and growing political space that has been created to address these issues over the past year has been extraordinary, with strong positive responses from people all over the world. Mikhail Gorbachev wrote in January 2007 that, as someone who signed the first treaties on real reductions in nuclear weapons, he thought it his duty to support our call for urgent action: "It is becoming clearer that nuclear weapons are no longer a means of achieving security; in fact, with every passing year they make our security more precarious." In June, the United Kingdom's foreign secretary, Margaret Beckett, signaled her government's support, stating: "What we need is both a vision -- a scenario for a world free of nuclear weapons -- and action -- progressive steps to reduce warhead numbers and to limit the role of nuclear weapons in security policy. These two strands are separate but they are mutually reinforcing. Both are necessary, but at the moment too weak." We have also been encouraged by additional indications of general support for this project from other former U.S. officials with extensive experience as secretaries of state and defense and national security advisors. These include: Madeleine Albright, Richard V. Allen, James A. Baker III, Samuel R. Berger, Zbigniew Brzezinski, Frank Carlucci, Warren Christopher, William Cohen, Lawrence Eagleburger, Melvin Laird, Anthony Lake, Robert McFarlane, Robert McNamara and Colin Powell. Inspired by this reaction, in October 2007, we convened veterans of the past six administrations, along with a number of other experts on nuclear issues, for a conference at Stanford University's Hoover Institution. There was general agreement about the importance of the vision of a world free of nuclear weapons as a guide to our thinking about nuclear policies, and about the importance of a series of steps that will pull us back from the nuclear precipice**. The U.S. and Russia, which possess close to 95% of the world's nuclear warheads, have a special responsibility, obligation and experience to demonstrate leadership**, but other nations must join. Some steps are already in progress, such as the ongoing reductions in the number of nuclear warheads deployed on long-range, or strategic, bombers and missiles. Other near-term steps that the U.S. and Russia could take, beginning in 2008, **can in and of themselves dramatically reduce nuclear dangers. They include: • Extend key provisions o**f the **S**tra**t**egic **A**rms **R**eduction **T**reaty of 1991. Much has been learned about the vital task of verification from the application of these provisions. The treaty is scheduled to expire on Dec. 5, 2009. The key provisions of this treaty, including their essential monitoring and verification requirements, should be extended, and the further reductions agreed upon in the 2002 Moscow Treaty on Strategic Offensive Reductions should be completed as soon as possible.

### Proliferation risks global nuclear war and extinction

Krieger ‘9[David Krieger, Pres. Nuclear Age Peace Foundation and Councilor of World Future Council, “Still Loving the Bomb After All These Years,” September 4, 2009, <https://www.wagingpeace.org/articles/2009/09/04_krieger_newsweek_response.php?krieger>, DA 7/16/11]

Jonathan Tepperman’s article in the September 7, 2009 issue of Newsweek, “Why Obama Should Learn to Love the Bomb,” provides a novel but frivolous argument that nuclear weapons “may not, in fact, make the world more dangerous….” Rather, in Tepperman’s world, “The bomb may actually make us safer.” Tepperman shares this world with Kenneth Waltz, a University of California professor emeritus of political science, who Tepperman describes as “the leading ‘nuclear optimist.’” Waltz expresses his optimism in this way: “We’ve now had 64 years of experience since Hiroshima. It’s striking and against all historical precedent that for that substantial period, there has not been any war among nuclear states.” Actually, there were a number of proxy wars between nuclear weapons states, such as those in Korea, Vietnam and Afghanistan, and some near disasters, the most notable being the 1962 Cuban Missile Crisis. Waltz’s logic is akin to observing a man falling from a high rise building, and noting that he had already fallen for 64 floors without anything bad happening to him, and concluding that so far it looked so good that others should try it. Dangerous logic! Tepperman builds upon Waltz’s logic, and concludes “that all states are rational,” even though their leaders may have a lot of bad qualities, including being “stupid, petty, venal, even evil….” He asks us to trust that rationality will always prevail when there is a risk of nuclear retaliation, because these weapons make “the costs of war obvious, inevitable, and unacceptable.” Actually, he is asking us to do more than trust in the rationality of leaders; he is asking us to gamble the future on this proposition. “The iron logic of deterrence and mutually assured destruction is so compelling,” Tepperman argues, “it’s led to what’s known as the nuclear peace….” But if this is a peace worthy of the name, which it isn’t, it certainly is not one on which to risk the future of civilization. One irrational leader with control over a nuclear arsenal could start a nuclear conflagration, resulting in a global Hiroshima. Tepperman celebrates “the iron logic of deterrence,” but deterrence is a theory that is far from rooted in “iron logic.” It is a theory based upon threats that must be effectively communicated and believed. Leaders of Country A with nuclear weapons must communicate to other countries (B, C, etc.) the conditions under which A will retaliate with nuclear weapons. The leaders of the other countries must understand and believe the threat from Country A will, in fact, be carried out. The longer that nuclear weapons are not used, the more other countries may come to believe that they can challenge Country A with impunity from nuclear retaliation. The more that Country A bullies other countries, the greater the incentive for these countries to develop their own nuclear arsenals. Deterrence is unstable and therefore precarious. Most of the countries in the world reject the argument, made most prominently by Kenneth Waltz, that the spread of nuclear weapons makes the world safer. These countries joined together in the Nuclear Non-Proliferation Treaty (NPT) to prevent the spread of nuclear weapons, but they never agreed to maintain indefinitely a system of nuclear apartheid in which some states possess nuclear weapons and others are prohibited from doing so. The principal bargain of the NPT requires the five NPT nuclear weapons states (US, Russia, UK, France and China) to engage in good faith negotiations for nuclear disarmament, and the International Court of Justice interpreted this to mean complete nuclear disarmament in all its aspects. Tepperman seems to be arguing that seeking to prevent the proliferation of nuclear weapons is bad policy, and that nuclear weapons, because of their threat, make efforts at non-proliferation unnecessary and even unwise. If some additional states, including Iran, developed nuclear arsenals, he concludes that wouldn’t be so bad “given the way that bombs tend to mellow behavior.” Those who oppose Tepperman’s favorable disposition toward the bomb, he refers to as “nuclear pessimists.” These would be the people, and I would certainly be one of them, who see nuclear weapons as presenting an urgent danger to our security, our species and our future. Tepperman finds that when viewed from his “nuclear optimist” perspective, “nuclear weapons start to seem a lot less frightening.” “Nuclear peace,” he tells us, “rests on a scary bargain: you accept a small chance that something extremely bad will happen in exchange for a much bigger chance that something very bad – conventional war – won’t happen.” But the “extremely bad” thing he asks us to accept is the end of the human species. Yes, that would be serious. He also doesn’t make the case that in a world without nuclear weapons, the prospects of conventional war would increase dramatically. After all, it is only an unproven supposition that nuclear weapons have prevented wars, or would do so in the future. We have certainly come far too close to the precipice of catastrophic nuclear war. As an ultimate celebration of the faulty logic of deterrence, Tepperman calls for providing any nuclear weapons state with a “survivable second strike option.” Thus, he not only favors nuclear weapons, but finds the security of these weapons to trump human security. Presumably he would have President Obama providing new and secure nuclear weapons to North Korea, Pakistan and any other nuclear weapons states that come along so that they will feel secure enough not to use their weapons in a first-strike attack. Do we really want to bet the human future that Kim Jong-Il and his successors are more rational than Mr. Tepperman?

## American Oil Dependency

### US-Russian relations key to American oil supply

Butler ’08[Desmond, reporter-associated press, “[The West's Dependence On Russia's Vast Energy Supplies Worries US](http://www.huffingtonpost.com/2008/08/12/the-wests-dependence-on-r_n_118384.html),” August 12, 2008, http://www.huffingtonpost.com/2008/08/12/the-wests-dependence-on-r\_n\_118384.html]

The Cold War competition between the United States and Russia \_ played out in Europe with the threat of mutual nuclear destruction \_ ended with the collapse of the Soviet empire nearly two decades ago. But the Russian bear has re-emerged from its cave with a new and powerful weapon \_ the West's dependence on Moscow's vast energy supplies. The Russians now supply about 25 percent of the European Union's crude oil needs and half of its natural gas. And Moscow, with its recent attack on its former Georgian republic, may be trying to blunt the West's counteroffensive in the deadly serious energy competition. A key, U.S.-backed pipeline that carries oil out of Caspian and Central Asian fields to a Turkish port on the Mediterranean was nearly hit in recent attacks. The stakes are high for the Europeans. Some U.S. lawmakers worry about divisions within NATO due to Russia's domination of European gas markets and the threat of cold, dark winters if an angry Kremlin closes the valves. "It is unlikely that aggression against our NATO allies will occur with aircraft and tanks and troops," said Indiana Sen. Richard Lugar, the senior Republican on the Senate Foreign Relations Committee, in an Associated Press interview. "A nation could achieve the same and worse effects simply by turning off the taps\_ people freeze, industry stops." To counter this influence, the U.S. sent special envoy C. Boyden Gray to energy-rich Central Asia to lobby for new routes that run through Georgia \_ notably the Baku-Tbilisi-Ceyhan oil pipeline that was almost hit by a Russian bombing raid Monday. That pipeline carries Caspian crude to international markets from suppliers independent not only of Russia but also OPEC. Lesser amounts flow through the Baku-Supsa line, which ends on the Black Sea. The Caspian Sea port of Baku is the capital of Azerbaijan, another former Soviet republic that controls major petroleum reserves. In Azerbaijan, Gray's visit in early June was overshadowed when Alexei Miller, the chief executive of Russia's government-controlled energy giant, Gazprom, made a bold offer \_ still pending \_ to buy all of Azerbaijan's natural gas exports at market prices. Gray continued on to Turkmenistan. Russian President Dmitry Medvedev immediately announced his own trip and flew there a month later to unveil a major gas agreement that dealt another blow to U.S. hopes. Those setbacks underscore the challenges confronting Washington and the European Union, which is hamstrung by its limited power to set a unified energy policy in the face of Russia's divide-and-conquer strategy in the gas market. It has struck lucrative deals with individual European countries and companies to extend its distribution reach to the Western end of the continent. To overcome growing Russian sway, U.S. and European officials believe that the U.S. must use its influence to push through more pipelines from Central Asia to Europe. While Russia appears to hold a powerful hand, especially its long dominance over former republics in the Caucasus and Central Asia, countries like Turkmenistan, Khazakhstan and Azerbaijan are wary. The former republics want signs the West is serious about building more pipelines before making moves that would anger Moscow. The Kremlin has used its energy dominance as a weapon. In late 2006, Russia's Gazprom threatened to cut off natural gas supplies to Georgia in the dead of winter. Russia reduced its oil supply to the Czech Republic last month, shortly after the country agreed to allow a U.S. missile defense radar on its soil over Moscow's objection. Russia had previously cut gas supplies to Estonia, Lithuania, Ukraine and Belarus. Russia denies political motivation. As a counter to Moscow's growing strength, Washington wants pipelines built from Turkmenistan, across the Caspian to Azerbaijan, then through the Caucasus to Turkey and on to Western Europe. The route would bypass both Russia and Iran. Gray's trip and a similar one by Assistant Secretary of State Richard Boucher were aimed at promoting those pipelines and signaling that the U.S. was stepping up its game. "Paying more attention \_ and letting these countries know we are paying attention \_ is our main objective," said Gray, who was recently appointed as Special Envoy for Eurasian Energy. But the Russians seemed to be watching. Whether by coincidence or design, Miller, Gazprom's chief executive, scheduled an overlapping trip that mirrored Gray's. "People think \_ it's too flattering to me \_ that Alexei Miller was kind of stalking me when I was in the region," Gray said. Lugar, who has been pressing his concerns in trips to Central Asia and Europe, praises the appointment of Gray, a confidante of Bush and recent ambassador to the European Union. He says Russia will likely counter U.S. moves in its backyards. "Given the characteristics of Russian diplomacy, which have been not only competitive but sometimes gripping people by the throat, they are likely to feel irritated that someone else is in the field," he said. Lugar and others, including Sen. Joseph Biden, D-Del., the Senate Foreign Relations Committee chairman, believe that U.S. efforts to promote pipelines have foundered so far because they are a low priority for the Bush administration. "The United States does not have a clear, consistent strategy to promote our long-term security interests, or our near-term energy and economic interests. The Russians do," Biden wrote in response to written questions from the AP. But Konstanin Batunin, an oil and gas analyst at Alfa Bank in Russia, believes the U.S. \_ itself dependent on foreign oil \_ has failed to make much headway because it has little to offer the Europeans in terms of alternate supplies. "The powers are not equal," Batunin said, referring to a struggle between the U.S. and Russia to control the region. "The United States cannot offer an adequate alternative. A political resource with no economic element is not enough."

### This causes an overreliance on oil from the Middle East- and that’s bad- 2 reasons

First, it causes Middle East War—

### Oil dependence causes US war in Middle East- oil based economy drives conflicts

PBS, 2 [Public Broadcasting Service, Roper Poll-certified as America’s most trusted national institution. “What Have Been the Role and Effects of U.S. foreign policies and actions in the Middle East” <http://www.pbs.org/wgbh/globalconnections/mideast/questions/uspolicy/index.html#us_oil>. 2002”] AP

U.S. troops have seen limited action in the Middle East. As peacekeepers in Lebanon after Israel's 1982 invasion, U.S. forces fared poorly. Two hundred forty-one Marines were killed when their barracks was hit by a suicide truck-bomb in October 1983, prompting a U.S. withdrawal from Beirut to offshore warships. After a 1986 discotheque bombing in West Berlin was traced to Libya, the U.S. bombed that country, killing three dozen civilians, including Libyan ruler Muammar Qaddafi's adopted daughter. The most significant direct U.S. military intervention came in response to the Iraqi invasion of oil-rich Kuwait in August of 1990, which led to the Gulf War. Although the invasion didn't directly threaten American territory, a vital U.S. economic interest -- oil -- was at stake, along with principles of international law that protect the sovereignty and territorial integrity of nations. The Gulf War won the U.S. the gratitude of the oil-rich states of the Persian Gulf for eliminating the Iraqi military threat, but these regimes have had to deal with increased internal criticism for allowing U.S. troops to remain in Saudi Arabia. A member of the U.S. Air Force hands out candy to Kurdish children in a village in northern Iraq, August 1995. The Gulf War also left charges that the U.S. had abandoned some of its most vulnerable allies. The Kurds and Shiis of Iraq were encouraged to revolt against Saddam Hussein by the U.S., with assurances of U.S. support. But little support materialized when the uprising actually got under way, and Iraqi retaliation against both rebelling groups was harsh. Limited U.S. intervention allowed the creation of Kurdish safe havens in the north and assisted Shii refugees fleeing into Iran in the south, but charges that the U.S. abandoned its regional allies linger to this day, leading to skepticism that George W. Bush's call for a new government in Iraq would be accompanied by full American support. The U.S. and oil While American interest in the region isn't motivated by the pursuit of fossil fuels alone, the historically complicated U.S. relationships with Iran, Iraq, and the Gulf states have often revolved around oil -- specifically, ensuring an adequate supply at a reasonable cost. The Khawr Al Kafka oil terminal in the Persian Gulf. Since Standard Oil's 1936 discovery of massive oil deposits in Saudi Arabia, ensuring access to the region's fossil fuels has been on America's foreign policy agenda. The 1973-1974 OPEC oil boycott and the invasion of Kuwait in 1990 are both dramatic examples of how regional forces have challenged U.S. access to fuel. The 1973 boycott was particularly powerful; at the time, Arab nations supplied 37 percent of the oil consumed by the noncommunist world. To this day, ensuring the supply of oil from the region factors heavily in the development of U.S. foreign policy in the Middle East.

### Middle East conflict causes global nuclear war

Steinbach, 2 [John Steinbach, Analyst, Center for Research on Globaization, DC Iraq Coalition, “Israeli Weapons of Mass Destruction: A Threat To Peace,” March 2002, http://www.globalresearch.ca/articles/STE203A.html]

Meanwhile**,** the existence of an arsenal of mass destruction in such an unstable region in turn has serious implications for future arms control and disarmament negotiations, and even the threat of nuclear war. Seymour Hersh warns, "Should war break out in the Middle East again,... or should any Arab nation fire missiles against Israel, as the Iraqis did**,** a nuclear escalation, once unthinkable except as a last resort, would now be a strong probability**.**"(41) and Ezar Weissman, Israel's current President said "The nuclear issue is gaining momentum (and the) next war will not be conventional."(42) Russia and before it the Soviet Union has long been a major (if not the major) target of Israeli nukes. It is widely reported that the principal purpose of Jonathan Pollard's spying for Israel was to furnish satellite images of Soviet targets and other super sensitive data relating to U.S. nuclear targeting strategy. (43) (Since launching its own satellite in 1988, Israel no longer needs U.S. spy secrets.) Israeli nukes aimed at the Russian heartland seriously complicate disarmament and arms control negotiations and, at the very least, the unilateral possession of nuclear weapons by Israel is enormously destabilizing, and dramatically lowers the threshold for their actual use, if not for all out nuclear war. In the words of Mark Gaffney, "... if the familar pattern(Israel refining its weapons of mass destruction with U.S. complicity) is not reversed soon - for whatever reason - the deepening Middle East conflict could trigger a world conflagration." (44)

Second, it causes Resource Wars—  
  
Oil dependence on the Middle East causes resource wars- Oil peak approaching

Heinberg, 5 [Richard Heinberg, American journalist and educator who has written extensively on ecological issues, including oil depletion. He is the author of at least ten books. “How to Avoid Oil Wars, Terrorism, and Economic Collapse”, August 2005, http://www.oildepletionprotocol.org/how\_to\_avoid\_oil\_wars\_terrorism\_and\_economic\_collapse] OP

By now most well-informed people are aware that global oil production may soon reach its all-time peak, and that the consequences will likely be severe. Already many important oil-producing nations (such as the United States, Indonesia, and Iran) and some whole regions (such as the North Sea) are past their production maximums. With nearly every passing year another country reaches a production plateau or begins its terminal decline. Meanwhile global rates of oil discovery have been falling since the early 1960s, as has been confirmed by ExxonMobil. All of the 100 or so supergiant fields that are collectively responsible for about half of current world production were discovered in the 1940s, '50s, '60s, and '70s. No fields of comparable size have been found since then; instead, exploration during recent years has turned up only much smaller fields that deplete relatively quickly. The result is that today only one new barrel of oil is being discovered for every four that are extracted and used. World leaders are hampered in their ability to assess the situation by a lack of consistent data. Proven petroleum reserve figures look reassuring: the world has roughly a trillion barrels yet to produce, perhaps more; indeed, official reserves figures have never been higher. However, circumstantial evidence suggests that some of the largest producing nations have inflated their reserves figures for political reasons. Meanwhile oil companies routinely (and legitimately) report reserve growth for fields discovered decades ago. In addition, reserves figures are often muddied by the inclusion of non-conventional petroleum resources, such oil sands - which do need to be taken into account, but in a separate category, as their rates of extraction are limited by factors different from those that constrain the production of conventional crude. As a consequence of all of these practices, oil reserves data tend to give an impression of expansion and plenty, while discovery and depletion data do the opposite. This apparent conflict in the data invites dispute among experts as to when the global oil peak is likely to occur. Some analysts say that the world is virtually at its peak of production now; others contend that the event can be delayed for two decades or more through enhanced investment in exploration, the adoption of new extraction technologies, and the substitution of non-conventional petroleum sources (oil sands, natural gas condensates, and heavy oil) for conventional crude. However, there is little or no disagreement that a series of production peaks is now within sight - first, for conventional non-OPEC oil; then for conventional oil globally; and finally for all global conventional and non-conventional petroleum sources combined. Moreover, even though there may be dispute as to the timing of these events, it is becoming widely acknowledged that the world peak in all combined petroleum sources will have significant global economic consequences. Mitigation efforts will require many years of work and trillions of dollars in investment. Even if optimistic forecasts of the timing of the global production peak turn out to be accurate, the world is facing an historic change that is unprecedented in scope and depth of impact. Due to systemic dependence on oil for transportation, agriculture, and the production of plastics and chemicals, every sector of every society will be affected. Efforts will be needed to create alternative sources of energy, to reduce demand for oil through heightened energy efficiency, and to redesign entire systems (including cities) to operate with less petroleum. These efforts will be challenging enough in the context of a stable economic environment. However, if prices for oil become extremely volatile, mitigation programs could be undermined. While high but stable prices would encourage conservation and investment in alternatives, prices that repeatedly skyrocket and then plummet could devastate entire economies and discourage long-term investment. Actual shortages of oil - of which price shocks would be only a symptom - would be even more devastating. The worst impacts would be suffered by those nations, and those aspects of national economies, that could not obtain oil at any price affordable to them. Supply interruptions would likely occur with greater frequency and for increasing lengths of time as global oil production gradually waned. Efforts to plan a long-term energy transition would be frustrated, in both importing and exporting countries. Meanwhile the perception among importers that exporting nations were profiteering would foment animosities and an escalating likelihood of international conflict. In short, the global peak in oil production is likely to lead to economic chaos and extreme geopolitical tensions, raising the spectres of war, revolution, terrorism, and even famine, unless nations adopt some method of cooperatively reducing their reliance on oil.

### Resource wars cause extinction

Klare 6 (Michael T. Klare Ph.D, Professor of peace and world security studies at Hampshire University, “The Coming Resource Wars” http://www.alternet.org/story/33243/the\_coming\_resource\_wars, 3/10/2006)SV

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

## \*\*\*Aerospace Internal Link Scenarios\*\*\*

## Russian Nationalism 🡪 Genocide

### Space accomplishments are the key factor in Russian national pride

Harvey, 7 [Brian Harvery, author of several books about space, “The rebirth of the Russian space program: 50 years after Sputnik,” New Frontiers, p. 334]

The commitment of the Russians to their space program was something which many outside observers found hard to understand. It is not one universally shared in a country which has endured much hardship and where many people have more immediate and pressing concerns on their mind, but it is one held by enough people to matter. Soviet and Russian achievements in space were built up painstakingly, painfully, over many years. Their founders had learned in the hard school of the camps, the wartime frontline, the early rockets that often exploded and the Brezhnevite bureaucracy. They had known the heartbreaking failures, the loss of two Soyuz crews, the satellites that went silent, the upper stages that would not be tamed, the Moon race they could not win, the Mars probes that disappeared. But, they also remembered the night the Sputnik was launched, the day they hit the Moon, the glory of Gagarin's flight, Tereshkova, the spacewalk, the soft landing on the Moon, the pictures from Venus, the first space station and then Mir. These things had enabled the Soviet Union and Russia to walk tall in the world, to mark out space exploration as a unique arena of accomplishment. It was a space program in which its participants and admirers could justifiably take immense pride, a program built on a potent mixture of courage, endurance, daring, engineering genius, quality and imagination. It was a program which had deep historical roots—going back to Tsiolkovsky in the 1890s, Kondratyuk's writings during the First World War, Tsander's plans to go to Mars, Glushko's first experiments in the Gas Dynamics Laboratory in the 1920s. It was a program which both pre-dated and outlived the communist experiment. In keeping the Russian space program going, its engineers and scientists, now joined by its managers and accountants, were keeping alive a dream that went back two centuries.

### Russian nationalism leads to aggressive anti-semitism and genocide

Copila, 8[Emanuel Copila, teaching assistant and a PhD candidate within the Faculty of Political Sciences, Philosophy and Communicational Sciences, from West University of Timisoara (Romania) “Between Continuity and Change: The Resurgence of Nationalism in Post-Soviet Russia,” Romanian Review on Political Geography, <http://www.scribd.com/doc/45787088/Cultural-Ideal-or-Geopolitical-Project-Eurasianism-s-Paradoxes>, DA 7/19/11]

The anti-Semite dimension of the Russian nationalism Anti-Semitism is almost inherent to any form of aggressive nationalism. The allogene, depicted best in this type of discourse by the image of the stateless Jew, corrupts and undermines the nations in which he carries out his activities, thus national mobilization must be firstly directed towards the subversions and strangers from within and only then towards external dangers. During the Soviet era, after the year 1960, anti-Semitism had become a requisite of the all finer refined Russian nationalism, reaching all the way to the roots of the October Revolution. Therefore, the true Bolshevik heroes were only Lenin and Stalin, Trotsky and his partisans being only a subversive clique oriented towards the divergence of the Revolution so it would benefit the global Jewish establishment. The Zionist movement 48 was blamed for repeated tentative of destabilizing and compromise on worldwide communism, Fascism and Zionism being considered equal. Dozens of books, hundred of articles have confirmed (…) that Judaism had no other goals than to install a worldwide Fascism. Jews were portrayed as the everlasting aggressors, chauvinists, assassins, parasites. Their aim? To dominate the world through astuteness, corruption and murder. Pioneers of capitalism, they were accused of being the source of all historical plagues, being on top of the fight against communism, especially against Russia, which they were trying to destroy. History had been rewritten. (…) Hitler and his Nazis were depicted as puppets in the hands of the Jews. In 1941, they pushed the Fuhrer into attacking the USSR. Their complicity with National Socialism went up until encouraging the extermination of the poorest of the lot in the death camps Emanuel COPILA Ş 72 From the manifestos of the Pamjati national movement, active only in the late 80s, we find out that in the first government of the Soviet Union, made up of 22 members, only two were Russians, the rest being “nationalistic Jews”. These would have contributed actively to the demolishment of churches and of worship houses and of the deportations of intellectuals in camps. Even in Gorbachev’s time, the Jews were accused of occupying the best places in the Russian economy and that they had access to higher education in a much larger proportion than the rest of the population. 50 Among the diseases of the Russian nationalistic sentiment after 1970, anti-Semitism is a constant presence. Everything that goes on in Russia, and also all around the world, and is not agreed by the extreme nationalists, must necessarily be corollary of Jewish or freemason intrigues. 51 Not even today, at the beginning of the 21st century, does the anti-Semitism in Russia show any signs of fading. Moreover, the concept has been reinforced, and the consequences it has triggered at a social level are unsettling: the numbers of neo-Nazi groups and their victims are increasing day by day. Only in 2004 the neo-Nazi organizations, among which The Movement for Russia’s National Unity stands out, have killed 44 people, a considerable figure which says a lot about the radicalization of the Russian nationalism. 52 A frequently met tendency of the Russian neo-Nazis is to organize “squads” made up of volunteers that will act out at the outskirts of large cities so as to fight against the crimes caused by Asian or Muslim immigrants

### Genocide risks destruction on a global level – allowing future genocide causes extinction

Campbell, 1 [Kenneth J. Campbell, Professor Of Political Science And International Relations, “Genocide and the Global Village,” University of Delaware, September 2001, p. 15-16, DA 7/19/11]

Regardless of where or on how small a scale it begins, the crime of genocide is the complete ideological repudiation of, and a direct murderous assault upon, the prevailing liberal international order. Genocide is fundamentally incompatible with, and destructive of an open, tolerant, democratic, free market international order. As genocide scholar Herbert Hirsch has explained: The unwillingness of the world community to take action to end genocide and political massacres is not only immoral but also impractical. [W]ithout some semblance of stability, commerce, travel, and the international and intranational interchange of goods and information are subject**ed** to severe disruptions. Where genocide is permitted to proliferate, the liberal international order cannot long survive. No group will be safe; every group will wonder when they will be next. Left unchecked, genocide threatens to destroy whatever security, democracy, and prosperity exists in the present international system. As Roger Smith notes: Even the most powerful nations—those armed with nuclear weapons—may end up in struggles that will lead (accidentally, intentionally, insanely) to the ultimate genocide in which they destroy not only each other, but [humankind] mankind itself, sewing the fate of the earth forever with a final genocidal effort. In this sense, genocide is a grave threat to the very fabric of the international system and must be stopped, even at some risk to lives and treasure. The preservation and growth of the present liberal international order is a *vital* interest for all of its members—states as well as non-states—whether or not those members recognize and accept the reality of that objective interest. Nation states, as the principal members of the present international order, are the only authoritative holders of violent enforcement powers. Non-state actors, though increasing in power relative to states, still do not possess the military force, or the democratic authority to use military force, which is necessary to stop determined perpetrators of mass murder. Consequently, nation-states have a special responsibility to prevent, suppress, and punish all malicious assaults on the fundamental integrity of the prevailing international order.

## Russia- US War

### Collapse of Russia’s space program causes Russian nuclear launch against the US

Lodgson & Millar, 1 [John Lodgson, director of Space Policy Institute at George Washington University, and James Millar, Director of the Institute for European, Russian, and Eurasian Studies, “U.S. – Russian Cooperation in Human School of International Affairs George Washington University Washington, DC,” February, 2001, <http://www.overcast.pwp.blueyonder.co.uk/nsam271/media/USRussiaSpace.pdf>, DA 7/17/11]//RS

Thus "as long as nuclear deterrence is the basis of the U.S.-Russian strategic relationship, engaging Russia's missile and space industry in mutually beneficial technology exchange and relationships is key to predictability and stability. Any collapse of Russia's space infrastructure as a result of the inability to maintain and modernize it could lead to accidental or erroneous launches of strategic nuclear weapons fraught with catastrophic consequences for the United States. Russia's emerging dual-use space capabilities should be a concern but at the present juncture they cannot be a major argument against bilateral or multilateral cooperation." But another participant added "As to the relationship between the military and civilian components, it is becoming very blurred. The basic issue is, are we afraid of that? What would be the worst case scenario if part of the money and expertise goes into the defense sector? What we should be afraid of is Russia's weakness, rather than Russia's strength. One of the weaknesses is the disintegrating early warning system . . . . Even if part of the spin-off from the ISS may benefit the military, at this particular juncture it may be beneficial because it contributes to more predictability. Down the road, military spillover may be a much more serious issue."

### US-Russian war causes extinction and is an existential threat

Bostrom, 2 [Nick Bostrom, professor of philosophy - Oxford University, “Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards,” March 2002, Journal of Evolution and Technology, <http://www.nickbostrom.com/existential/risks.html>]

A much greater existential risk emerged with the build-up of nuclear arsenals in the US and the USSR. An all-out nuclear war was a possibility with both a substantial probability and with consequences that might have been persistent enough to qualify as global and terminal. There was a real worry among those best acquainted with the information available at the time **that** a nuclear Armageddon would occur and that it might annihilate our species or permanently destroy human civilization.[4] Russia and the US retain large nuclear arsenals that could be used in a future confrontation**,** either accidentally or deliberately. There is also a risk that other states may one day build up large nuclear arsenals. Note however that a smaller nuclear exchange, between India and Pakistan for instance, is not an existential risk, since it would not destroy or thwart humankind’s potential permanently. Such a war might however be a local terminal risk for the cities most likely to be targeted. Unfortunately, we shall see that nuclear Armageddon and comet or asteroid strikes are mere preludes to the existential risks that we will encounter in the 21st century.

## Economy

### Russian aerospace key to their economy

UKTI, 7/6 [United Kingdom Trade & Investment, leader in global aerospace analysis, “Sector Briefing: Aerospace Opportunities in Russia,” July 6, 2011, <http://www.ukti.gov.uk/export/sectors/advancedengineering/aerospace/sectorbriefing/161600.html>, DA 7/17/11]//RS

Aerospace is one of the Russia's highest value adding manufacturing sectors, with between 275 and 300 aerospace companies, including 108 industrial producers, and 111 R&D and design bureaus. The Russian aerospace industry is one of several key business sectors kept under constant review and scrutiny by the Russian Government. It is estimated by the Federal Target Programme “**The Development of Civil Aviation Engineering in Russia for 2002-2010 and to 2015” to spend $6.3 billion for the support and development of the aviation industry as Russia is looking towards the hi-tech sector as a source of its future growth**. It has been stated that Russia expects to become the world’s third largest aircraft manufacturer by 2015

### ( ) Russian aerospace industry key to Russian economy

ICDP, 96 [International Commercial Diplomacy Project, a project made to help advise potential commercial diplomats, “Barriers to Aviation/Aerospace Investment,” January 1996, <http://www.commercialdiplomacy.org/sampledocuments_htm/Labor/White_paper_Russia.htm#INTRODUCTION>, DA 7/17/11]//RS

The Russian Aerospace/Aviation industry provides enormous possibilities for cooperation with and investment from the West, including partnerships, technology exchanges and supplier relationships as described above. This cooperation and investment will bring great benefits to Russian producers both domestically and in international markets. As domestic and international competitiveness improve, domestic production will increase, jobs will be created and the aviation infrastructure will modernize and grow. Spin-off effects for the economy overall will be tremendous as development of the transportation infrastructure will promote commerce generally and the benefits of research and development spill over into other areas of commercial application. However, at the current time the obstacles to foreign investment in Russia are substantial. The barriers to American investment addressed by this paper, especially certification issues, customs problems and taxation, are not specific to the aerospace industry--therefore the progress made in resolving these issues will bring increased investment and resulting benefits to many industries and to the Russian economy as a whole.

### Russian economy key to American economy- oil, natural gas, trade, agriculture

Cooper, 9 [William H. Cooper, Specialist in International Trade and Finance, “Russia’s Economic Performance and Policies and Their Implications for the United States,” June 29, 2009, <http://www.fas.org/sgp/crs/row/RL34512.pdf>, DA 7/18/11]//RS

Russia’s economic prospects have direct and indirect implications for the United States. One way to measure the direct implications is by examining the status of U.S.-Russian economic ties. U.S.-Russian trade and investment flows have increased in the post-Cold War period reflecting the changed U.S.-Russian relationship. Many experts have suggested that the relationship could expand even further. U.S. imports from Russia have increased substantially, rising from $0.5 billion in 1992 to a peak of $26.8 billion in 2008. The large increase in U.S. imports reflects not so much an increase in the volume of trade but the rise in world prices of raw materials, particularly oil, that comprise the bulk of those imports (64% in 2008). U.S. exports have increased from $2.1 billion in 1992 peaking at $9.3 billion in 2008. Major U.S. exports to Russia consist of machinery, vehicles, and meat (mostly chicken).79 Despite the increase in bilateral trade, the United States and Russia still account for small shares of each others’ trade. In 2008, Russia accounted for about 0.7% of U.S. exports and 1.3% of U.S. imports. It was the 17th largest source of imports and 28th largest export market for the United States. The United States accounted for 3.4% of Russian exports and 5.4% of Russian imports. It was the fifth largest source of imports and 10th largest export market for Russia.80 According to Russian government data, by the end of 2008, the United States accounted for 3.3% of total accumulated foreign direct and portfolio investments in Russia and was the eighth largest source of foreign investment. However, the first three countries were Cyprus (21.5%), the Netherlands (17.5%), and Luxembourg (13.0%), suggesting that at least 50% of the investments night have been repatriated Russian funds.81 Russia and the United States have never been major economic partners, and it unlikely that the significance of bilateral trade will increase much in the near term. However, in some areas, such as agriculture, Russia has become an important market for U.S. exports. Russia is the largest foreign market for U.S. poultry. Furthermore, U.S. exports to Russia of energy exploration equipment and technology, as well as industrial and agricultural equipment, have increased as the dollar has declined in value. Russian demand for these products will likely grow as old equipment and technology need to be replaced and modernized. Russia’s significance as a supplier of U.S. imports will also likely remain small given the lack of international competitiveness of Russian production outside of oil, gas, and other natural resources. U.S.-Russian investment relations could grow tighter if Russia’s business climate improves; however, U.S. business concerns about the Russian government’s seemingly capricious intervention in energy and other sectors could dampen the enthusiasm of all but adventuresome investors. The greater importance of Russia’s economic policies and prospects to the United States lie in their indirect effect on the overall economic and political environment in which the United States and Russia operate. From this perspective, Russia’s continuing economic stability and growth can be considered positive for the United States. Because financial markets are interrelated, chaos in even some of the smaller economies can cause uncertainty throughout the rest of the world. Such was the case during Russia’s financial meltdown in 1998 and more recently with the 2008-2009 crisis. Promotion of economic stability in Russia has been a basis for U.S. support for Russia’s membership in international economic organizations, including the IMF, the World Bank, and the WTO. As a major oil producer and exporter, Russia influences world oil prices that affect U.S. consumers. The impact of Russian economic policies and prospects also plays a role in U.S. national security interests. For example, Russia is a major supplier of natural gas to many U.S. European allies. In 2006, Russia accounted for 20% of France’s, 25% of Italy’s, and 36% of Germany’s consumption of natural gas, making these allies possibly vulnerable to political pressure.82 On several occasions, most recently on January 1, 2009, Russia has temporarily shut-off gas supplies to Ukraine over a price dispute, and in so doing cut supplies to Europe. Although supplies were resumed two weeks later, the disruptions have affected European views of Russia as a reliable supplier of gas.83 Russia is also a primary supplier of natural gas to other former Soviet republics, providing it with potential political leverage. The United States has been promoting the construction of pipelines that by-pass Russia, thus decreasing Moscow’s monopoly control of Caspian and Central Asian energy flows.

### Russian economic decline causes nuclear war

Filger, 9 [Sheldon, correspondent for the Huffington Post, “Russian Economy Faces Disastrous Free Fall Contraction,” <http://www.globaleconomiccrisis.com/blog/archives/356>]

In Russia historically, economic health and political stability are intertwined to a degree that is rarely encountered in other major industrialized economies. It was the economic stagnation of the former Soviet Union that led to its political downfall. Similarly, Medvedev and Putin, both intimately acquainted with their nation’s history, are unquestionably alarmed at the prospect that Russia’s economic crisis will endanger the nation’s political stability, achieved at great cost after years of chaos following the demise of the Soviet Union. Already, strikes and protests are occurring among rank and file workers facing unemployment or non-payment of their salaries. Recent polling demonstrates that the once supreme popularity ratings of Putin and Medvedev are eroding rapidly. Beyond the political elites are the financial oligarchs, who have been forced to deleverage, even unloading their yachts and executive jets in a desperate attempt to raise cash. Should the Russian economy deteriorate to the point where economic collapse is not out of the question, the impact will go far beyond the obvious accelerant such an outcome would be for the Global Economic Crisis. There is a geopolitical dimension that is even more relevant then the economic context. Despite its economic vulnerabilities and perceived decline from superpower status, Russia remains one of only two nations on earth with a nuclear arsenal of sufficient scope and capability to destroy the world as we know it. For that reason, it is not only President Medvedev and Prime Minister Putin who will be lying awake at nights over the prospect that a national economic crisis can transform itself into a virulent and destabilizing social and political upheaval. It just may be possible that U.S. President Barack Obama’s national security team has already briefed him about the consequences of a major economic meltdown in Russia for the peace of the world. After all, the most recent national intelligence estimates put out by the U.S. intelligence community have already concluded that the Global Economic Crisis represents the greatest national security threat to the United States, due to its facilitating political instability in the world. During the years Boris Yeltsin ruled Russia, security forces responsible for guarding the nation’s nuclear arsenal went without pay for months at a time, leading to fears that desperate personnel would illicitly sell nuclear weapons to terrorist organizations. If the current economic crisis in Russia were to deteriorate much further, how secure would the Russian nuclear arsenal remain? It may be that the financial impact of the Global Economic Crisis is its least dangerous consequence.

### ( ) Russian economic collapse causes global nuclear war- internal conflicts cause loose nukes

David, 99 [Steven David, Professor of Political Science at Johns Hopkins University, “Internal War: Causes and Cures,” July 1999, <https://muse.jhu.edu/journals/world_politics/related/v049/49.4er_brown.html>, DA 7/17/11]

If internal war does strike Russia, economic deterioration will be a prime cause. From 1989 to the present, the GDP has fallen by 50 percent. In a society where, ten years ago, unemployment scarcely existed, it reached 9.5 percent in 1997 with many economists declaring the true figure to be much higher. Twenty-two percent of Russians live below the official poverty line (earning less than $ 70 a month). Modern Russia can neither collect taxes (it gathers only half the revenue it is due) nor significantly cut spending. Reformers tout privatization as the country's cure-all, but in a land without well-defined property rights or contract law and where subsidies remain a way of life, the prospects for transition to an American-style capitalist economy look remote at best. As the massive devaluation of the ruble and the current political crisis show, Russia's condition is even worse than most analysts feared. If conditions get worse, even the stoic Russian people will soon run out of patience. A future conflict would quickly draw in Russia's military. In the Soviet days civilian rule kept the powerful armed forces in check. But with the Communist Party out of office, what little civilian control remains relies on an exceedingly fragile foundation -- personal friendships between government leaders and military commanders. Meanwhile, the morale of Russian soldiers has fallen to a dangerous low. Drastic cuts in spending mean inadequate pay, housing, and medical care. A new emphasis on domestic missions has created an ideological split between the old and new guard in the military leadership, increasing the risk that disgruntled generals may enter the political fray and feeding the resentment of soldiers who dislike being used as a national police force. Newly enhanced ties between military units and local authorities pose another danger. Soldiers grow ever more dependent on local governments for housing, food, and wages. Draftees serve closer to home, and new laws have increased local control over the armed forces. Were a conflict to emerge between a regional power and Moscow, it is not at all clear which side the military would support. Divining the military's allegiance is crucial, however, since the structure of the Russian Federation makes it virtually certain that regional conflicts will continue to erupt. Russia's 89 republics, krais, and oblasts grow ever more independent in a system that does little to keep them together. As the central government finds itself unable to force its will beyond Moscow (if even that far), power devolves to the periphery. With the economy collapsing, republics feel less and less incentive to pay taxes to Moscow when they receive so little in return. Three-quarters of them already have their own constitutions, nearly all of which make some claim to sovereignty. Strong ethnic bonds promoted by shortsighted Soviet policies may motivate non-Russians to secede from the Federation. Chechnya's successful revolt against Russian control inspired similar movements for autonomy and independence throughout the country. **If these rebellions spread and Moscow responds with force, civil war is likely**. Should Russia succumb to internal war, the consequences for the United States and Europe will be severe. A major power like Russia -- even though in decline -- does not suffer civil war quietly or alone. An embattled Russian Federation might provoke opportunistic attacks from enemies such as China. Massive flows of refugees would pour into central and western Europe. Armed struggles in Russia could easily spill into its neighbors. **Damage from the fighting, particularly attacks on nuclear plants, would poison the environment of much of Europe and Asia.** Within Russia, the consequences would be even worse. Just as the sheer brutality of the last Russian civil war laid the basis for the privations of Soviet communism, a second civil war might produce another horrific regime. M**ost alarming is the real possibility that the violent disintegration of Russia could lead to loss of control over its nuclear arsenal**. No nuclear state has ever fallen victim to civil war, but even without a clear precedent the grim consequences can be foreseen. Russia retains some 20,000 nuclear weapons and the raw material for tens of thousands more, in scores of sites scattered throughout the country. So far, the government has managed to prevent the loss of any weapons or much material. If war erupts, however, Moscow's already weak grip on nuclear sites will slacken, making weapons and supplies available to a wide range of anti-American groups and states. Such dispersal of nuclear weapons represents the greatest physical threat America now faces. And it is hard to think of anything that would increase this threat more than the chaos that would follow a Russian civil war.

### Economic downturn causes isolationism and nuclear war

Friedberg, 8 [Aaron Friedberg, Professor of Politics and IR at Princeton, and Gabriel Schoenfeld, Visiting Scholar at the Witherspoon Institute, “The Dangers of a Diminished America,” Wall Street Journal, October 21, 2008, <http://online.wsj.com/article/SB122455074012352571.html/>, DA 7/18/11]

One immediate implication of the crisis that began on Wall Street and spread across the world is that the primary instruments of U.S. foreign policy will be crimped. The next president will face an entirely new and adverse fiscal position. Estimates of this year's federal budget deficit already show that it has jumped $237 billion from last year, to $407 billion. With families and businesses hurting, there will be calls for various and expensive domestic relief programs. In the face of this onrushing river of red ink, both Barack Obama and John McCain have been reluctant to lay out what portions of their programmatic wish list they might defer or delete. Only Joe Biden has suggested a possible reduction -- foreign aid. This would be one of the few popular cuts, but in budgetary terms it is a mere grain of sand. Still, Sen. Biden's comment hints at where we may be headed: toward a major reduction in America's world role, and perhaps even a new era of financially-induced isolationism.  Pressures to cut defense spending, and to dodge the cost of waging two wars, already intense before this crisis, are likely to mount. Despite the success of the surge, the war in Iraq remains deeply unpopular. Precipitous withdrawal -- attractive to a sizable swath of the electorate before the financial implosion -- might well become even more popular with annual war bills running in the hundreds of billions.  Protectionist sentiments are sure to grow stronger as jobs disappear in the coming slowdown. Even before our current woes, calls to save jobs by restricting imports had begun to gather support among many Democrats and some Republicans. In a prolonged recession, gale-force winds of protectionism will blow.  Then there are the dolorous consequences of a potential collapse of the world's financial architecture. For decades now, Americans have enjoyed the advantages of being at the center of that system. The worldwide use of the dollar, and the stability of our economy, among other things, made it easier for us to run huge budget deficits, as we counted on foreigners to pick up the tab by buying dollar-denominated assets as a safe haven. Will this be possible in the future?  Meanwhile, traditional foreign-policy challenges are multiplying. The threat from al Qaeda and Islamic terrorist affiliates has not been extinguished. Iran and North Korea are continuing on their bellicose paths, while Pakistan and Afghanistan are progressing smartly down the road to chaos. Russia's new militancy and China's seemingly relentless rise also give cause for concern.  If America now tries to pull back from the world stage, it will leave a dangerous power vacuum. The stabilizing effects of our presence in Asia, our continuing commitment to Europe, and our position as defender of last resort for Middle East energy sources and supply lines could all be placed at risk.  In such a scenario there are shades of the 1930s, when global trade and finance ground nearly to a halt, the peaceful democracies failed to cooperate, and aggressive powers led by the remorseless fanatics who rose up on the crest of economic disaster exploited their divisions. Today we run the risk that rogue states may choose to become ever more reckless with their nuclear toys, just at our moment of maximum vulnerability.  The aftershocks of the financial crisis will almost certainly rock our principal strategic competitors even harder than they will rock us. The dramatic free fall of the Russian stock market has demonstrated the fragility of a state whose economic performance hinges on high oil prices, now driven down by the global slowdown. China is perhaps even more fragile, its economic growth depending heavily on foreign investment and access to foreign markets. Both will now be constricted, inflicting economic pain and perhaps even sparking unrest in a country where political legitimacy rests on progress in the long march to prosperity.  None of this is good news if the authoritarian leaders of these countries seek to divert attention from internal travails with external adventures.

## Iran Proliferation

[Read with an economy scenario]

### Decline of Russian economy causes an advanced missile systems sale to Iran- seen as strategic adjustment

Sestanovich, 8 [Stephen Sestanovich, Senior Fellow for Russian and Eurasian Studies, “Russia and the Global Economic Crisis,” Council on Foreign Relations, November 25, 2008, <http://www.cfr.org/economic-development/russia-global-economic-crisis/p17844?breadcrumb=%2Fpublication%2Fby_type%2Fregion_issue_brief>, DA 7/18/11]

Unlike most other countries, Russia can always use its arms exports as a means of sweetening commercial deals. At a time when Russian economic needs are especially great, however, its customers are likely to press their advantage-seeking more advanced equipment than they have been offered in the recent past. China, whose own military purchases from Russia have slowed recently, is one Russian client likely to push for such upgrades. Iran and Venezuela are two others of special interest to the United States. It is widely thought that Russia, while steadily increasing its arms sales to Iran, has declined to sell Tehran its most advanced air-defense systems. A protracted economic crisis will surely inspire many inside the Russian defense industry--and probably within the government as well--to call for a review of this policy. All of these strategic adjustments--in defense spending, arms control, pipeline construction, weapons exports--represent matters of high policy for Russia's leadership. Yet, all politics being local, some of the most consequential issues created by the economic crisis may prove to be those that would ordinarily be considered matters of low policy. When production falls and unemployment rises in Russia, many of the Gastarbeiter, or guest workers, that have been needed to fuel the boom are usually sent home. For countries of the Caucasus and Central Asia, which have provided most of this enormous transient labor force (some estimate more than one million workers in Moscow alone), this will be a huge jolt. Quickly, Russia will go from being an important safety valve for socioeconomic discontent to a source of it. In the short term, Russia's neighbors will doubtless see this reflux of their own citizens as a reason to maintain good relations with Moscow, in hopes of winning coordinated management of a potentially dangerous problem.

### Iranian missile sales cause nuclear war

Ferguson, 6 [Nial Ferguson, Professor of history at Harvard University, “The Origins of the Great War of 2007- And How It Could Have Been Prevented,” January 15, 2006, <http://www.telegraph.co.uk/comment/personal-view/3622324/The-origins-of-the-Great-War-of-2007-and-how-it-could-have-been-prevented.html>, DA 7/18/11]//RS

With every passing year after the turn of the century, the instability of the Gulf region grew. By the beginning of 2006, nearly all the combustible ingredients for a conflict- far bigger in its scale and scope than the wars of 1991 or 2003 - were in place. The first underlying cause of the war was the increase in the region's relative importance as a source of petroleum. On the one hand, the rest of the world's oil reserves were being rapidly exhausted. On the other, the breakneck growth of the Asian economies had caused a huge surge in global demand for energy. It is hard to believe today, but for most of the 1990s the price of oil had averaged less than $20 a barrel. A second precondition of war was demographic. While European fertility had fallen below the natural replacement rate in the 1970s, the decline in the Islamic world had been much slower**.** By the late 1990s the fertility rate in the eight Muslim countries to the south and east of the European Union was two and half times higher than the European figure. This tendency was especially pronounced in Iran, where **the** social conservatism of the 1979 Revolution - which had lowered the age of marriage and prohibited contraception - combined with the high mortality of the Iran-Iraq War and the subsequent baby boom to produce, by the first decade of the new century, a quite extraordinary surplus of young men. More than two fifths of the population of Iran in 1995 had been aged 14 or younger. This was the generation that was ready to fight in 2007. This not only gave Islamic societies a youthful energy that contrasted markedly with the slothful senescence of Europe. It also signified a profound shift in the balance of world population. In 1950, there had three times as many people in Britain as in Iran. By 1995, the population of Iran had overtaken that of Britain and was forecast to be 50 per cent higher by 2050. Yet people in the West struggled to grasp the implications of this shift. Subliminally, they still thought of the Middle East as a region they could lord it over, as they had in the mid-20th century. The third and perhaps most important precondition for war was cultural. Since 1979, not just Iran but the greater part of the Muslim world had been swept by a wave of religious fervour, the very opposite of the process of secularisation that was emptying Europe's churches. Although few countries followed Iran down the road to full-blown theocracy, there was a transformation in politics everywhere. From Morocco to Pakistan, the feudal dynasties or military strongmen who had dominated Islamic politics since the 1950s came under intense pressure from religious radicals. The ideological cocktail that produced **'**Islamism' was as potent as either of the extreme ideologies the West had produced in the previous century, communism and fascism. Islamism was anti-Western, anti-capitalist and anti-Semitic. A seminal moment was the Iranian president Mahmoud Ahmadinejad's intemperate attack on Israel in December 2005, when he called the Holocaust a 'myth'. The state of Israel was a 'disgraceful blot', he had previously declared, to be wiped 'off the map'. Prior to 2007, the Islamists had seen no alternative but to wage war against their enemies by means of terrorism. From the Gaza to Manhattan, the hero of 2001 was the suicide bomber. Yet Ahmadinejad, a veteran of the Iran-Iraq War, craved a more serious weapon than strapped-on explosives. His decision to accelerate Iran's nuclear weapons programme was intended to give Iran the kind of power North Korea already wielded in East Asia: the power to defy theU**nited** States; the power to obliterate America's closest regional ally. Under different circumstances, it would not have been difficult to thwart Ahmadinejad's ambitions. The Israelis had shown themselves capable of pre-emptive air strikes against Iraq's nuclear facilities in 1981. Similar strikes against Iran's were urged on President Bush by neo-conservative commentators throughout 2006. The United States, they argued, was perfectly placed to carry out such strikes. It had the bases in neighbouring Iraq and Afghanistan. It had the intelligence proving Iran's contravention of the Non-Proliferation Treaty. But the President was advised by his Secretary of State, Condoleezza Rice, to opt instead for diplomacy. Not just European opinion but American opinion was strongly opposed to an attack on Iran. The invasion of Iraq in 2003 had been discredited by the failure to find the weapons of mass destruction Saddam Hussein had supposedly possessed and by the failure of the US-led coalition to quell a bloody insurgency. Americans did not want to increase their military commitments overseas; they wanted to reduce them. Europeans did not want to hear that Iran was about to build its own WMD. Even if Ahmad-inejad had broadcast a nuclear test live on CNN, liberals would have said it was a CIA con-trick. So history repeated itself. As in the 1930s, an anti-Semitic demagogue broke his country's treaty obligations and armed for war. Having first tried appeasement, offering the Iranians economic incentives to desist, the West appealed to international agencies - the International Atomic Energy Agency and the United Nations Security Council. Thanks to China's veto, however, the UN produced nothing but empty resolutions and ineffectual sanctions, like the exclusion of Iran from the 2006 World Cup finals. Only one man might have stiffened President Bush's resolve in the crisis: not Tony Blair, he had wrecked his domestic credibility over Iraq and was in any case on the point of retirement - Ariel Sharon. Yet he had been struck down by a stroke as the Iranian crisis came to a head. With Israel leaderless, Ahmadinejad had a free hand. As in the 1930s, too, the West fell back on wishful thinking. Perhaps, some said, Ahmadinejad was only sabre-rattling because his domestic position was so weak**.** Perhaps his political rivals in the Iranian clergy were on the point of getting rid of him. In that case, the last thing the West should do was to take a tough line; that would only bolster Ahmadinejad by inflaming Iranian popular feeling. So in Washington and in London people crossed their fingers, hoping for the deus ex machina of a home-grown regime change in Teheran.This gave the Iranians all the time they needed to produce weapons-grade enriched uranium at Natanz. The dream of nuclear non-proliferation, already interrupted by Israel, Pakistan and India, was definitively shattered. Now Teheran had a nuclear missile pointed at Tel-Aviv. And the new Israeli government of Benjamin Netanyahu had a missile pointed right back at Teheran. The optimists argued that the Cuban Missile Crisis would replay itself in the Middle East. Both sides would threaten war - and then both sides would blink. That was Secretary Rice's hope - indeed, her prayer - as she shuttled between the capitals. But it was not to be. The devastating nuclear exchange of August 2007 represented not only the failure of diplomacy, it marked the end of the oil age. Some even said it marked the twilight of the West**.** Certainly, that was one way of interpreting the subsequent spread of the conflict as Iraq's Shi'ite population overran the remaining American bases in their country and the Chinese threatened to intervene on the side of Teheran.

## Russian Proliferation

### Decline of Russian space competitiveness causes missile proliferation—Russian spare capacity will be used for military production

Vaknin, 05 [Sam Vaknin, PhD, Editor in Chief of Global Politician, Author of peer-reviewed articles on economics and finance, December 2005, “Pinks in Space The Space Industry in Central and Eastern Europe,” <http://samvak.tripod.com/pp126.html>, DA 7/16/11]//RS

The dark side of Russia's space industry is its sales of missile technology to failed and rogue states throughout the world. Timothy McCarthy and Victor Mizin of the U.S. Center for Nonproliferation Studies wrote in the "International Herald Tribune in November 2001: "[U.S. policy to date] leaves unsolved the key structural problem that contributes to illegal sales: over-capacity in the Russian missile and space industry and the inability or unwillingness of Moscow to do anything about it ... There is simply too much industry [in Russia] chasing too few legitimate dollars, rubles or euros. [Downsizing] and restructuring must be a major part of any initiative that seeks to stop Russian missile firms from selling 'excess production' to those who should not have them." **The official space industry has little choice but to resort to missile proliferation for its survival**. The Russian domestic market is inefficient, technologically backward, and lacks venture capital. It is thus unable to foster innovation and reward innovators in the space industry. Its biggest clients - government and budget-funded agencies - rarely pay or pay late. Prices for space-related services do not reflect market realities. According to fas.org's comprehensive survey of the Russian space industry, investment in replacement of capital assets deteriorated from 9 percent in 1998 to 0.5 percent in 1994. In the same period, costs of materials shot up 382 times, cost of hardware services went up by 172 times, while labour costs increased 82-fold. The average salary in the space industry, once a multiple of the Russian average wage, has now fallen beneath it. The resulting brain drain was crippling. More than 35 percent of all workers left - and more than half of all the experts.

### Specifically the US is key in resolving Russian-NATO battle over European missile shield

RIA Novasti, 6/8 [RIA Novasti, “Russia may develop nuclear offensive, arms race – Serdyukov,” June 8, 2011, <http://en.rian.ru/world/20110608/164518658.html>, DA 7/18/11]//RS

Russian Defense Minister Anatoly Serdyukov on Wednesday said that Russia would develop its own offensive nuclear force if NATO fails to come to agreement over the European defense shield. "We have no other way, otherwise we'll just have to develop an arms race," Serdyukov said after a Russia-NATO meeting in Brussels. The talks in Brussels, he said, did not result in the solution of conceptual approaches and the Russia-NATO working group on the missile shield issue only managed to agree on the plan of work for 2011. "We failed to agree on conceptual approaches... Our dialogue must be continued," he said. Russia and NATO agreed to cooperate on the European missile shield during the NATO-Russia Council summit in Lisbon in November 2010. NATO insists there should be two independent systems that exchange information, while Russia favors a joint system with full-scale interoperability. Serdyukov said that **the solution to the ongoing talks on the European missile shield depends on the United States, and not on NATO**. "This is a U.S. position. There is a number of [NATO] countries expressing only concern. We could have received their support," he said. He also said that NATO makes bilateral missile defense agreements with individual countries without taking into account Russia's concerns. The minister added, however, that Russia is not dramatizing the issue and is offering constructive approaches for cooperation. "We are not dramatizing the current situation. We are ready to proceed with dialogue both at the Russia-NATO level and bilateral levels," he said adding that the mooted shield must correspond to the real missile threat. Russia has retained staunch opposition to the planned deployment of U.S. missile defense systems near its borders, claiming they would be a security threat. NATO and the United States insist that the shield would defend NATO members against missiles from North Korea and Iran and would not be directed at Russia.

### Missile proliferation causes NBC war in the Middle East

Said, 1 [Dr. Mohamed Kadry Said, Head of the Military Studies Unit and Technology Advisor at the Al Ahram Center for Political and Strategic Studies (Cairo), Professor of Missile Flight Mechanics at the Military Technical College (Cairo), and member of the committee for strategic planning in the Egyptian Council for Space Research, Science and Technology, “Missile Proliferation in the Middle East: a Regional Perspective,” <http://www.unidir.ch/pdf/articles/pdf-art75.pdf>, DA 7/16/11]//RS

The Middle East’s experience with ballistic missiles is unique compared to other regions in the world. Missiles in the Middle East are not only acquired for deterrence or as a weapon of last resort, but are actually used in the battlefield. Most of the important wars in the Middle East since 1970 had included missile exchanges with ranges far beyond the front line. Important capitals and large cities in the area, like Baghdad, Riyadh, Tel Aviv, Tehran and Khartoum, remember the fear and uncertainty caused by ballistic missile strikes. The nature of the problem in the Middle East is not limited to confining missile proliferation in its material sense, but to fighting the proliferation of a .missile culture. and the temptation to use such lethal weapons against population centres and the civilian infrastructure. For historical reasons the Middle East has failed to build security structures or dialogue forums to handle global changes in military technology and its impact on regional security. The absence of rules and constraints has led to further searching for new missile capabilities and basing options to guarantee security. The rapid spread of information, know-how and technology will soon put these weapons in the hands of more countries as well as enhance their lethal capabilities. **The growing proliferation of missiles in the Middle East increases the potential for long-range missile exchange in any future regional war.** This has produced a major shift in military thinking and gives threat perceptions generated by missile acquisition new strategic dimensions. **The dangers of a miscalculation leading to conflict with nuclear, biological or chemical warheads will increase.**

### Bioterrorism alone is recognized as the most severe risk for causing extinction

Matheny, 7 [Jason G. Matheny, “Reducing the Risk of Human Extinction,” December 7, 2007, Risk Analysis: Volume 27, Issue 5, pages 1335–1344, <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2007.00960.x/full>, DA 7/16/11]//RS

Of current extinction risks, the most severe may be bioterrorism. The knowledge needed to engineer a virus is modest compared to that needed to build a nuclear weapon; the necessary equipment and materials are increasingly accessible and because biological agents are self-replicating, a weapon can have an exponential effect on a population (Warrick, 2006; Williams, 2006). 5 Current U.S. biodefense efforts are funded at $5 billion per year to develop and stockpile new drugs and vaccines, monitor biological agents and emerging diseases, and strengthen the capacities of local health systems to respond to pandemics (Lam, Franco, & Shuler, 2006). There is currently no independent body assessing the risks of high-energy physics experiments. Posner (2004) has recommended withdrawing federal support for such experiments because the benefits do not seem to be worth the risks.

### Middle East conflict causes global nuclear war

Steinbach, 2 [John Steinbach, Analyst, Center for Research on Globaization, DC Iraq Coalition, “Israeli Weapons of Mass Destruction: A Threat To Peace,” March 2002, http://www.globalresearch.ca/articles/STE203A.html]

Meanwhile**,** the existence of an arsenal of mass destruction in such an unstable region in turn has serious implications for future arms control and disarmament negotiations, and even the threat of nuclear war. Seymour Hersh warns, "Should war break out in the Middle East again,... or should any Arab nation fire missiles against Israel, as the Iraqis did**,** a nuclear escalation, once unthinkable except as a last resort, would now be a strong probability**.**"(41) and Ezar Weissman, Israel's current President said "The nuclear issue is gaining momentum (and the) next war will not be conventional."(42) Russia and before it the Soviet Union has long been a major (if not the major) target of Israeli nukes. It is widely reported that the principal purpose of Jonathan Pollard's spying for Israel was to furnish satellite images of Soviet targets and other super sensitive data relating to U.S. nuclear targeting strategy. (43) (Since launching its own satellite in 1988, Israel no longer needs U.S. spy secrets.) Israeli nukes aimed at the Russian heartland seriously complicate disarmament and arms control negotiations and, at the very least, the unilateral possession of nuclear weapons by Israel is enormously destabilizing, and dramatically lowers the threshold for their actual use, if not for all out nuclear war. In the words of Mark Gaffney, "... if the familar pattern(Israel refining its weapons of mass destruction with U.S. complicity) is not reversed soon - for whatever reason - the deepening Middle East conflict could trigger a world conflagration." (44)

### Ballistic missile proliferation snowballs - a few acquisitions can spark missile buildups and WMD development

Mistry, 3 [Dinshaw Mistry, Assistant Professor at the University of Cincinnati, International Security, 27.4]

There have also been negative trends in missile proliferation. For example, as Scud missiles acquired by several Middle Eastern states in the 1970s and 1980s (and CSS-2 missiles bought by Saudi Arabia) near retirement, the demand by these countries for such missiles has begun to increase as they seek to replenish their dwindling inventories. Several states in the region—including Egypt and Syria—are developing Scuds, while Iran pursues development of Shehab missiles. In time, regional powers could build 1,000 km range Nodong-type and longer-range Taepodong-type missiles and export them to new clients. If even a few states obtain these missiles, others may seek them as well (to replace their aging arsenals or to match their rivals' missile forces). 30 In addition, some states may acquire "strategic" chemical or biological weapons capabilities, which would greatly heighten security concerns among neighboring [End Page 128] states and revive their demand (and development efforts) not only for ballistic missiles but also for a WMD-based deterrent. 31 In the absence of strong international commitments binding these countries and their neighbors to refrain from missile development, states that have renounced their missile aspirations could begin to rethink their decision. Because missile technology will be more easily available in the future, any renewed missile programs are unlikely to be halted by MTCR barriers. In such a situation, the few missile nonproliferation successes of years past could be reversed, and the missile nonproliferation regime (and possibly even other WMD control regimes) could collapse.

### Proliferation risks global nuclear war and extinction

Krieger ‘9[David Krieger, Pres. Nuclear Age Peace Foundation and Councilor of World Future Council, “Still Loving the Bomb After All These Years,” September 4, 2009, <https://www.wagingpeace.org/articles/2009/09/04_krieger_newsweek_response.php?krieger>, DA 7/16/11]

Jonathan Tepperman’s article in the September 7, 2009 issue of Newsweek, “Why Obama Should Learn to Love the Bomb,” provides a novel but frivolous argument that nuclear weapons “may not, in fact, make the world more dangerous….” Rather, in Tepperman’s world, “The bomb may actually make us safer.” Tepperman shares this world with Kenneth Waltz, a University of California professor emeritus of political science, who Tepperman describes as “the leading ‘nuclear optimist.’” Waltz expresses his optimism in this way: “We’ve now had 64 years of experience since Hiroshima. It’s striking and against all historical precedent that for that substantial period, there has not been any war among nuclear states.” Actually, there were a number of proxy wars between nuclear weapons states, such as those in Korea, Vietnam and Afghanistan, and some near disasters, the most notable being the 1962 Cuban Missile Crisis. Waltz’s logic is akin to observing a man falling from a high rise building, and noting that he had already fallen for 64 floors without anything bad happening to him, and concluding that so far it looked so good that others should try it. Dangerous logic! Tepperman builds upon Waltz’s logic, and concludes “that all states are rational,” even though their leaders may have a lot of bad qualities, including being “stupid, petty, venal, even evil….” He asks us to trust that rationality will always prevail when there is a risk of nuclear retaliation, because these weapons make “the costs of war obvious, inevitable, and unacceptable.” Actually, he is asking us to do more than trust in the rationality of leaders; he is asking us to gamble the future on this proposition. “The iron logic of deterrence and mutually assured destruction is so compelling,” Tepperman argues, “it’s led to what’s known as the nuclear peace….” But if this is a peace worthy of the name, which it isn’t, it certainly is not one on which to risk the future of civilization. One irrational leader with control over a nuclear arsenal could start a nuclear conflagration, resulting in a global Hiroshima. Tepperman celebrates “the iron logic of deterrence,” but deterrence is a theory that is far from rooted in “iron logic.” It is a theory based upon threats that must be effectively communicated and believed. Leaders of Country A with nuclear weapons must communicate to other countries (B, C, etc.) the conditions under which A will retaliate with nuclear weapons. The leaders of the other countries must understand and believe the threat from Country A will, in fact, be carried out. The longer that nuclear weapons are not used, the more other countries may come to believe that they can challenge Country A with impunity from nuclear retaliation. The more that Country A bullies other countries, the greater the incentive for these countries to develop their own nuclear arsenals. Deterrence is unstable and therefore precarious. Most of the countries in the world reject the argument, made most prominently by Kenneth Waltz, that the spread of nuclear weapons makes the world safer. These countries joined together in the Nuclear Non-Proliferation Treaty (NPT) to prevent the spread of nuclear weapons, but they never agreed to maintain indefinitely a system of nuclear apartheid in which some states possess nuclear weapons and others are prohibited from doing so. The principal bargain of the NPT requires the five NPT nuclear weapons states (US, Russia, UK, France and China) to engage in good faith negotiations for nuclear disarmament, and the International Court of Justice interpreted this to mean complete nuclear disarmament in all its aspects. Tepperman seems to be arguing that seeking to prevent the proliferation of nuclear weapons is bad policy, and that nuclear weapons, because of their threat, make efforts at non-proliferation unnecessary and even unwise. If some additional states, including Iran, developed nuclear arsenals, he concludes that wouldn’t be so bad “given the way that bombs tend to mellow behavior.” Those who oppose Tepperman’s favorable disposition toward the bomb, he refers to as “nuclear pessimists.” These would be the people, and I would certainly be one of them, who see nuclear weapons as presenting an urgent danger to our security, our species and our future. Tepperman finds that when viewed from his “nuclear optimist” perspective, “nuclear weapons start to seem a lot less frightening.” “Nuclear peace,” he tells us, “rests on a scary bargain: you accept a small chance that something extremely bad will happen in exchange for a much bigger chance that something very bad – conventional war – won’t happen.” But the “extremely bad” thing he asks us to accept is the end of the human species. Yes, that would be serious. He also doesn’t make the case that in a world without nuclear weapons, the prospects of conventional war would increase dramatically. After all, it is only an unproven supposition that nuclear weapons have prevented wars, or would do so in the future. We have certainly come far too close to the precipice of catastrophic nuclear war. As an ultimate celebration of the faulty logic of deterrence, Tepperman calls for providing any nuclear weapons state with a “survivable second strike option.” Thus, he not only favors nuclear weapons, but finds the security of these weapons to trump human security. Presumably he would have President Obama providing new and secure nuclear weapons to North Korea, Pakistan and any other nuclear weapons states that come along so that they will feel secure enough not to use their weapons in a first-strike attack. Do we really want to bet the human future that Kim Jong-Il and his successors are more rational than Mr. Tepperman?

## Russia- China War

US-Russian relations prevent Russia-China war

Newsweek, 95 [May 15, 1995, lexis]

"Russia," says Deputy Secretary of State Strobe Talbott, "is a big country." That it is; lop off the newly independent states born within the old Soviet husk and you've still got a lot left -- a highly educated work force sitting on top of some of the globe's most valuable resources. True, much of that vast territory has an awful climate (climate matters-for different reasons than Russia's, it explains why Australia will never be a great power). But unlike India and China, two other "giant" states, Russia will be able to husband its vast resources without the additional strain of feeding -- and employing-more than a billion souls. It also, of course, is the only country that can launch a devastating nuclear attack on the United States. That kind of power demands respect. And sensitive handling. Stephen Sestanovich, head Russia watcher at the Carnegie Endowment for International Peace in Washington, argues that present U.S. policy is geared too much to "dismantling Russian military might" -- a policy that, since it breeds Russian resentment of Western meddling, is self-defeating. "We have to reorient Russian power," says Sestanovich, "not eliminate it. Because we can't eliminate it." Indeed, Washington should prefer a strong Russia. A Russia so weak, for example, that it could not resist a Chinese land grab of its Far East without resorting to nuclear weapons is a 21st-century nightmare. All this implies a close U.S. -- Russian relationship stretching into the future. American officials say it will be a "pragmatic" one, recognizing that Russian and U.S. national interests will sometimes collide. The danger, for the United States, is that a pragmatic relationship could be dominated by security issues. In Western Europe, some futurists say that in the coming decades Russia will talk to the United States about nuclear weapons but to the European Union about everything else-trade, economic development and the rest.

### Russia-China war causes extinction- billions of people affected by nuclear strikes

Sharavin, 1 [Alexander Sharavin, Director of the Institute for Military and Political Analysis, “The Third Threat: Russia is overlooking the increasing military might of China,” September 28, 2001, Nezavisimoe Voennoe Obozrenie, No. 28, <http://www.cdi.org/russia/johnson/5470.html>, DA 7/19/11]//RS

Chinese propaganda has constantly been showing us skyscrapers in free trade zones in southeastern China. It should not be forgotten, however, that some 250 to 300 million people live there, i.e. at most a quarter of China's population. A billion Chinese people are still living in misery. For them, even the living standards of a backwater Russian town remain inaccessibly high. They have absolutely nothing to lose. There is every prerequisite for "the final throw to the north." The strength of the Chinese People's Liberation Army (CPLA) has been growing quicker than the Chinese economy. A decade ago the CPLA was equipped with inferior copies of Russian arms from late 1950s to the early 1960s. However, through its own efforts Russia has nearly managed to liquidate its most significant technological advantage. Thanks to our zeal, from antique MiG-21 fighters of the earliest modifications and S-75 air defense missile systems the Chinese antiaircraft defense forces have adopted Su-27 fighters and S-300 air defense missile systems. China's air defense forces have received Tor systems instead of anti-aircraft guns which could have been used during World War II. The shock air force of our "eastern brethren" will in the near future replace antique Tu-16 and Il-28 airplanes with Su-30 fighters, which are not yet available to the Russian Armed Forces! Russia may face the "wonderful" prospect of combating the Chinese army, which, if full mobilization is called, is comparable in size with Russia's entire population, which also has nuclear weapons (even tactical weapons become strategic if states have common borders) and would be absolutely insensitive to losses (even a loss of a few million of the servicemen would be acceptable for China). Such a war would be more horrible than the World War II. It would require from our state maximal tension, universal mobilization and complete accumulation of the army military hardware, up to the last tank or a plane, in a single direction (we would have to forget such "trifles" like Talebs and Basaev, but this does not guarantee success either). Massive nuclear strikes on basic military forces and cities of China would finally be the only way out, what would exhaust Russia's armament completely. We have not got another set of intercontinental ballistic missiles and submarine-based missiles, whereas the general forces would be extremely exhausted in the border combats. In the long run, even if the aggression would be stopped after the majority of the Chinese are killed, our country would be absolutely unprotected against the "Chechen" and the "Balkan" variants both, and even against the first frost of a possible nuclear winter.

## Asteroid Collision

### Russian aerospace industry collapse causes asteroid collision- that causes mass death

Russian Press Digest, 10 [RusData Line, “Russia is Developing Equipment for Exploration of a Potentially Dangerous Asteroid,” May 19, 2010]

Russian scientists are promising to develop a cosmic device for exploration of a celestial body which, according to certain astronomers, presents a certain threat to life on Earth. On Tuesday, director of the Space Research Institute, RAS, academician Lev Zeleny, told journalists that the leading domestic enterprise in the rocket and space industry - Lavochkin Scientific Production Association, is creating a device for the exploration of the asteroid Apophis. "In 2029, the trajectory of Apophis will be at a fairly close distance from the Earth, and during the second cycle of movement, in 2036, there is a probability that it will collide with our planet," cautioned academician Zeleny. According to him, the damage resulting from such a collision will be three times more severe than the destruction that was caused by the Tunguska meteorite. Scientists believe that the space object that caused the explosion near the Podkamennaya Tunguska River on June 30, 1908, was 50 meters in diameter and could have weighed 1-2 million tons. For comparison: the size of Apophis, discovered in 2004, is 270 by 60 meters, and the asteroid's total weight, according to various estimates, amounts to anywhere from 26 to 45 tons. The likelihood that the giant cosmic "cobblestone" will collide with the Earth in 2029 is negligible: according to official estimates, published by NASA, the probability of a collision is 1 in 250,000. However, Apophis will "come near" our planet; according to the latest estimates, in 2029, the asteroid will pass the Earth's surface at a distance of 28,900 kilometers (give or take 200-300 km). Such proximity could have an effect on the orbit of a small celestial body. Deviation from the previous route could result in the Apophis to once again pass the Earth at a dangerously close distance 7 years later, in 2036. According to NASA, in the event the "celestial guest" collides with the Earth, an explosion with the force of more than 500 megatons is possible (for comparison: the effects of the Tunguska meteorite's landing are estimated at about 10 megatons, which is equivalent to an explosion of a hydrogen bomb). Scientists, who based their estimates on a maximum possible size of the asteroid - 390 meters - concluded that if such a celestial body were to enter the Earth's atmosphere at a speed of 12.6 km/s, then the collision would form a crater on the Earth's surface of almost 6 km in diameter and trigger an earthquake, measuring 6.5 on the Richter scale, within a 10 km radius. If the asteroid falls into an ocean, it would result in an enormous tsunami; and, if a densely populated area is stricken, the destruction will affect several hundreds of kilometers. However, scientists note that even such a pessimistic scenario does not assume that this will be a global-scale catastrophe, similar to the one which led to the distinction of the dinosaurs - Apophis is simply too small for this. According to the hypothesis of a Nobel Prize laureate, Luis Alvarez, the "stone" that caused a nuclear winter 65 million years ago was about 10 km in diameter. "People's lives are in danger. It is better we spend a few hundred million dollars and create a system that will allow us to avoid a collision, than sit and wait for this to happen and thousands of people lose their lives," Anatoly Perminov, head of Russia's Federal Space Agency Roscosmos, warned the public in January of this year. However, astronomers say that one should not expect the end of the world to come in 2036; the probability Apophis will collide with Earth is very small, but, as was noted by academician Lev Zeleny, this is not a "zero probability". In order to obtain some more precise data on the behavior of the asteroid it was suggested to place a special beacon on Apophis. This, according to Mr. Zeleny, should be accomplished in 2029 as the asteroid approaches the Earth. "The beacon will make it possible to obtain very precise trajectory measurements of the asteroid, which will allow making a more precise forecast as to whether or not it will collide with the Earth 7 years later as well as taking the necessary measures to divert it from its dangerous course," explained the director of the Space Research Institute, RAS. The topic of protection of the Earth from the asteroid threat has not only been discussed within the scientific community for a long time, but has also become a part of the mass culture - take the Hollywood production, Armageddon, as an example, which was filmed six years prior to the discovery of Apophis in 1998. In the movie, an American expedition lands on an asteroid, as it approaches the Earth, and destroys it with a nuclear explosion. Scientists are offering measures for eliminating the uninvited celestial guest that are no-less-effective and, at a first glance, equally science-fictional. For example, the space device could deploy a "solar sail" - a thin light-reflecting film - on the asteroid. It is believed that the pressure of electromagnetic rays could alter the asteroid's speed and direction. Experts of the European Space Agency proposed changing the trajectory of Apophis with the use of a special "orbit evacuator". The asteroid should be approached by a space ship, which will hover above it at the nearest possible proximity, which will be made possible by engines powered by solar batteries. The "cosmic traction engine" will pull the asteroid, while slightly accelerating is movement, and eventually bring the celestial body to a safer orbit. The development of such a "traction ship" or a "cosmic traction device" has been promised by the British corporation, EADS Atrium. In turn, the Lavochkin Scientific Production Association, which has not only produced artificial Earth satellites Lunokhod-1, and devices for the exploration of Venus and Mars, but also intercontinental cruise missiles, could use its designs. However, as was noted last December by the head of Roscosmos, Anatoly Perminov, there are no plans to destroy the asteroid. "No nuclear explosions, everything will be done based on the laws of physics," stressed the head of the space agency.