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1AC – Inherency

Contention One – Inherency

**NASA lacks deep space propulsion and shuttle capacity.**

Watson 2010

Traci Watson, USA Today, 21 June 2010, "Obama plan to land on asteroid may be unrealistic for 2025," www.usatoday.com/tech/science/space/2010-06-20-asteroid-obama-nasa-plan\_N.htm

In Armageddon, Willis' character and his crew blast off in two modified space shuttles to reach the killer asteroid. But NASA has long planned to retire the shuttles within the next year. And even if they weren't all headed to museums, they're useless as asteroid transporters. The shuttles were built only to circle Earth, says Dan Adamo, a former mission control engineer who has studied human missions to asteroids. They don't carry the fuel to jump into deep space, and their heat shields aren't designed to withstand the extra-high temperatures of returning from a destination other than the Earth's orbit. What's needed instead is a giant rocket on the scale of the monstrous Saturn V - taller than Big Ben - that propelled man to the moon in the 1960s and 1970s. Such a project is "a difficult challenge" that will cost in the multiple billions of dollars, says Ray Colladay, a member of NASA's advisory council. NASA spent more than $52 billion in 2010 dollars to develop and build the Saturn V. Building a 21st-century version can be done but will require a sharp increase in the NASA budget later this decade, some space experts say. "That's the issue everybody wants to duck right now, because it's uncomfortable to face that," Colladay says.

1AC – Planetary Defense Adv

Advantage One – Near Earth Objects

Initially note, an Earth shattering asteroid is inevitable & current efforts are insufficient. Only nuclear pulse propulsion can ensure survival.

Smith 2002

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, Why Build Orion, <http://www.angelfire.com/stars2/projectorion/build.html>

Of course, if that fails we can always hope for a large asteroid to swing this way. A long shot I know, but the possibility of a major impact from space is a dead certainty. The geological record shows the Earth has been hit many times by large objects. Some of them coming very close to sterilising this rock overnight. In the event of true Armageddon the governments of this world would be tripping over themselves to fabricate pulse units and send Orion on it's maiden voyage. Asteroids are one of the very few threats to us that we currently have no prepared defense against whatsoever. So having the ultimate rocket on standby isn't a bad idea. Our 10,000 ton(or bigger) Orion could successfully deflect such a wayward astronomical body. There is nothing else we can build which would either reach such a threat in time or indeed make any impact on it.

1AC – Planetary Defense Adv

Specifically, proposed asteroid defense lacks deep space propulsion necessary for successful detection and deflection.

Ragheb 2010

M. Ragheb, Associate professor of Engineering at University of Illinois, Nuclear defense against stellar objects, https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Nuclear%20Defense%20Against%20Stellar%20Objects.pdf

Some studies were conducted and suggested some defenses entailing ground and space based infrastructures much more extensive than those envisioned for ballistic missile defense. Because of the limitations of current space propulsion technologies these systems would require deployment of interceptors in deep space in order to allow engagement at a sufficient distance from Earth. The low specific impulse methods suggested for altering these objects trajectories such as solar sails and electric thrusters would not provide enough time for reaching the orbit of the space object in time for altering the trajectories between the time of detection and the time of impact. Such schemes entail a high risk since their effectiveness will depend on the body’s shape, composition, trajectory and size, which are all unknowns beforehand. There is no room for error once the object is engaged and the propulsion system must operate for a long time for the maneuver to work. This is even more important in the case of comets since they offer a much shorter time detection span than asteroids. Nuclear propulsion approaches with high specific impulses can offer more economical ground based defenses based on present day technology. If a catastrophic event were identified, high impulse nuclear systems can be promptly launched into space using conventional chemical lifting methods. The nuclear approach would provide high power density and specific impulse to rapidly travel to the space object to deflect it in time from its collision trajectory with Earth.

1AC – Planetary Defense Adv

The impact magnitude of a catastrophic near Earth object makes probability calculations irrelevant & irresponsible.

Easterbrook 2008

Gregg, Fellow at the Brookings Institution, “The Sky Is Falling,” The Atlantic, June http://www.theatlantic.com/magazine/print/2008/06/the-sky-is-falling/6807/

A generation ago, the standard assumption was that a dangerous object would strike Earth perhaps once in a million years. By the mid-1990s, researchers began to say that the threat was greater: perhaps a strike every 300,000 years. This winter, I asked William Ailor, an asteroid specialist at The Aerospace Corporation, a think tank for the Air Force, what he thought the risk was. Ailor’s answer: a one-in-10 chance per century of a dangerous space-object strike. Regardless of which estimate is correct, the likelihood of an event is, of course, no predictor. Even if space strikes are likely only once every million years, that doesn’t mean a million years will pass before the next impact—the sky could suddenly darken tomorrow. Equally important, improbable but cataclysmic dangers ought to command attention because of their scope. A tornado is far more likely than an asteroid strike, but humanity is sure to survive the former. The chances that any one person will die in an airline crash are minute, but this does not prevent us from caring about aviation safety. And as Nathan Myhrvold, the former chief technology officer of Microsoft, put it, “The odds of a space-object strike during your lifetime may be no more than the odds you will die in a plane crash—but with space rocks, it’s like the entire human race is riding on the plane.”

1AC – Planetary Defense Adv

Additionally, nuclear pulse propulsion could successfully deflect near earth objects using nuclear fission without inducing fracture and superior to alternative options.

Ragheb 2010

M. Ragheb, Associate professor of Engineering at University of Illinois, Nuclear defense against stellar objects, https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Nuclear%20Defense%20Against%20Stellar%20Objects.pdf

Nuclear deflection approaches then can be also used to nudge the object at a large distance from the Earth from its trajectory, ablate its surface, or even fragment it into smaller objects with altered non impact trajectories. Fusion based devices primarily generate x-rays which are absorbed in a few millimeters of an asteroid, ablating its surface and possibly nudging it from its trajectory. Devices with primarily a neutron component can cause fragmentation since neutrons could penetrate the surface to about 10 cms. A single or multiple pulse detonations of nuclear fission, fission/fusion or fusion devices can be used to easily alter the trajectory of the planetesimal from its collision course with Earth. Two stages occur in the process. First, the illumination of its surface by the prompt x-rays and gamma rays traveling at the speed of light from the pulse would cause ablation of the surface and generate thrust that is parallel to the object’s projected area. This would be followed by a second wave consisting of the plasma of fission products producing a second impulse in the same direction. The process can be carried out remotely without astronauts being dispatched to carry out the process. It is also suggested that the thrust would be parallel to the object’s projected area, independent of its mass distribution or angular momentum if it was rotating in space. The amount of impulse could be adjusted by the frequency of the pulses, detonation standoff distance, and yield and type of the pulse unit. If an External Pulse Plasma Propulsion (EPPP) system is used, it would double as the propulsion means as well as the nudging means. This approach does not require any unrealistic asteroid capture or attachment of a propulsion unit to an unreachable surface that could be rotating, with insignificant gravity.

1AC – Disarm Adv

Advantage Two – Nuclear Explosive Devices

Despite reductions in the size of nuclear arsenals, nuclear weapons remain an environmental and security risk due to waste management and storage issues.

Sieff 2001

Martin, Senior News Analyst, JRL, http://www.cdi.org/russia/johnson/5550-12.cfm

The sweeping cuts in Russian and U.S. nuclear arsenals agreed in Washington this week by presidents Vladimir Putin and George W. Bush raise major questions of environmental and security safety. But these could be answered in three words: "Build the Orion!" "Orion" in this case refers not to the hunter of classical mythology or to the vast constellation that dominates the night sky in the Northern Hemisphere. It means the manned spaceship powered by nuclear weapons designed more than 40 years ago by the great British-American physicist Freeman Dyson. Dyson was no crackpot. He was one of the greatest scientists of the 20th century. It was he who played a key role in explaining and popularizing the late Richard Feynman's Nobel-prize-winning, revolutionary methodology of calculating quantum electrodynamics theory to the world. In 1958, Dyson, and other young idealistic scientists gathered with small nuclear weapons designer Theodore "Ted" Taylor at the General Atomic division of the General Dynamics Corporation in San Diego, Calif., to work on Project Orion, the idea of a spaceship powered by atomic bombs. And they designed it. Dyson and his colleagues knew that the Soviet Union and the United States would build more rather than less nuclear warheads to keep up with one another. They knew it was only a matter of time before other nations joined the nuclear club. They also knew that even if the United States and the Soviet Union should ever reach strategic arms reduction agreements to mutually slash the size of their huge nuclear arsenals, the radioactive, fissile material taken from those warheads posed almost-eternal security risks of its own. It would have to be guarded with 100 percent perfect security indefinitely to prevent it falling into the hands of terrorists, criminals or political extremist fanatics. Nor could the fissile material once manufactured ever be rendered down into more harmless compounds or other elements. And even if it was protected safely, the environmental and contamination dangers from it would also last at the very least thousands, perhaps even hundreds of thousands of years, given the slow half-life, radioactive decay rates of the lethal elements involved.

1AC – Disarm Adv

Additionally, the existence of nuclear technology is inevitable and irreversible. The only solution is peaceful utilization via space shuttle propulsion.

Sieff 2001

Martin, Senior News Analyst, JRL, http://www.cdi.org/russia/johnson/5550-12.cfm

Dyson and Taylor proposed a radical solution to these problems. The atomic weapons could only be used up and totally rendered useless if they were actually exploded and they proposed to do this with lots of them. This would happen not on the earth or in the main atmosphere, but -- mainly -- in the far reaches of outer space, where the addition of the nuclear radiation to all the background radiation already there would be literally negligible and where the blast effects would be harmless. Dyson and Taylor proposed to explode atomic bombs at regular intervals at very short distances behind a specially designed space ship in order to propel it to the Moon and other planets in the Solar System far more quickly and cheaply than chemical-fuel rockets could ever do. Unlike President Ronald Reagan's 1980s vision of "Star Wars" or the Strategic Defense Initiative, the Taylor-Dyson "Orion" vision was far cheaper and more practical. It did not require the development of any new technologies whatsoever. It did not require the development of electronic sensors of simultaneous enormous sensitivity, robustness and reliability, which President Bush's current Anti-Ballistic Missile defense program will require. These are essential for the Bush ABM program to ensure that ground-based interceptor missiles can reliably intercept incoming intercontinental ballistic missiles at combined speeds of up to 36,000 miles per hour, or 18 times the speed of a fired bullet. Dyson even envisaged inter-planetary regular travel as a practical reality by 1970. "We sketched a 12-year flight program ending with large manned expeditions to Mars, in 1968 and to the satellites of Jupiter and Saturn in 1970," he wrote in his 1979 autobiography "Disturbing the Universe." "The costs of our program added up to about $100 million a year (in 1958 dollars)." Dyson, Taylor and their colleagues were simultaneously scientific visionaries and political idealists. They wanted to boost the space age out into the Solar System as quickly as possible to inspire the world. And they also wanted a safe, practical and even politically popular way to destroy the vast stockpiles of nuclear weapons then accelerating during the most tense years of the Cold War at a fearsome rate. Their answer to both these projects was the Orion project. In July 1958, Dyson spelled out these aims in a paper he called "A Space Traveler's Manifesto." He concluded, "We have for the first time imagined a way to sue the huge stockpiles of our bombs for

better purpose than for murdering people. Our purpose, and our belief, is that the bombs which killed and maimed at Hiroshima and Nagasaki shall one day open the skies to man."

1AC – Disarm Adv

We Isolate 2 Impacts

1.) Storage of waste on Earth results in plutonium poisoning and global extinction.

Willson 2004

Harry, Unusually qualified peace activist and co-founder of Amador Publishers, REVIEW HUMAN SURVIVAL ON A PLUTONIUM-CONTAMINATED PLANET, http://www.amadorbooks.com/books/pluto.htm

This study brings closure to species survival arguments, by specifying via an Equation and its Graph what concentrations of Plutonium are required to cause species extinctions. The key variable is genome size. Amphibians have the largest genomes, and are already suffering malformations and extinctions. Larger animals, especially carnivores, will certainly be next. Humans will not be immune. The Department of Energy's Waste Isolation Pilot Project (WIPP) near Carlsbad, NM, is designed to hold plutonium-contaminated material, produced by our nation's nuclear armament industry, "out of the environment" for 10,000 years. The number of hld's [human lethal doses] of plutonium scheduled to be placed in WIPP is alarming and unacceptable. Charles Hyder received B.S. and M.S. degrees in physics from the University of New Mexico (1958,1960), and a Ph.D. in Astrogeo- physics from the University of Colorado (1964). He published more than twenty solar and comet papers. He worked for NASA, UCLA, UNM, and the Southwest Research and Information Center. He was an early whistle-blower, presenting effective criticism of plans for radwaste disposal in New Mexico, [particularly at WIPP]. He and nineteen other radwaste experts were employed by the government of Lower Saxony to critique the Gorleben Salt Dome project, which was ultimately rejected. In 1986-87 Hyder underwent a seven-month fast in Washington, DC, protesting against War. In this book he commits to another fast, "terminal," he says, protesting the proposed opening of WIPP. It will remain open, "over my dead body." This book provides the science which underlies that kind of certainty and commitment. In HUMAN SURVIVAL... Hyder advises his readers to become strict vegetarians. He suggests living at high altitudes, rather than in low-lying areas, where heavy metals settle. He asserts that recent, global amphibian extinctions are our dying canaries!

1AC – Disarm Adv

2.) A shift away from nuclear weapons locks in American primacy through conventional superiority.

Lind 2009

Michael, Policy Director of the [Economic Growth Program](http://growth.newamerica.net/home) at the New America Foundation, How I learned to stop worrying and live with the bomb, http://www.salon.com/news/opinion/feature/2009/10/13/nuclear\_weapons/index.html

President Obama's Nobel Peace Prize has been justified by some because it draws attention to the goal he endorses of ridding the world of nuclear weapons. I share that goal, but not because nuclear weapons are uniquely horrible -- if you're a victim, it makes little difference whether you're killed or maimed by nuclear weapons or conventional weapons, which sometimes can create lingering illnesses and poison the landscape, too. I support the abolition of nuclear weapons because, if it were successful, it would lock in the advantages of the small number of great powers like the U.S. that are capable of building and maintaining first-class conventional militaries. The goal of American liberal internationalism, since the days of Woodrow Wilson and Franklin Roosevelt, has been what Wilson called "a community of power" -- a great power concert whose members collaborate to keep the peace. This is different from the conservative vision of unilateral U.S. hegemony. But whether you think the law should be enforced by a posse or a single sheriff, you want the law officers to be better armed than the law-breakers. Superior conventional forces are the weapons of the rich. Only the most advanced industrial states can afford to build world-class conventional military forces, and paying for them is much easier if an economy is large and dynamic. This is good news. Countries with large and dynamic economies tend to have relatively rational if not necessarily democratic governments and to be committed to the geopolitical status quo. Nazi Germany, rich but irrational, committed suicide in a short period of time, and the Soviet Union eventually fell apart because its economy could not support its massive conventional and nuclear forces. Today's rapidly developing China is far more prudent and responsible than Mao's China. Nuclear weapons, by contrast, are weapons of the weak. They can be acquired by regimes that, because of poverty or ideology, are incapable of developing the world-class economy needed to support world-class conventional forces. It is easier for North Korea to build an atomic bomb than a fleet of aircraft carriers. We should support the total abolition of nuclear weapons, then, for practical strategic reasons. It would reinforce the military primacy of the U.S. and what Theodore Roosevelt called the "civilized" great powers. In the early years of World War I, the U.S. and Britain denounced submarine warfare by Germany, not because it was uniquely horrible (the official reason) but because it weakened the British Fleet and the ability of the U.S. to reinforce Britain in a war (the actual reason). Today the U.S. and other great powers -- including, perhaps, China, India, Russia and Brazil, acting as partners in a future great-power concert -- can deter regional aggressors and undertake necessary interventions most effectively if their near-monopoly of conventional military force is unchallenged by weapons of mass destruction.

1AC – Disarm Adv

American primacy reduces the likelihood of every scenario for great power war.

Kagan 2007

Robert, End of Dreams, Return of History, Hoover Institute, http://www.hoover.org/publications/policy-review/article/6136

The current order, of course, is not only far from perfect but also offers no guarantee against major conflict among the world ’s great powers. Even under the umbrella of unipolarity, regional conflicts involving the large powers may erupt. War could erupt between China and Taiwan and draw in both the United States and Japan. War could erupt between Russia and Georgia, forcing the United States and its European allies to decide whether to intervene or suffer the consequences of a Russian victory. Conflict between India and Pakistan remains possible, as does conflict between Iran and Israel or other Middle Eastern states. These, too, could draw in other great powers, including the United States. Such conflicts may be unavoidable no matter what policies the United States pursues. But they are more likely to erupt if the United States weakens or withdraws from its positions of regional dominance. This is especially true in East Asia, where most nations agree that a reliable American power has a stabilizing and pacific effect on the region. That is certainly the view of most of China ’s neighbors. But even China, which seeks gradually to supplant the United States as the dominant power in the region, faces the dilemma that an American withdrawal could unleash an ambitious, independent, nationalist Japan.

1AC – Disarm Adv

Finally, nuclear pulse propulsion is the key to global disarmament. Provides a popular way to reduce nuclear stockpiles, shifts research focus and alleviates institutional pressure.

Schweitzer 2009

Curtis, Writer, Composer & Political Researcher, Resurrecting Orion, April 27th, http://curtisschweitzer.net/blog/?p=2546

Ultimately, however, the most important obstacle to remove is the irrational fear and loathing that the worldwide public has toward nuclear devices. Although the strong dislike for and fear of nuclear weapons is understandable given the harrowing experience of the Cold War, the international community has moved into a new era. Continuing bans on and limitations of militarized nuclear weapons is, of course, still a necessary obligation of the international community. Nonetheless, as has been the theme in this essay thus far, the emerging realization that there are better uses for the world’s massive nuclear stockpiles is a key component in mankind’s progress toward seriously exploring (and possibly colonizing) the solar system. Developing nuclear-pulse propulsion systems could even play a role in the larger issue of global nuclear disarmament. Reducing nuclear stockpiles by repurposing warheads for space exploration is a far better use of both the nuclear material and the time and effort spent researching and developing those devices than is the incredibly expensive, ultimately fruitless process of disassembling and destroying them. Moreover, repurposing weapons means that concerns over increased nuclear proliferation as a result of Orion programs can be significantly mitigated. All of Orion’s problems are solvable. All of them have known, inexpensive, often beneficial answers, and the product of addressing them is a vast leap forward in human spaceflight and expansion beyond the borders of our fragile earth. The benefits are immeasurably greater than the risks. It is not rationality that stands between humanity and nuclear-propelled spaceflight– indeed, it is irrationality. In the end, the only thing that will ever prove to be an effective means of making Orion a reality is a change in heart among everyday people. All the politicians in the world will not change the hearts and minds of millions of people who either don’t know about the prospects for project Orion or who are indifferent to it. Since there has never been a serious effort by any government to consider the technology, let alone promote it, there remains a significant opportunity to galvanize support for an Orion program, especially if its lofty promises are communicated clearly. Orion promises us a way forward. In difficult economic times, it is a far more efficient use of limited funds, and the benefits of the program promise to revolutionize the world of technology just as the moonshot did during the space race. There are new markets, technologies, and wealth waiting to be discovered, and the only thing standing between us and that future is our own illogical fear of nuclear devices. Overcoming that fear (and strictly regulating a world with an amended partial-test-ban treaty) will not be easy– but going to the moon will. Going to Mars will be– at least comparatively. The International Space Station could be finished in a single mission. A moon base established in two. Manned missions to Saturn and beyond in the near future. Americans once had a dream, not to conquer space, but to blaze the trail for humanity. It is an American flag that flies on the moon today, next a plaque proclaiming that we came “in peace for all mankind”. We have a chance to do that again, and what’s more, to use our most destructive weapons to do so. We have the opportunity to beat our swords into plowshares, to harness our most feared and reviled technology for a peaceful and scientific end. That day– the day when, collectively, Americans come together in front of our TV sets, en masse in Times Square, on the new media outlets like YouTube and the blogosphere to watch the American flag being driven into the cold red soil of Mars while overhead a hundred scientists, engineers and explorers wait to be ferried down to the surface– on that day, we will once again know that rare kinship for which we have always yearned. We will know the solemn pride that accompanies the knowledge that we have helped lift humanity from amidst its petty squabbles, that we have put to shame those who seek to build weapons, not engines– missiles, not spacecraft.

1AC – Plan

Text - The United States federal government should facilitate the development of nuclear pulse propulsion beyond the Earth’s mesosphere.

1AC – Solvency

Contention Four – Solvency

Nuclear pulse propulsion is feasible and could easily overcome all problems with existing propulsion technology.

**Schweitzer** 200**9**

Curtis, Writer, Composer & Political Researcher, Resurrecting Orion, April 27th, http://curtisschweitzer.net/blog/?p=2546

The benefits of Orion are clear: the question is, how can we overcome its problems? Luckily, this question has already been largely answered by the very engineers who first came up with the concept– indeed, much of Orion’s hazards can be overcome by the very project itself. Orion’s massive energy release during launch means that the usual need to place a launch site as close to the equator as possible vanishes– Orion could easily be launched from a floating platform in the south pacific, for instance, or even from Antarctica. (The political considerations– and there are huge political considerations to look at given that the whole continent is a massive wildlife preserve– aside, Antarctica represents the most practical ground-based launch site). Even looking to the North seems feasible– after all, much of northern Russia has already been used for nuclear testing, and as such, there is data to help project coordinators launch at a time and place that would reduce the inevitable radioactive fallout that an Orion-like launch would create. Once in space, Orion could function as its own space station– after all, given the ability to life city-sized ships into orbit with relatively little effort, one of the first functions of an Orion launch could be to create a permanent presence in space. Likewise, Orion could be used as a way to jump-start the space-elevator project, which would eliminate or drastically reduce the need to launch multiple Orion vehicles. Once man has a secure foothold in space, it becomes far less important that Orion vessels be launched from earth, which eliminates almost all modern objections to the technology. Most modern space-born missions are designed around the extreme conservation of weight. Removing this barrier is key to Orion’s appeal: after all, when you can lift a city into orbit, the exploration and colonization of space becomes a far more practical idea. Orion’s potential to power spacecraft that can approach relativistic speeds also mitigates almost completely the problem of long voyages inside the solar system– remember, Mars wouldn’t be a month, but rather a few days’ trip. Indeed, it is easy to see how the economics of intra-solar-system logistics could be solved almost completely by adopting Orion-like spacecraft. What’s more, with permanent bases on the Moon, Mars, the orbiting bodies of Saturn, and more, the introduction, construction, and deployment of new exploratory vehicles and telescopes would be well within reach during our lifetime.

1AC – Solvency

Only American leadership can offer the necessary coordination required for solvency

Stone 2011

Christopher, space policy analyst and strategist who lives near Washington DC, American leadership in space: leadership through capability, The Space Review, http://www.thespacereview.com/article/1797/1

If America wants to retain its true leadership in space, it must approach its space programs as the advancement of its national “security, prestige and wealth” by maintaining its edge in spaceflight capabilities and use those demonstrated talents to advance international prestige and influence in the space community. These energies and influence can be channeled to create the international space coalitions of the future that many desire and benefit mankind as well as America. Leadership will require sound, long-range exploration strategies with national and international political will behind it. American leadership in space is not a choice. It is a requirement if we are to truly lead the world into space with programs and objectives “worthy of a great nation”.

1AC – Solvency

Nuclear pulse propulsion would not increase nuclear risks and for obvious reasons cannot be developed privately.

Kapp 2009

Thomas L, Activist, publishes Rational Review News Digest, Anarchy and the Nuclear Option, <http://c4ss.org/content/756>

The costs of constructing a nuclear weapon are huge. Not only is research and development expensive, but the actual assembly of the weapons requires acquisition of huge amounts of raw material (uranium), processing of that material by large numbers of expensive machines (gas centrifuges), and the attention of skilled technicians who don’t work cheaply. In other words, only two types of organizations could reasonably be expected to create a nuclear weapon: A state, which can take the cost out of its subjects’ hides whether they like it or not; or a large corporation of the kind which generally only exists under the auspices of the state and which has no profit motive to build such a weapon unless it’s doing so for the state. Of course, the nuclear genie is unfortunately already out of the bottle. There are already a lot of weapons out there. It’s reasonable to be concerned that if the state disappeared tomorrow, those weapons might fall into the hands of individuals or groups who could never have built them, and who might be inclined to actually use them rather than merely use them as a “Mutually Assured Destruction” threat to keep cold wars cold. I have two counter-arguments to offer to that reasonable concern. The first is that the danger it alludes to already exists because the weapons already exist. Maintaining the state does not guarantee that these weapons will never be stolen by force, or illicitly sold by those appointed to guard them. Both possibilities became major concerns during the disintegration of the Soviet Union. For all we know, “private nukes” may already be in play. The second is that, to the extent that nuclear weapons may fall into non-state hands and be used, the state is the most likely target for their use. Even if the physical target is a civilian population, the justification for their use would be to put pressure on a state to act or react in a given way. To this extent, permitting the continued existence of the state — any state, anywhere — represents an increased risk. Not only does the existence of nuclear weapons not constitute an argument against the stateless society, precisely the opposite is true: Only states or state-privileged organizations are likely to command the resources to build nukes, or to have any motive to do so. Only states or those attacking states have any incentive to use nukes as instruments of warfare. “Private nukes” are not, and never have been, a serious threat except to the extent that the existence of the state makes them one. However, I can envision a scenario in which “private nukes” might contribute to the peaceful establishment of stateless societies: If Earth’s states are serious about divesting themselves of their nuclear weapons, they should offer those weapons, gratis, to private organizations which demonstrate the ability to build “Project Orion” style spacecraft — spacecraft propelled by the detonation of nuclear weapons behind a “pusher plate.”

1AC – Solvency

Finally, even if the plan can’t stop a planet ending asteroid, the construction of one nuclear pulse ship is sufficient to overcome all obstacles to space exploration allowing escape to other planets.

**Smith** 200**3**

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, The Case for Orion, March 12th http://www.spacedaily.com/news/nuclearspace-03h.html

Unparalleled access to space means we can lift the industrial infrastructure necessary to start using natural space resources for the first time. We could then mine asteroids and build fleets of Orions off Earth where environmental impact studies would be of no concern. The last frontier is after all an endless ocean of positive particulate radiation. Like the Starship Enterprise we would never in all likelyhood try to land Orions on Earth. They would act as interplanetary ferries. We would still need to develop a reusable launch vehicle but it would only need enough fuel to reach orbit. Our newly aquired mining, construction and fuel processing industries in space would ensure that abundant fuel stops in the form of space stations would exist for return journeys. One Orion launch might be all thats necessary to kick off a new age of space exploration. Perhaps one of the best arguments for allowing nuclear power to increase our foothold in space is provided by Daniel Durda, a senior research scientist at the Southwest Research Institute in Boulder, Colorado. "The worst scenario I can think of is a multi-kilometer-diameter, long-period comet discovered several months out on an impact trajectory as it is entering the inner solar system," he said. "There is absolutely nothing we could do about it at this point in time. Nothing." You have only to look at the pockmarked moon to realise we can and do occasionally get hit by large bodies. Survival should be a strong motivator for us even if our exploratory urge has diminished.

Inherency – No Deep Space Propulsion

More funding is necessary before NASA will be able to create a spacecraft capable of completing the planned 2016 OSIRIS-REx mission.

Watson 2010

Traci Watson, USA Today, 21 June 2010, "Obama plan to land on asteroid may be unrealistic for 2025," www.usatoday.com/tech/science/space/2010-06-20-asteroid-obama-nasa-plan\_N.htm

In Armageddon, Willis' character and his crew blast off in two modified space shuttles to reach the killer asteroid. But NASA has long planned to retire the shuttles within the next year. And even if they weren't all headed to museums, they're useless as asteroid transporters. The shuttles were built only to circle Earth, says Dan Adamo, a former mission control engineer who has studied human missions to asteroids. They don't carry the fuel to jump into deep space, and their heat shields aren't designed to withstand the extra-high temperatures of returning from a destination other than the Earth's orbit. What's needed instead is a giant rocket on the scale of the monstrous Saturn V - taller than Big Ben - that propelled man to the moon in the 1960s and 1970s. Such a project is "a difficult challenge" that will cost in the multiple billions of dollars, says Ray Colladay, a member of NASA's advisory council. NASA spent more than $52 billion in 2010 dollars to develop and build the Saturn V. Building a 21st-century version can be done but will require a sharp increase in the NASA budget later this decade, some space experts say. "That's the issue everybody wants to duck right now, because it's uncomfortable to face that," Colladay says.

Inherency – Will Fail Meow

Budget cuts and reallocation of NASA’s budget makes further development and exploration of space unsustainable.

Washington Post 2010

Washington Post, 23 April 2010, "Obama should rethink NASA’s space program," http://www.washingtonpost.com/wp-dyn/content/article/2010/04/22/AR2010042205398.html

PRESIDENT OBAMA had the right idea when he recommended scrapping the Bush administration's ill-conceived, under-funded program to return to the moon by 2020 and reach Mars by 2037. As a presidential commission headed by former Lockheed Martin chief executive Norman Augustine concluded last year, the human spaceflight program appears "on an unsustainable trajectory," with resources falling woefully short of an unclear goal. So we agree with the president's instinct to hit the reset button. But his plan also is fundamentally flawed, although for the opposite reason than the one most of Mr. Obama's critics have cited. Those critics, including some former astronauts, accuse Mr. Obama of effectively abandoning human spaceflight by replacing an existing program with a new one. We blame him for not making a cleaner break from unsustainable schemes to put people into space. "The bottom line is nobody is more committed to manned spaceflight, to human exploration of space than I am," Mr. Obama said at the Kennedy Space Center last Thursday. His proposed route is to skip the moon and instead head to Mars, with interim stops at intriguing destinations such as near-Earth asteroids or the moons of Mars. That's too bad. While we understand the romantic attraction of human spaceflight, the drive for exploration can be satisfied by less costly and less hazardous means. Human spaceflight is not an affordable priority given the pressing demands on Earth and the scarce resources available to meet them. Equally worrying, the Obama plan risks repeating the mistakes of the past: budgeting too little. As the Augustine commission urged, "These challenging initiatives must be adequately funded, including reserves to account for the unforeseen and unforeseeable. . . . Space operations become all the more difficult when means do not match aspirations." Under Mr. Bush's Constellation program, NASA was spending 39 percent of its budget on human spaceflight; Mr. Obama proposes devoting just 18 percent. It's hard to see how that will be enough if the mission remains largely the same, even with the prospect of cost savings from new technologies and increased reliance on the private sector. Mr. Obama would give NASA $6 billion more -- for all purposes, not just for spaceflight -- over five years. Mr. Obama said last week that he was committing $3 billion to begin developing the heavy-lift rocket necessary to get crew and supplies into deep space. You don't have to be a rocket scientist to understand that won't be enough. The smaller rocket that Mr. Obama announced he was canceling, the Ares I launch vehicle, has already cost $9 billion. In the face of congressional unhappiness, Mr. Obama also announced that he would revive a scaled-back version of another part of the Bush program, the Orion space capsule, at a cost of $1 billion to $3 billion. This is certain to further strain other NASA priorities.

Inherency – Funding Shortage Meow

In order for NASA to develop the resources it requires to complete Obama’s planned asteroid landing, it requires substantially more funding.

Washington Post 2010

Washington Post, 23 April 2010, "Obama should rethink NASA’s space program," http://www.washingtonpost.com/wp-dyn/content/article/2010/04/22/AR2010042205398.html

The president's much more ambitious schedule for sending Americans into deep space gives NASA the mission it needs to develop a new-generation rocket and to maintain excellence in the astronaut corps. But while Obama would increase the space agency's budget by $6 billion, to $100 billion over the next five years, that amount is not enough for a robust rocket program, much less for the development of a deep-space crew capsule.

Planetary Defense Adv – NPP (S)

Only nuclear based propulsion can intercept deep space NEO.

Ragheb 2010

M. Ragheb, Associate professor of Engineering at University of Illinois, Nuclear defense against stellar objects, https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Nuclear%20Defense%20Against%20Stellar%20Objects.pdf

Some studies were conducted and suggested some defenses entailing ground and space based infrastructures much more extensive than those envisioned for ballistic missile defense. Because of the limitations of current space propulsion technologies these systems would require deployment of interceptors in deep space in order to allow engagement at a sufficient distance from Earth. The low specific impulse methods suggested for altering these objects trajectories such as solar sails and electric thrusters would not provide enough time for reaching the orbit of the space object in time for altering the trajectories between the time of detection and the time of impact. Such schemes entail a high risk since their effectiveness will depend on the body’s shape, composition, trajectory and size, which are all unknowns beforehand. There is no room for error once the object is engaged and the propulsion system must operate for a long time for the maneuver to work. This is even more important in the case of comets since they offer a much shorter time detection span than asteroids. Nuclear propulsion approaches with high specific impulses can offer more economical ground based defenses based on present day technology. If a catastrophic event were identified, high impulse nuclear systems can be promptly launched into space using conventional chemical lifting methods. The nuclear approach would provide high power density and specific impulse to rapidly travel to the space object to deflect it in time from its collision trajectory with Earth.

Planetary Defense Adv – NPP (S)

NPP will use nuclear fission which avoids fractures and superior to alternative options.

Ragheb 2010

M. Ragheb, Associate professor of Engineering at University of Illinois, Nuclear defense against stellar objects, https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Nuclear%20Defense%20Against%20Stellar%20Objects.pdf

Nuclear deflection approaches then can be also used to nudge the object at a large distance from the Earth from its trajectory, ablate its surface, or even fragment it into smaller objects with altered non impact trajectories. Fusion based devices primarily generate x-rays which are absorbed in a few millimeters of an asteroid, ablating its surface and possibly nudging it from its trajectory. Devices with primarily a neutron component can cause fragmentation since neutrons could penetrate the surface to about 10 cms. A single or multiple pulse detonations of nuclear fission, fission/fusion or fusion devices can be used to easily alter the trajectory of the planetesimal from its collision course with Earth. Two stages occur in the process. First, the illumination of its surface by the prompt x-rays and gamma rays traveling at the speed of light from the pulse would cause ablation of the surface and generate thrust that is parallel to the object’s projected area. This would be followed by a second wave consisting of the plasma of fission products producing a second impulse in the same direction. The process can be carried out remotely without astronauts being dispatched to carry out the process. It is also suggested that the thrust would be parallel to the object’s projected area, independent of its mass distribution or angular momentum if it was rotating in space. The amount of impulse could be adjusted by the frequency of the pulses, detonation standoff distance, and yield and type of the pulse unit. If an External Pulse Plasma Propulsion (EPPP) system is used, it would double as the propulsion means as well as the nudging means. This approach does not require any unrealistic asteroid capture or attachment of a propulsion unit to an unreachable surface that could be rotating, with insignificant gravity.

Planetary Defense Adv – NPP (S)

**Nuclear pulse propulsion is key to escape deadly asteroids.**

Smith 2003

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, The Case for Orion, March 12th http://www.spacedaily.com/news/nuclearspace-03h.html

Perhaps one of the best arguments for allowing nuclear power to increase our foothold in space is provided by Daniel Durda, a senior research scientist at the Southwest Research Institute in Boulder, Colorado. "The worst scenario I can think of is a multi-kilometer-diameter, long-period comet discovered several months out on an impact trajectory as it is entering the inner solar system," he said. "There is absolutely nothing we could do about it at this point in time. Nothing." You have only to look at the pockmarked moon to realise we can and do occasionally get hit by large bodies. Survival should be a strong motivator for us even if our exploratory urge has diminished.

Planetary Defense Adv – NPP (S)

The nuclear pulse propulsion in a Project Orion-based spacecraft could effectively deflect large asteroids set to collide with earth with minimal warning and an automated mission.

SonicBomb 2011

SonicBomb, 10 April 2011, “Project Orion – to Saturn by Atom Bomb,” http://www.sonicbomb.com/modules.php?name=News&file=print&sid=89

One useful mission for [Project Orion] would be to deflect an asteroid that could collide with the earth, depicted dramatically in the 1998 film Deep Impact. The extremely high performance would permit even a late launch to succeed, and the vehicle could effectively transfer a large amount of kinetic energy to the asteroid by simple impact, and in the event of an imminent asteroid impact a few predicted deaths from fallout would probably not be considered a show-stopper. Also, an automated mission would eliminate the most problematic issues of the design: the shock absorbers.

Planetary Defense Adv – NASA Key

Establishment of planetary defense efforts will require NASA to take a lead role in facilitating international cooperation.

David 2010

Leonard David, Space.com, past editor-in-chief of National Space Society/s Ad Astra and Space World, 19 October 2010, "Planetary Defense Coordination Office Proposed to Fight Asteroids," www.space.com/9356-planetary-defense-coordination-office-proposed-fight-asteroids.html

A new report calls on NASA to establish a Planetary Defense Coordination Office to lead national and international efforts in protecting Earth against impacts by asteroids and comets. The final report of the Ad-Hoc Task Force on Planetary Defense of the NASA Advisory Council was delivered to the Council this month, proposing five recommendations that suggest how the space agency should organize, acquire, investigate, prepare, and lead national and international efforts in planetary defense against near-Earth objects. While the task force report underscores the importance of NASA taking a leadership role in planetary defense, there’s no obligation by NASA leadership, or the White House to follow the recommendations.

NASA key – no other US agency has the resources or familiarity to coordinate international planetary defense.

SSB, ASEB, & DEPS 2010

Space Studies Board (SSB), Aeronautics and Space Engineering Board (ASEB), Department of Engineering and Physical Sciences (DEPS), "Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies," 2010

It seems sensible to assign responsibility for this NEO hazards program to an existing governmental administrative structure, especially in view of the likely relatively small size of the undertaking. It also seems more efficient to place the program under the control of a single entity in coordination with other relevant government organizations. The coordination could be implemented by way of a standing committee or an interagency task force of the appropriate agencies to organize and lead the effort to plan and coordinate any action to be taken by the United States individually, or in concert with other nations. This committee or task force would have membership from each of the relevant national agencies (NASA and the National Science Foundation [NSF]) and executive departments (Defense, Energy, Homeland Security, Justice, and State), with the chair from the lead entity. (Other relevant agencies and departments might include the Departments of Transportation and of Health and Human Services, the Environmental Protection Agency, the General Services Administration, and the Department of Agriculture.) The first step of the standing committee or interagency task force would be to define the necessary roles and responsibilities of each member agency in addressing the various aspects of the threat, from surveying the sky through civil defense. The lead responsibility for a given task would be assigned to the appropriate agency or department. In view of the intrinsic international nature of the program, a civilian rather than a military agency would have advantages for housing it. Otherwise, one could envision continual internal conflict over military security and classification issues. Of course, any group will have such issues from time to time, but a civilian group could have far fewer such conflicts and also would likely be more acceptable to its counterparts in other nations. In an emergency, the military could be enlisted or appointed by the president to help; the military would maintain currency with the issues through membership in the standing committee or interagency task force. Among the civilian agencies and departments, NASA has the broadest and deepest familiarity with solar system objects and its associated rendezvous missions. The NSF supports ground-based solar system research, but it traditionally responds to proposals rather than initiating and organizing complex programs (the International Geophysical Year being one of the exceptions). The Departments of Defense and of Energy, however, have by far the most important experience with nuclear explosives, necessary for some active-defense missions for changing NEO orbits. For such missions and their preparations, these departments, or at least the latter, would certainly become involved, with coordination being maintained through the standing committee or task force described above.

Planetary Defense Adv – NASA Key/A2 Privatization CP

NASA key – further development of space exploration must be NASA, not commercial investors.

Griffin 2006

NASA HQ, 19 January 2006, “Remarks by NASA Administrator Griffin at the National Society of Professional Engineers Professional Development Conference,” http://www.spaceref.com/news/viewsr.html?pid=19329

I’d now like to address how we are organizing our engineering work at NASA to achieve the kind of technical excellence that is necessary to execute our long-term exploration program successfully. As a central organizing principle of our work, and despite the fact that 80% of our total funding goes to industry and will continue to do so, I firmly believe that it must be NASA and its engineering staff, and not our contractors, who will assume the primary responsibility for making this program work. We are undertaking a multi-generational program of sustained exploration, and we must ask where our intellectual capital should reside. Should it be outside the government in the hands of a prime contractor whose interests may change over the years? Or should it remain in-house, where we can sustain the program's momentum, and retain an institutional memory of the system and cost trades that are made, and a strong understanding about why the architecture is the way it is? I do not believe that it is wise to contract out these vital functions. Making NASA engineers clearly responsible and accountable for our technical products at the system level will drive our team toward excellence.

Planetary Defense Adv – Nuclear War !

**Near earth objects will cause miscalculation and nuclear war.**

Whitt 02

Kelly Kizer Whitt, 17 September 2002, Astronomy.com, "Small Near-Earth Objects Could Trigger Nuclear War," www.freerepublic.com/focus/news/752087/posts

Near-Earth objects (NEOs) pose a threat to our global security, and not just from a catastrophic impact. A large meteorite exploding in Earth's atmosphere could trigger a nuclear war. Such a scenario was in the making on June 6, 2002. Just as the tensions between India and Pakistan were reaching their boiling point, a meteor exploded as it entered the atmosphere over the Eastern Hemisphere, causing an energy release of 12 kilotons, equivalent to the blast that destroyed Hiroshima. Fortunately, the bright flash and damaging shock wave of the detonating meteorite occurred over the Mediterranean Sea, just west of the disputed Kashmir region. If the explosion had happened a little earlier while it was over the countries in conflict, the confusion and panic could easily have sparked a nuclear response from either country. While the United States was able to quickly determine the source of the explosion, India and Pakistan, as well as most other countries, do not have the resources available to distinguish whether an explosion's source is natural or man-made. Brigadier General Simon P. Worden, the U.S. Space Command's deputy director for operations at Peterson Air Force Base in Colorado, would like to change that.

Planetary Defense Adv – A2 Accidents

The probability of a NEO outweighs the probability of an accident.

Lenard 2001

Roger X., President, IOSTAR Corporation, Societal imperatives and the need for space nuclear power and propulsion systems, Space Policy, Vol 17 Iss 4

These same groups also cite the potential for accidents that might pose some risk to society. While it is feasible for a nuclear power system to re-enter the earth’s atmosphere, recent commercial groups have studied this possibility and have concluded that there is less than one in 10 million chance of an unintended re-entry of a radiologically hot reactor [11]. Since fission products represent a relatively limited dose to the populace, particularly from a global perspective, the possibility for a severe loss of life is more likely to be less than one in 10 million. Alternatively, it has been shown that over a several thousand-year time frame, the chance of being killed by an asteroid is 1 in 24,000 [12]. Thus, the risks inherent in nuclear power and propulsion are substantially less than the risk of asteroid impact. The reality is that groups that would attempt to prevent deployment of nuclear propulsion to move asteroids, thereby protecting the earth and its environment are not only luddites, they are nihilists; the very few would deny an important future to the many. The risk to society from a nuclear reactor accident is many orders of magnitude less than the risk from asteroid impact.

Planetary Defense Adv – A2 Low Probability

**Probability claims about planetary defense inherently underestimate the dangers.**

Sandberg 2011

A postdoctoral fellow at the Future of Humanity Institute of Oxford University, gave the keynote address at Planetary Defense Conference <http://ieet.org/index.php/IEET/more/sandberg20110513>

My own talk was about the issue of cognitive bias and rationality in impact mitigation. Basically, our biases are interfering with both the public, decisionmakers and the research community, and overcoming them is an important part in public relations, explaining the situation and doing the research. Not all of them are bad for the impact risk community: the preference for hard numbers really helps it in the “competition” with softer risks. But availability bias (it has never happened, never will) and scope neglect (a million dead are just

statistics) make many decisions rather irrational. There are also problems with planetary defence being a public good, being long-term (it might be rational to put off doing things for a while, since tech is advancing - but this easily leads to putting off doing things too long; the “sweet spot” might be a decade, about a political lifetime) and discounting the future too heavily.

Disarm Adv – NPP (S)

Only NPP can solve the problems of nuclear waste terrorism and nuclear weapons.

Sieff 2001

Martin, Senior News Analyst, JRL, http://www.cdi.org/russia/johnson/5550-12.cfm

The sweeping cuts in Russian and U.S. nuclear arsenals agreed in Washington this week by presidents Vladimir Putin and George W. Bush raise major questions of environmental and security safety. But these could be answered in three words: "Build the Orion!" "Orion" in this case refers not to the hunter of classical mythology or to the vast constellation that dominates the night sky in the Northern Hemisphere. It means the manned spaceship powered by nuclear weapons designed more than 40 years ago by the great British-American physicist Freeman Dyson. Dyson was no crackpot. He was one of the greatest scientists of the 20th century. It was he who played a key role in explaining and popularizing the late Richard Feynman's Nobel-prize-winning, revolutionary methodology of calculating quantum electrodynamics theory to the world. In 1958, Dyson, and other young idealistic scientists gathered with small nuclear weapons designer Theodore "Ted" Taylor at the General Atomic division of the General Dynamics Corporation in San Diego, Calif., to work on Project Orion, the idea of a spaceship powered by atomic bombs. And they designed it. Dyson and his colleagues knew that the Soviet Union and the United States would build more rather than less nuclear warheads to keep up with one another. They knew it was only a matter of time before other nations joined the nuclear club. They also knew that even if the United States and the Soviet Union should ever reach strategic arms reduction agreements to mutually slash the size of their huge nuclear arsenals, the radioactive, fissile material taken from those warheads posed almost-eternal security risks of its own. It would have to be guarded with 100 percent perfect security indefinitely to prevent it falling into the hands of terrorists, criminals or political extremist fanatics. Nor could the fissile material once manufactured ever be rendered down into more harmless compounds or other elements. And even if it was protected safely, the environmental and contamination dangers from it would also last at the very least thousands, perhaps even hundreds of thousands of years, given the slow half-life, radioactive decay rates of the lethal elements involved. Dyson and Taylor proposed a radical solution to these problems. The atomic weapons could only be used up and totally rendered useless if they were actually exploded and they proposed to do this with lots of them. This would happen not on the earth or in the main atmosphere, but -- mainly -- in the far reaches of outer space, where the addition of the nuclear radiation to all the background radiation already there would be literally negligible and where the blast effects would be harmless. Dyson and Taylor proposed to explode atomic bombs at regular intervals at very short distances behind a specially designed space ship in order to propel it to the Moon and other planets in the Solar System far more quickly and cheaply than chemical-fuel rockets could ever do. Unlike President Ronald Reagan's 1980s vision of "Star Wars" or the Strategic Defense Initiative, the Taylor-Dyson "Orion" vision was far cheaper and more practical. It did not require the development of any new technologies whatsoever. It did not require the development of electronic sensors of simultaneous enormous sensitivity, robustness and reliability, which President Bush's current Anti-Ballistic Missile defense program will require. These are essential for the Bush ABM program to ensure that ground-based interceptor missiles can reliably intercept incoming intercontinental ballistic missiles at combined speeds of up to 36,000 miles per hour, or 18 times the speed of a fired bullet. Dyson even envisaged inter-planetary regular travel as a practical reality by 1970. "We sketched a 12-year flight program ending with large manned expeditions to Mars, in 1968 and to the satellites of Jupiter and Saturn in 1970," he wrote in his 1979 autobiography "Disturbing the Universe." "The costs of our program added up to about $100 million a year (in 1958 dollars)." Dyson, Taylor and their colleagues were simultaneously scientific visionaries and political idealists. They wanted to boost the space age out into the Solar System as quickly as possible to inspire the world. And they also wanted a safe, practical and even politically popular way to destroy the vast stockpiles of nuclear weapons then accelerating during the most tense years of the Cold War at a fearsome rate. Their answer to both these projects was the Orion project. In July 1958, Dyson spelled out these aims in a paper he called "A Space Traveler's Manifesto." He concluded, "We have for the first time imagined a way to sue the huge stockpiles of our bombs for better purpose than for murdering people. Our purpose, and our belief, is that the bombs which killed and maimed at Hiroshima and Nagasaki shall one day open the skies to man."

Disarm Adv – NPP (S)

Successful development of nuclear pulse propulsion results in global disarmament.

Schweitzer 2009

Curtis, Writer, Composer & Political Researcher, Resurrecting Orion, April 27th, http://curtisschweitzer.net/blog/?p=2546

Ultimately, however, the most important obstacle to remove is the irrational fear and loathing that the worldwide public has toward nuclear devices. Although the strong dislike for and fear of nuclear weapons is understandable given the harrowing experience of the Cold War, the international community has moved into a new era. Continuing bans on and limitations of militarized nuclear weapons is, of course, still a necessary obligation of the international community. Nonetheless, as has been the theme in this essay thus far, the emerging realization that there are better uses for the world’s massive nuclear stockpiles is a key component in mankind’s progress toward seriously exploring (and possibly colonizing) the solar system. Developing nuclear-pulse propulsion systems could even play a role in the larger issue of global nuclear disarmament. Reducing nuclear stockpiles by repurposing warheads for space exploration is a far better use of both the nuclear material and the time and effort spent researching and developing those devices than is the incredibly expensive, ultimately fruitless process of disassembling and destroying them. Moreover, repurposing weapons means that concerns over increased nuclear proliferation as a result of Orion programs can be significantly mitigated. All of Orion’s problems are solvable. All of them have known, inexpensive, often beneficial answers, and the product of addressing them is a vast leap forward in human spaceflight and expansion beyond the borders of our fragile earth. The benefits are immeasurably greater than the risks. It is not rationality that stands between humanity and nuclear-propelled spaceflight– indeed, it is irrationality. In the end, the only thing that will ever prove to be an effective means of making Orion a reality is a change in heart among everyday people. All the politicians in the world will not change the hearts and minds of millions of people who either don’t know about the prospects for project Orion or who are indifferent to it. Since there has never been a serious effort by any government to consider the technology, let alone promote it, there remains a significant opportunity to galvanize support for an Orion program, especially if its lofty promises are communicated clearly. Orion promises us a way forward. In difficult economic times, it is a far more efficient use of limited funds, and the benefits of the program promise to revolutionize the world of technology just as the moonshot did during the space race. There are new markets, technologies, and wealth waiting to be discovered, and the only thing standing between us and that future is our own illogical fear of nuclear devices. Overcoming that fear (and strictly regulating a world with an amended partial-test-ban treaty) will not be easy– but going to the moon will. Going to Mars will be– at least comparatively. The International Space Station could be finished in a single mission. A moon base established in two. Manned missions to Saturn and beyond in the near future. Americans once had a dream, not to conquer space, but to blaze the trail for humanity. It is an American flag that flies on the moon today, next a plaque proclaiming that we came “in peace for all mankind”. We have a chance to do that again, and what’s more, to use our most destructive weapons to do so. We have the opportunity to beat our swords into plowshares, to harness our most feared and reviled technology for a peaceful and scientific end. That day– the day when, collectively, Americans come together in front of our TV sets, en masse in Times Square, on the new media outlets like YouTube and the blogosphere to watch the American flag being driven into the cold red soil of Mars while overhead a hundred scientists, engineers and explorers wait to be ferried down to the surface– on that day, we will once again know that rare kinship for which we have always yearned. We will know the solemn pride that accompanies the knowledge that we have helped lift humanity from amidst its petty squabbles, that we have put to shame those who seek to build weapons, not engines– missiles, not spacecraft.

Disarm Adv – War !

Absent disarmament nuclear war is inevitable.

Harrell 2009

Eben, writer for Time, 2-20-09, The Nuclear Risk: How Long Will Our Luck Hold? <http://www.time.com/time/world/article/0,8599,1880702,00.html#ixzz0dt55cGcXhttp>

But to marvel at the bizarre coincidence of the collision, or to breathe a sigh of relief that nuclear safety was not breached, is to miss the point. The seemingly impossible collision of two subs in a large ocean should remind us of the fallacy by which we assume nuclear weapons will never be used. Because the threat of global nuclear war is not zero, even a small chance of war each year, multiplied over a number of years, adds up to the likelihood that the weapons will be used. Like those two subs stalking through the Atlantic, the odds will begin to align. Mathematically, they are destined to. This is not a mere logic game. If there is a single "big idea" to have emerged in the first decade of the new millennium — from [the September 11 attacks](http://www.time.com/time/magazine/article/0,9171,1000761,00.html) to the [financial crash](http://www.time.com/time/business/article/0,8599,1846450,00.html) — it is the notion of the ["black swan,"](http://www.time.com/time/business/article/0,8599,1853531,00.html) the danger posed by difficult to predict, high-impact events. The short history of nuclear weapons is already scattered with unplanned and seemingly improbable incidents that suggest we feel more secure than we should. In 1995, a communication failure with the Russian Embassy led the Russian military to believe that a weather rocket launched off the coast of Norway was an incoming submarine-launched ballistic missile. In the 1980s, malfunctioning U.S. missile defense systems relayed information to U.S. officials of a massive incoming first strike — twice. As recently as 2007, a U.S. Air Force plane flew across the American heartland while unknowingly carrying several live warheads on board. At the time, all of these events were described as freak occurrences. The truth is they were freak occurrences. But they happened.([Read the Top 10 underreported stories of 2008.](http://www.time.com/time/specials/2008/top10/article/0,30583,1855948_1861760,00.html" \t "_blank)) A day after the latest nuclear accident became public, an analyst from the Federation of American Scientists, a nonproliferation think tank, released U.S. Naval intelligence documents obtained through the Freedom of Information Act that showed that the Russian Navy undertook more underwater ballistic missile submarine patrols in 2008 than it has in a decade. The Russian subs are joined in the word's oceans by nuclear-armed vessels from France, Britain, and China. Under the plains of the American West, and in similar silos in Russia, Air Force missile operators keep constant vigil, launch keys at the ready. Nuclear missiles have no self-destruct button; once launched, they cannot be called back. Twenty years after the end of the cold war, humanity still lives within 30 minutes of its own destruction. The price we pay for maintaining nuclear weapons is the gamble that the highly improbable will not lead to the unthinkable. The question to ask after this latest nervy episode: is it worth it?

Disarm Adv – Waste !

Amphibian extinctions prove waste from the nuclear arsenal risks global extinction.

Willson 2004

Harry, Unusually qualified peace activist and co-founder of Amador Publishers, REVIEW HUMAN SURVIVAL ON A PLUTONIUM-CONTAMINATED PLANET, http://www.amadorbooks.com/books/pluto.htm

This study brings closure to species survival arguments, by specifying via an Equation and its Graph what concentrations of Plutonium are required to cause species extinctions. The key variable is genome size. Amphibians have the largest genomes, and are already suffering malformations and extinctions. Larger animals, especially carnivores, will certainly be next. Humans will not be immune. The Department of Energy's Waste Isolation Pilot Project (WIPP) near Carlsbad, NM, is designed to hold plutonium-contaminated material, produced by our nation's nuclear armament industry, "out of the environment" for 10,000 years. The number of hld's [human lethal doses] of plutonium scheduled to be placed in WIPP is alarming and unacceptable. Charles Hyder received B.S. and M.S. degrees in physics from the University of New Mexico (1958,1960), and a Ph.D. in Astrogeo- physics from the University of Colorado (1964). He published more than twenty solar and comet papers. He worked for NASA, UCLA, UNM, and the Southwest Research and Information Center. He was an early whistle-blower, presenting effective criticism of plans for radwaste disposal in New Mexico, [particularly at WIPP]. He and nineteen other radwaste experts were employed by the government of Lower Saxony to critique the Gorleben Salt Dome project, which was ultimately rejected. In 1986-87 Hyder underwent a seven-month fast in Washington, DC, protesting against War. In this book he commits to another fast, "terminal," he says, protesting the proposed opening of WIPP. It will remain open, "over my dead body." This book provides the science which underlies that kind of certainty and commitment. In HUMAN SURVIVAL... Hyder advises his readers to become strict vegetarians. He suggests living at high altitudes, rather than in low-lying areas, where heavy metals settle. He asserts that recent, global amphibian extinctions are our dying canaries!

Disarm Adv – Waste !

**Nuclear waste disposal will inevitably cause extinction.**

Hyder 1999

Charles, B.S. and M.S. degrees in physics from the University of New Mexico (1958,1960), and a Ph.D. in Astrogeophysics from the University of Colorado (1964). He has published more than twenty solar and comet papers. He has worked, for NASA, UCLA, UNM, and the Southwest Research and Information Center, Human Extinction on this contaminated planet, http://members.fortunecity.com/osservatorio/charleshyderbook2.html

It is in that context, and in the inescapable belief and conviction that the operation of WIPP will lead to Human Extinction if even 1/100 of the WIPPu reaches the biosphere\* --------------------------------------------------------------------------------------------------------------------- \* That may occur soon: e.g. during the 30 yrs. of radioactive transport accidents; or a prompt Radioactive Brine/Gas Geyser Erupt; or a "Karst Connection" for water to scour WIPP in 10 to 100 years; or ... during the next 30,000 years. So, WIPP operation gets "National/Global Emergency" status. Thus, I charge that the DOE, the AEC, et al. have been guilty of Treason for Intentionally Withholding Crucial, Relevant Evidence about the real biological Hazards of Radioactivity from the U.S. President, from the U.S. Congress, from their own workers, and from "The People" throughout most of my long life.   The Global Amphibian Extinctions are Chernobyl's ominous Legacy: Their Deaths are an "Epitaph by Example" for Humans.

Disarm Adv – Conventional > Nuclear

Nuclear disarmament locks in American military primacy.

Lind 2009

Michael, Policy Director of the [Economic Growth Program](http://growth.newamerica.net/home) at the New America Foundation, How I learned to stop worrying and live with the bomb, http://www.salon.com/news/opinion/feature/2009/10/13/nuclear\_weapons/index.html

President Obama's Nobel Peace Prize has been justified by some because it draws attention to the goal he endorses of ridding the world of nuclear weapons. I share that goal, but not because nuclear weapons are uniquely horrible -- if you're a victim, it makes little difference whether you're killed or maimed by nuclear weapons or conventional weapons, which sometimes can create lingering illnesses and poison the landscape, too. I support the abolition of nuclear weapons because, if it were successful, it would lock in the advantages of the small number of great powers like the U.S. that are capable of building and maintaining first-class conventional militaries. The goal of American liberal internationalism, since the days of Woodrow Wilson and Franklin Roosevelt, has been what Wilson called "a community of power" -- a great power concert whose members collaborate to keep the peace. This is different from the conservative vision of unilateral U.S. hegemony. But whether you think the law should be enforced by a posse or a single sheriff, you want the law officers to be better armed than the law-breakers. Superior conventional forces are the weapons of the rich. Only the most advanced industrial states can afford to build world-class conventional military forces, and paying for them is much easier if an economy is large and dynamic. This is good news. Countries with large and dynamic economies tend to have relatively rational if not necessarily democratic governments and to be committed to the geopolitical status quo. Nazi Germany, rich but irrational, committed suicide in a short period of time, and the Soviet Union eventually fell apart because its economy could not support its massive conventional and nuclear forces. Today's rapidly developing China is far more prudent and responsible than Mao's China. Nuclear weapons, by contrast, are weapons of the weak. They can be acquired by regimes that, because of poverty or ideology, are incapable of developing the world-class economy needed to support world-class conventional forces. It is easier for North Korea to build an atomic bomb than a fleet of aircraft carriers. We should support the total abolition of nuclear weapons, then, for practical strategic reasons. It would reinforce the military primacy of the U.S. and what Theodore Roosevelt called the "civilized" great powers. In the early years of World War I, the U.S. and Britain denounced submarine warfare by Germany, not because it was uniquely horrible (the official reason) but because it weakened the British Fleet and the ability of the U.S. to reinforce Britain in a war (the actual reason). Today the U.S. and other great powers -- including, perhaps, China, India, Russia and Brazil, acting as partners in a future great-power concert -- can deter regional aggressors and undertake necessary interventions most effectively if their near-monopoly of conventional military force is unchallenged by weapons of mass destruction.

Disarm Adv – Conventional > Nuclear

**Nuclear weapons only benefit rogue nations – Overwhelming American conventional superiority ensures disarmament will only increase American military power.**

Scoblic 2009

J. Peter executive editor of the New Republic and author of "U.S. vs. Them: Conservatism in the Age of Nuclear Terror," The hawkish case for nuclear disarmament, http://articles.latimes.com/2009/aug/16/opinion/oe-scoblic16

Traditionally, military power was measured in relative, not absolute, terms, meaning that your security was a function not of how many weapons you had, but of how many more you had than your enemy. The advent of nuclear weapons skewed that calculation. Because it would take only a few nuclear weapons to destroy a civilization, the atomic bomb became an equalizer for Davids confronting Goliath-sized enemies. During the Cold War, one could argue that that dynamic helped the U.S. because Warsaw Pact forces outnumbered NATO's. But today, with the specter of rogue-state nuclear programs, it's more likely that we are the ones who would be deterred. For example, would we have waged Operation Desert Storm (let alone Operation Iraqi Freedom) if Saddam Hussein had been able to strike New York or Washington with a nuclear weapon? Probably not. Our half-trillion-dollar-a-year military can, in essence, be defanged by any dictator with a handful of A-bombs. That is a remarkable waste of America's incredible conventional superiority. Our fleet of stealth fighters and bombers can establish air dominance in virtually any scenario, allowing us to obliterate an adversary's military infrastructure at will. At sea, our fleet is larger than the next 17 navies combined and includes 11 carrier battle groups that can project power around the globe. (By contrast, few of our potential adversaries field even a single carrier.) All in all, the U.S. accounts for just shy of half the world's defense spending, more than the next 45 nations combined. That's six times more than China, 10 times more than Russia and nearly 100 times more than Iran. -- Yet despite potential flash points with nations such as Russia (over Georgia) or China (over Taiwan), it would be lunacy to engage in combat with either because of the risk of escalation to a nuclear conflict. Abolishing nuclear weapons would obviously not make conflict with those states a good idea, but it would dramatically increase American freedom of action in a crisis. That should make hawks, with their strong faith in the efficacy of American military power, very happy. Indeed, if anyone opposes disarmament, it should be our rivals.

Disarm Adv – Unilateral Reductions => Conventional

Unilateral reductions enhance American conventional capabilities and are critical to deterrent credibility.

Dujarric 2010

Robert, runs the Institute of Contemporary Asian Studies, The Obama bid to rid the world of nuclear weapons boosts US security -- minus the threat of Armageddon, http://www.csmonitor.com/Commentary/Opinion/2010/0304/The-Obama-bid-to-rid-the-world-of-nuclear-weapons-boosts-US-security-minus-the-threat-of-Armageddon

The ability to compel enemies of the US to alter their behavior with these nonnuclear systems is far more plausible than with nuclear weapons, since America’s enemies rightly doubt that Washington will ever pay the political price of a nuclear first strike. A nonnuclear environment will favor the technologically advanced, since postnuclear systems are more sophisticated. As the country with the largest military- industrial complex, the US would benefit the most from the transition to a postnuclear world. Mr. Obama’s detractors say this push to rid the world of nuclear weapons is dangerous, or a product of a lofty attitude. The Nobel Peace Prize Committee says this is a noble goal. But it’s much more probable that Obama sees just how much more powerful the US can be with a nonnuclear sword held over its enemies’ heads. Achieving a total ban on nuclear weapons will not be easy. But working toward it is a logical goal for the US. Even if negotiations fail, the process will encourage more US research and development on nonnuclear alternatives that, even absent the abolition of nuclear explosives, will strengthen US military capabilities and deterrence.

Disarm Adv – A2 Ally Defense

**Conventional weapons are better at defending allies and the homeland.**

Dujarric 2010

Robert, runs the Institute of Contemporary Asian Studies, The Obama bid to rid the world of nuclear weapons boosts US security -- minus the threat of Armageddon, http://www.csmonitor.com/Commentary/Opinion/2010/0304/The-Obama-bid-to-rid-the-world-of-nuclear-weapons-boosts-US-security-minus-the-threat-of-Armageddon

If an enemy nation decided to engage in a massive act of aggression against vital US interests, generally defined as the US homeland or that of America’s closest allies. The logic is that no one will ever think of attacking the US given the certainty of immediate and terminal punishment, with possession of the Bomb. But today, there are nonnuclear options that can, in Air Force Gen. Curtis LeMay’s immortal words, “Bomb them back into the Stone Age.” These include nonnuclear attacks on electric grids (a very soft version of these were used against Serbia during the Kosovo war), destroying telecommunication networks, and, if one wishes to kill millions of enemy citizens, high-precision weapons that can wreak havoc on dams, bridges, chemical factories, oil refineries, nuclear reactors, water treatment plants, toxic dumps, and so forth, thereby causing countless fatalities. These options can be calibrated, thus lending credibility to US deterrence even in cases of only relatively minor attacks. With nuclear devices, however, even if only a single small-yield device is fired, it crosses an apocalyptic threshold making it extremely difficult for any US president – be he a George W. Bush or a Barack Obama – to credibly deter anything but a genocidal attack on the US by brandishing the threat of atomic revenge.

Disarm Adv – A2 Deter Large Armies

**Conventional precision strikes are more effective.**

Dujarric 2010

Robert, runs the Institute of Contemporary Asian Studies, The Obama bid to rid the world of nuclear weapons boosts US security -- minus the threat of Armageddon, http://www.csmonitor.com/Commentary/Opinion/2010/0304/The-Obama-bid-to-rid-the-world-of-nuclear-weapons-boosts-US-security-minus-the-threat-of-Armageddon

2. **If there was a large army in the field that posed a huge threat.**  In the case of a Soviet invasion of Europe during the cold war, for example, the US Army and Air Force might have launched small (tactical) atomic warheads to annihilate the Red Army’s hordes. Today, though, sensors and guided munitions make it possible to stop the enemy and minimize collateral damage, a vital goal if – as in Europe then and possibly in Korea or Taiwan in the future – invaders cross into friendly territory. An additional problem with the tactical nuclear option is the risk of uncontrollable escalation into Armageddon, which is not a far-fetched end once nuclear warfare is opened. What sane US president would want to face that?

Disarm Adv – A2 Bunker Busters Good

Nuclear bunkerbusters are counterproductive at decapitating leadership.

Dujarric 2010

Robert, runs the Institute of Contemporary Asian Studies, The Obama bid to rid the world of nuclear weapons boosts US security -- minus the threat of Armageddon, http://www.csmonitor.com/Commentary/Opinion/2010/0304/The-Obama-bid-to-rid-the-world-of-nuclear-weapons-boosts-US-security-minus-the-threat-of-Armageddon

If there became a pressing need to obliterate deeply buried and armored targets such as the enemy’s leadership’s bunkers and facilities manufacturing or developing weapons of mass destruction and other high-value items. Using atomic devices to achieve these goals is fraught with dangers. Leadership decapitation – as was attempted with conventional means against Saddam Hussein – often postulates the autocrats will be replaced by statesmen, enjoying popular support, willing to make peace with America. Starting this process with a nuclear strike is not the best way to generate a wave of pro-American sentiment. As for wiping out WMD sites, the same issues may apply, as well as the risk of nuclear contamination.

Conventional alternatives are coming online now and are superior.

Dujarric 2010

Robert, runs the Institute of Contemporary Asian Studies, The Obama bid to rid the world of nuclear weapons boosts US security -- minus the threat of Armageddon, http://www.csmonitor.com/Commentary/Opinion/2010/0304/The-Obama-bid-to-rid-the-world-of-nuclear-weapons-boosts-US-security-minus-the-threat-of-Armageddon

Fortunately for the US, work on advanced nonnuclear penetrators is proceeding apace. While the details are classified, it is clear that the combination of weaponry with higher precision, greater penetration capability, and more potent explosives is moving quickly.

Disarm Adv – American Leadership !

American hegemony prevents great power conflict.

Kagan 2007

Robert, End of Dreams, Return of History, Hoover Institute, http://www.hoover.org/publications/policy-review/article/6136

The current order, of course, is not only far from perfect but also offers no guarantee against major conflict among the world ’s great powers. Even under the umbrella of unipolarity, regional conflicts involving the large powers may erupt. War could erupt between China and Taiwan and draw in both the United States and Japan. War could erupt between Russia and Georgia, forcing the United States and its European allies to decide whether to intervene or suffer the consequences of a Russian victory. Conflict between India and Pakistan remains possible, as does conflict between Iran and Israel or other Middle Eastern states. These, too, could draw in other great powers, including the United States. Such conflicts may be unavoidable no matter what policies the United States pursues. But they are more likely to erupt if the United States weakens or withdraws from its positions of regional dominance. This is especially true in East Asia, where most nations agree that a reliable American power has a stabilizing and pacific effect on the region. That is certainly the view of most of China ’s neighbors. But even China, which seeks gradually to supplant the United States as the dominant power in the region, faces the dilemma that an American withdrawal could unleash an ambitious, independent, nationalist Japan.

Solvency – Timeframe

Full scale development is feasible in ten years.

Flora 2002

Michael, President and CEO of the Ben Gordon Center, Project Orion: Its Life, Death, and Possible Rebirth, http://www.astronautix.com/articles/probirth.htm

Although the Saturn V no longer exists, U.S. engineers are currently studying several heavy-lift systems. Given the recent reduction in world tensions, even the Russian Energia could be considered. Russian nuclear scientists, unemployed after the Cold War, might collaborate with Americans on nuclear-pulse space projects. Fast flights to the planets might be made in ten years or less, at reasonable expense, instead of thirty to fifty years.

Solvency – => Space Age

NPP results in space colonization.

**Smith** 200**3**

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, The Case for Orion, March 12th http://www.spacedaily.com/news/nuclearspace-03h.html

Why worry about bold new tasks when life in the west is relatively comfortable and so many problems exist down here which need solving? What Orion can do is put unimaginably massive payloads into space at low cost. **Something we no longer dream about or seem to desire.** Unparalleled access to space means we can lift the industrial infrastructure necessary to start using natural space resources for the first time. We could then mine asteroids and build fleets of Orions off Earth where environmental impact studies would be of no concern. The last frontier is after all an endless ocean of positive particulate radiation. Like the Starship Enterprise we would never in all likelyhood try to land Orions on Earth. They would act as interplanetary ferries. We would still need to develop a reusable launch vehicle but it would only need enough fuel to reach orbit. Our newly aquired mining, construction and fuel processing industries in space would ensure that abundant fuel stops in the form of space stations would exist for return journeys. One Orion launch might be all thats necessary to kick off a new age of space exploration.

Solvency – US Leadership K

**American leadership is key coordination and development.**

Stone 2011

Christopher, space policy analyst and strategist who lives near Washington DC, American leadership in space: leadership through capability, The Space Review, http://www.thespacereview.com/article/1797/1

If America wants to retain its true leadership in space, it must approach its space programs as the advancement of its national “security, prestige and wealth” by maintaining its edge in spaceflight capabilities and use those demonstrated talents to advance international prestige and influence in the space community. These energies and influence can be channeled to create the international space coalitions of the future that many desire and benefit mankind as well as America. Leadership will require sound, long-range exploration strategies with national and international political will behind it. American leadership in space is not a choice. It is a requirement if we are to truly lead the world into space with programs and objectives “worthy of a great nation”.

Solvency – A2 But Wont That Melt The Ship?

Pulsed technology precludes high temperatures.

Dinkin 2005

Sam, columnist at the Space Review, Revisiting Project Orion, the Space Review, January 24th, <http://www.thespacereview.com/article/309/1>

Bush has got NERVA, but is that enough? Internal combustion nuclear engines have an inherent limit. If the exhaust is too hot, it melts the rocket nozzles. This is an inherent limit in all non-pulsed designs. By using external combustion, fantastic temperatures hotter than the surface of the sun can be achieved, yet the plasma will cool sufficiently as it expands so as not to melt the pusher plate of the Orion.

Solvency – A2 But Wont That Melt The Ship?

Graphite coating prevents overheating.

Smith 2003

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, The Case for Orion, March 12th http://www.spacedaily.com/news/nuclearspace-03h.html

Evidence of this obtained from nuclear tests was the foundation for further research into the feasibility of a pusher plate. It was discovered that ablation (erosion) of the surface of a pusher plate could also be reduced by coating it with graphite. Coating the launch pad in similar fashion would minimise ablation of the surface and therefore create very little fallout indeed. Airbursts are relatively clean from a fallout point of view.

Solvency – A2 Killing People Immoral

NPP will kill substantially less people than existing transportation technology – get over it

Dinkin 2005

Sam, columnist at the Space Review, Revisiting Project Orion, the Space Review, January 24th, <http://www.thespacereview.com/article/309/1>

Orion’s fantastic engineering is not good enough if the rocket kills people. Freeman Dyson, one of the great contributors to Orion, feels that he was decisive in getting the Orion project nixed in the 1963 Partial Test Ban Treaty. He was making the decision based on the fallout. He calculated that there would be enough fallout to kill one to ten people globally with each launch. The morality of this is too simplistic: It kills people so let’s not do it. That would rule out just about every human transportation type. How can we balance the books? If something is worth a lot, then it is worth doing even if it kills people. We agree to a steady flux of deaths from the particulates and radiation released by coal-fired power plants because we want our homes heated and our refrigerators to run. One rough estimate is [100,000 deaths a year from coal-fired power plants](http://chem.lapeer.org/Chem1Docs/NuclearArticle.html). Suppose we simultaneously enact a policy to cut [the coal contribution to global radiation](http://solstice.crest.org/repp_pubs/articles/envImp/05radiation.htm) by more than we added radiation to the atmosphere with the Orion launches (for example, by taxing Orion launches and using the money to buy coal emission permits)? Well, we would be saving lives on balance. The absolute moralist nevertheless would say, “No! Just save the lives and forget the Orion launch.”

Solvency – A2 Private Actor CP

**Private actors will be jailed if they try to make the nuclear technology required.**

Smith 2002

Wayne, Founder of the Pro-Nuclear Space Movement & consultant for the Nuclear Space Technology Institute, Why Build Orion, <http://www.angelfire.com/stars2/projectorion/build.html>

Of course, **the** real **question** is, **do we launch it**? Obviously we can't do that just yet. Laws relating to the ownership of fission and fusion devices are strict to say the very least and the penalties for violating these regulations extremely harsh. **Just ask Saddam Hussein**, **who was only suspected of aquiring such technology**. Peaceful intentions or no we aren't going to get our hands on either enriched Uranium or Plutonium very easily, so an immediate launch is rather unlikely. The good news is that this saves us a lot of money. Specially designed pulse units(**nuclear bombs**) **are** by far the most complex items **necessary for a completed Orion**. Many hundreds if not **thousands of them would be needed for an interplanetary mission**. **By drawing a line through all the expenses involved with their development and purchase**, **not only do we** deftly **avoid the political obstacles** facing us, **we reduce the overall costings by atleast half**. **No need to hire a nuclear weapons manufacturer for** a **new** line of specialised **thermonuclear bombs** with all the red tape that would entail. Matters are simplified enormously. The ship itself is purely straightforward hands on engineering.

Disad Ans – A2 Spending

**NPP is the most cost effective space fuel.**

Flora 2002

Michael, President and CEO of the Ben Gordon Center, Project Orion: Its Life, Death, and Possible Rebirth, http://www.astronautix.com/articles/probirth.htm

Does it make any sense to even think of reviving the nuclear-pulse concept? Economically the answer is yes. Pedersen (55) says that 10,000-ton spaceships with 10,000-ton payloads are feasible. Spaceships like this could be relatively cheap compared to Shuttle-like vehicles due to their heavyweight construction. One tends to think of shipyards with heavy plates being lowered into place by cranes. How much would the pulse units cost? Pedersen gives the amazingly low figure of $10,000 to $40,000 per unit for the early Martin design (56); there is reason to think that $1 million is an upper limit (57). Primarily from strength of materials considerations, Dyson (58) argues that 30 meters/second (about 100 feet/second) is the maximum velocity increment that could be obtained from a single pulse. Given that low-altitude orbital velocity is about 26,000 feet/second, around 350 pulses would be required (59). Using $500,000 as a reasonable pulse-unit cost, this implies a "fuel cost" of $175 million, cheaper than a Shuttle launch. Whereas the Shuttle might carry thirty tons of payload, the pulse vehicle would carry thousands. If one uses the extreme example of spending $5 billion to build a vehicle to lift 10,000 tons (or 20 million pounds) to orbit, the cost if spread over a single flight is $250 per pound, far cheaper than the accepted figure of $5,000 to $6,000 per pound for a Shuttle flight. Efficiency improvements could be made by improving the design of the pulse units. Considerable progress has been made in nuclear bomb design over the past thirty years. Neutron bombs, for instance, demonstrate that it is possible to change the form of the energy emitted by the explosion. Recent work on X-ray lasers bears on the important problem of shaping the explosion into a beam. Yet it is impossible to prevent the formation of radioactive fission fragments. For a ground launch, choosing a very remote site such as a floating platform in the extreme southern Atlantic or Pacific would minimize the radiation hazard to humans. The chemical-rocket imperative to launch as close to the equator as possible disappears when such an abundance of energy is available. Even this might be judged environmentally unacceptable, though; perhaps ANY release of radiation into the atmosphere is wrong. In this case the option of a space launch remains open. Even this has been criticized on the grounds that it would leave a radioactive debris trail in space. However, interplanetary space is a very dangerous environment to begin with, being periodically saturated with fast charged particles from solar flares and with extremely energetic cosmic rays occasionally blasting through. The notion that the bomb debris would form a trail is challenged by the fact that the velocity of most of the debris would exceed solar escape velocity (60).

Disad Ans – A2 Violates I-Law

NPP will not cost the United States diplomatically, even if it results in withdraw from the test-ban treaty.

**Schweitzer** 200**9**

Curtis, Writer, Composer & Political Researcher, Resurrecting Orion, April 27th, http://curtisschweitzer.net/blog/?p=2546

If amending the treaty proves to be an nonviable option in readying the world for Orion, the United States and any partner nations in a potential Orion project should withdraw or threaten to withdraw from the test-ban treaty until it is either amended or they are given the world community’s blessing to launch an Orion spacecraft. Though it functions with an extremely useful purpose, in the aftermath of the Cold War, the test-ban treaty has become outmoded, and is causing more problems than it solves. Weaponized nuclear detonations for military purposes have long been banned, and should continue to be so. However, launching a city into orbit is clearly worth the risks imposed by atmospheric detonation, but diplomatically, there should be no need to worry about international backlash or protest for a project so obviously peaceful and beneficial to mankind.

Plan results in treaty renegotiations that solve.

USAF 1996

US Air Force, COL (Sel) John M. Urias, Iole M. DeAngelis, Maj Donald A. Ahern, Maj Jack S. Caszatt, Maj George W Fenimore III, Michael J. Wadzinski, October 1996, "A Research Paper Presented to Air Force 2025," csat.au.af.mil/2025/volume3/vol3ch16.pdf

As the planetary defense problem becomes better understood and accepted within the global community, and as potential solutions, including a PDS, are developed, it will likely become necessary to selectively renegotiate existing treaties that currently prohibit testing and using weapons in space. Perhaps a treaty specifically tailored to the evolutionary development of a planetary defense system as well as its use during an ECO threat crisis will be needed. Regardless of the outcome, however, it is safe to say that the use of weapons in space, especially WMD, will remain highly restricted.

Critique Ans – A2 Leadership => Nationalism

American space leadership has empirically avoided the nationalistic tendencies of other leadership efforts.

Friedman 2011

Lou, Director of the Society's LightSail Program and remains involved in space programs and policy, American Leadership, http://www.thespacereview.com/article/1778/1

“American Leadership” is a phrase we hear bandied about a lot in political circles in the United States, as well as in many space policy discussions. It has many different meanings, most derived from cultural or political biases, some of them contradictory. The term sometimes arouses antipathy from non-Americans and from advocates of international cooperation. They may find it synonymous with American hubris or hegemony. It is true that American leadership can be used as a nationalistic call to advance American interests at the expense of non-American interests. But more often it may be used as an international call for promoting mutual interests and cooperation. That is certainly true in space, as demonstrated by the International Space Station, Cassini-Huygens, the James Webb Space Telescope, the Europa Jupiter System Mission, Mars 2016/2018 and Earth observing satellites.

Egypt Protesters proves even if the world remains wary; ultimately most want American leadership.

Friedman 2011

Lou, Director of the Society's LightSail Program and remains involved in space programs and policy, American Leadership, http://www.thespacereview.com/article/1778/1

On a bigger stage I was struck by the demands of the Egyptian protesters over the past few weeks for American leadership and engagement in reforming their country, while at the same time strongly resenting any American interference in their country. This demand for American leadership and opposition to American hegemony may seem inconsistent. It is not: it only emphasizes the need to recognize the difference and use leadership for cooperation and engagement. If we Americans do this in the space program, we will accomplish more in our many Earth, space science, and exploration projects, and we will raise higher the importance of the space program on the national and international political agenda.

Topicality Ans – Development

**Propulsion technologies like nuclear pulse are space development.**

Pericles 2002

Pericles 2.0, blogger at Slagheap, “Looking Down the Road,” 10/2/02) <http://slagheap.blogspot.com/2002/10/looking-down-road.html>

I emailed [Elon Musk](http://www.spacex.com/" \t "_blank) a couple of days ago regarding ways that he could better invest his money than in attempting to build a converted Russian ICBM ELV from scratch -- recommending that he fund [XCOR's Xerus spaceplane](http://www.xcor.com/), finish the 3/4 completed [Kistler K-1](http://www.kistleraerospace.com/" \t "_blank) two-stage RLV, or even re-start the Roton project. The XCOR engineers, most (all?) of whom were Rotary Rocket engineers before Hudson, facing low funding, laid off the engines development team, would likely be thrilled to have the opportunity to re-start the Roton. I don't expect he'll listen to a complete stranger, but I figured, hey, it's worth a try. He's wealthy enough that he could potentially do a lot of good for the space movement, and I really don't want to see another [Beal Aerospace](http://www.bealaerospace.com/) fiasco.  Writing the email got me thinking: what are the best and worst case scenarios for space development over the next decade or so? I realized that there could either be a lot of substantial progress towards opening the frontier, or a lot of frustrating stagnation. There's several crucial items that I can count off the top of my head: the Xerus spaceplane, the [Bigelow orbital hotel](http://www.bigelowaerospace.com/), NASA's NExT plans for an L1 space station and nuclear propulsion initiative for deep space and Mars missions, building the ISS beyond the more-or-less worthless "core complete," the X-Prize, and, of course, the omnipresent challenge of a cheap RLV (SSTO or otherwise). Things like carbon nanotube space elevators are off by more than a decade, even given full funding, I think.  The Xerus spaceplane is, in my opinion, an essential first step towards the realization of space tourism. It is inexpensive enough (estimated cost is something like $10M) to make it plausibly fundable by private sources and "angel" investors, and would serve as the final proof-positive for a space tourism market. It is also important in that if its builders, XCOR Aerospace, have a successful business, that gives them leverage to build an orbital RLV -- whether that's something like the Roton (XCOR recently purchased the rights to use the technology developed at Rotary Rocket), or an orbital evolution of a suborbital rocketplane. Alternately, an [X-Prize](http://www.xprize.org/) vehicle could occupy the same niche as Xerus, although the chronically underfunded contestants have a widely varying degree of credibility. (One of the most credible, primarily because it is fully funded and has already done a manned test flight, is [Armadillo Aerospace](http://www.armadilloaerospace.com/), which is headed up and funded by John Carmack (the id Software guy).) Bigelow's space hotel is important because it gives a cheap RLV a reason for existing -- to bring up the cargo required for such a facility, and to taxi people back and forth. So, that being said, if all goes well, and it almost certainly will not, but if it did, at the end of the decade, we could have:  A space hotel (or more than one) in LEO, serviced by an inexpensive RLV. A research outpost in the form of a completed ISS. A fledgling space station at L1, which would serve as a convenient jumping-off point for Mars or Moon trips. Efficient nuclear propulsion (I assume the initiative in NASA is more NERVA than ORION, although George Dyson said that NASA was very interested in the results of his research into the ORION program -- apparently he'd had more luck digging up stuff than they had! � so we may end up seeing nuclear pulse propulsion as well) that would make interplanetary travel easy (relatively speaking) and quick. Coupled with these things is the realization that if we had routine civilian access to LEO and an L1 gateway station, a great many other things become feasible � such as, for example, the long-delayed but much-talked-about SPS, or civilian missions to the Moon, and even the start of a commercial Moonbase, [Artemis](http://www.asi.org/) style.

Topicality Ans – Development

Mook 2010

William Mook, CEO at Mok Industries LLC, Speaker at National Space Society, CEO at Mok Energy Corporation, “Space,” 4/15/10, <http://www.scribd.com/doc/29940862/Space>

The cost of space travel is a function of the cost of momentum. The cost of momentum is an exponential function of rocket exhaust speed which is the square root of rocket chamber temperature. Larger systems also have lower speciﬁc cost of momentum. Since the surface of the Earth is in ﬁxed relation to other surfaces in the solar system, the order of space development is well deﬁned in terms of momentum. Since all points on the surface of the Earth is at the same potential energy relative to the rest of the cosmos, space faring capabilities are available equally to all points on Earth and to all people residing on Earth. So, space technology transcends Earth and unites Earth. From 1950 through 1964 the USA invested heavily in the development of larger and hotter rockets. From 1950 through 1964 the cost of momentum dropped steadily. As these costs dropped, the USA achieved the following milestones in space development; (1) Small sub-orbital payloads - small one and two stage chemical rockets - IRBMS ICBMS - global thermonuclear war - world peace. (1950) (2) Moderate orbiting payloads - moderate three and four stage chemical rockets communications satellites, navigation satellites, weather satellites, spy satellites, interplanetary ﬂyby - global communications - internet, Gaia hypothesis. (1960) - world communications After 1964 major investments stopped, along with the growth of NASA's budget, but the Apollo program was permitted to continue until the lunar landing was achieved. The major casualty in 1964 was NERVA - NASA's nuclear thermal rocket and NOVA - the follow-on rocket after the Saturn rocket. (3) Large cislunar payloads - large ﬁve and six stage chemical rockets - Apollo, Skylab lunar landing - photo of Earth from moon - Environmental movement - 'ﬂag of Earth' the Earth as a single place with common problems and goals. Also, insights of lunar explorers lead to new movements like IONS - founded by Edgar Mitchell. (1970) world perspective. After 1969 NASA's budget was further reduced and ﬂights to the moon ended, while large rocket construction ceased in the USA. The reduction in cost of momentum ceased. Had investments in space faring technology continued apace after 1963 the USA would likely have continued to investment into Nuclear Pulse rockets. This would have led to a fourth step in our development of interplanetary space; (4) Very large interplanetary payloads - a very very large chemical booster combined with a very large nuclear propelled upper stage of immense capability and performance. With this technology we establish cities on the moon and mars, orbit solar power   satellites and space colonies, and capture asteroids return them to Earth orbit and process them into useful products for use in space an on Earth at lower cost than processing the same materials from Earth on Earth. (1980) - world plenty. ADDITIONAL NOTES ABOUT 1980 STEP 4: Limits to Growth appeared in 1972 in response to viewing the world as a single limited system. The ability to capture energy and resources off-world at costs lower than extracting them from the surface of the Earth itself eliminates this limit while freeing our ecology of industry which moves off-world, resolving many of the problems created by the development of space faring technology up to this point. Gerard O'Neill's space colonies (1969), Buckminster Fuller's Cloud Nine ﬂoating cities (1963), Peter Glaser's power satellites (1968) all require large material resources on orbit, and heavy lifting across the solar system. Ted Taylor's then classiﬁed nuclear pulse rocket (1958) would have met the lifting needs of these visionary plans and Paul Sandorf's nuclear deﬂection procedures (1967) would have met the material needs as well - retrieving rich materials from around the solar system and delivering them to Earth at less cost than extracting them from Earth in the ﬁrst place. Also, the 65,000 active nuclear weapons of this era, along with the 200,000 stockpiled elements, would have been converted into 20 million nuclear triggers for nuclear pulse units to support and sustain this transformation of human affairs. Instead of threatening nuclear annihilation, this material, which Brookings says cost humanity over $7.5 trillion to accumulate, would instead have immeasurably enrich humanity. It could still do so today. All it takes, as Werner von Braun told JFK, is the will to do it. CONTINUING THE DEVELOPMENT ARC: The USA abandoned fundamental improvements in rocket technology in 1964, and abandoned the moon in 1969, merely ﬂying off the inventory of ﬂight vehicles, until Apollo 13 caused the administration to question doing even that, which led to Skylab until the Shuttle program was underway. Despite this singular lack of advance, we do have technology to further reduce costs below that enjoyed by a mature nuclear pulse technology. As cost of momentum continues to fall, the rate at which materials are retrieved for use on and around Earth increase, displacing Earth based resources with off-world resources, saving the Earth's environment while expanding human wealth. Telerobotics and global communications combine at this stage to allow massive offworld factories and processing to take place without large numbers of people on orbit, while the distribution of ﬁnished goods and materials are energetically favored from orbit.   Even so, the cost of leaving Earth drops as momentum costs are reduced. Going up hill is very costly when compared to coming downhill. The technology is well deﬁned. Arthur Kantrowitz (1972) proposed using intense lasers to propel spacecraft and increase their performance. Leik Myrabo (1976) and Jordin Kare (1978) developed practical ﬂight systems. Major investment in high efﬁciency free electron lasers, and holographic beam steering techniques (used in part to deliver industrial energy cheaply from space to Earth) along with the development of Micro Electro Mechanical Systems (MEMS) rockets bring about further development of rocket technology further reducing its cost radically while increasing reliability and safety. As the cost of solar pumped laser photons fall costs fall for both energy and transport. At this time further reductions allow the development of privately owned space vehicles - the development of which would mirror the same arc of high priced rockets forty years earlier; THE DEVELOPMENT ARC THAT NEVER WAS BUT SHOULD HAVE BEEN: 1990 - 2010 (5) privately owned small suborbital rockets - MEMS based laser powered rockets illuminated by solar pumped lasers from space - fully automated using GPS technology and advanced computing to provide transport from any point to any other point in less than 40 minutes. (Anywhere in North America in 10 minutes) - not only replacing roads and personal automobiles, but also smaller systems providing totally autonomous package delivery. A deli in New York delivers a meal anywhere in the world for pennies. (1990) Global Village (6) privately owned moderately sized orbital rockets - expanded capabilities give people the ability to travel and stay on orbit. Combined with massive off world industry - based on captive asteroids and tele-robotic labor made possible by advanced global communications - give rise to O'Neill style space colonies - but at this point- privately owned. (2000) Diaspora (7) privately owned large interplanetary rockets -moving power satellites closer to the sun, expanding the diameter of the laser emitters, and beaming terawatts safely and reliably around the solar system using advanced dynamic holography, we use LASER LIGHT SAILS to move privately owned space colonies out of their orbits around Earth and across the solar system (2010) At this point we have the beginnings of a technology that can move us from star to star Robert Forward (1983) Laser Light Sail What can we do today?   (1) Change the way we contain missile proliferation (2) Allow ownership and development of off world resources (3) Open the classiﬁed technical libraries of NASA and USAF and NSA (4) Establish clear cost reduction goals propulsion systems - while increasing their size capability reliability and ease of use; (5) Transfer this technology to the private sector for commercial application CHEMICAL ROCKET TECHNOLOGY (a) unpiloted two stage to orbit fully reusable RLV - 20 tons payload (b) unpiloted two stage to orbit fully reusable RLV - 200 tons payload (c) piloted stages for each (d) programs for each (i) global wireless hotspot (primary revenue generator) \* basic services \*\* banking and mediation services \*\*\* telepresence & telerobotics (ii) return to the moon (including tourism) (iii) ﬂight to Mars (including tourism) (iv) interplanetary internet (unpiloted outposts accessed by all) Since charging a nominal fee for communications allow the satellite network to make more money than all the space programs in the world combined, at this point we are free of the largesse of the Federal government and ask only that we not be taxed for a generation or two as we continue developing this frontier for the beneﬁt of all. Once the space program is in a revenue positive mode, we can enlarge our sights and take on bigger problems; NUCLEAR PULSE TECHNOLOGY (d) create enhanced nonproliferation treaty (e) take possession of all nuclear materials and nuclear programs (f) convert all nuclear materials to nuclear pulse triggers (g) develop advanced nuclear pulse propulsion (h) build a ﬂeet of nuclear rockets and carry out a piloted grand tour (i) identify the richest asteroids in the solar system (j) use nuclear rockets to retrieve the richest asteroids, to LEO (k) use nuclear rockets to lift large industrial components to LEO (l) build even larger infrastructure (i) space colonies \* orbiting factories \*\* orbiting farms \*\*\* orbiting forests \*\*\*\* orbiting residences (ii) power satellites \* maser   \*\* laser Once we rid the world of nuclear weapons and have major off-world assets and a ﬂow of low-cost materials returning to Earth, we shut down major sources of pollution on Earth, while providing massive increases in the living standards of all. People live anywhere and work anywhere else telerobotically. People are paid for their work, and buy things over the internet. These things are then delivered directly to where they live from orbit at less cost than making and delivering them on Earth - with far less environmental impact. This expands the revenue of off-world activities, and the amounts of money available for rocketry R&D. LASER PROPULSION (m) ballistic package delivery (n) ballistic personal orbital spaceship (o) space home (p) sun orbiting power satellite (q) laser light sail (r) mobile space home This could all be done by 2040 if begun today, and need cost us nothing. Ten million millionaires in the world today control $40 trillion of the world's $58 trillion in liquid assets. All we need do is make it reasonable for them to make use of advanced technologies we already have in place to radically improve life on Earth. All we need do is set the stage, and open to the resources of our frontier and make practical use of these resources to make life better for all. This has always been the role of the frontier - and this is how we do it.

\*\*Neg\*\*

Advantage Frontline – Planetary Defense

Nuclear solutions to NEOs are the worst option – results in asteroid reformation.

O’Neill 2010

Ian, PhD Solar Physics @ University of Wales - Space Producer for Discovery News , Mar 21, 2010, “ANOTHER GOOD REASON NOT TO SHOOT NUKES AT ASTEROIDS,” http://news.discovery.com/space/another-good-reason-not-to-shoot-nukes-at-asteroids.html

Don Korycansky of the University of California, Santa Cruz, and Catherine Plesko of the Los Alamos National Laboratory in New Mexico have simulated the nuke versus asteroid scenario and demonstrated that if the explosion of an interceptor nuke was too small, the asteroid will reform under its mutual gravity much faster than expected. (This is assuming the asteroid was made of rock, acting like a "rubble pile" rather than a solid lump of iron ore. It's debatable whether any explosion could do anything about an asteroid that's mainly metal, apart from heating it up a little.) Trying to destroy asteroids with nuclear explosions is a risky business at the best of times, but this research has found that a 1 kilometer-wide asteroid could reassemble itself in a matter of hours. "The high-speed stuff goes away but the low-speed stuff reassembles [in] 2 to 18 hours," said Korycansky at the meeting.

Advantage Frontline – Planetary Defense

Nuclear NEO interceptors are ineffective and result in additional fallout.

**O’Neill** 200**8**

Ian, PhD Solar Physics @ University of Wales - Space Producer for Discovery News, Nov. 27, 2008, “ Apollo Astronaut Highlights Threat of Asteroid Impact,” <http://www.astroengine.com/2008/11/apollo-astronaut-highlights-threat-of-asteroid-strike/>

Unfortunately, the commonly held opinion is to dispense an incoming asteroid or comet with a few carefully placed atomic bombs (by a generic crew of Hollywood oil drillers). Alas, Armageddon this ain’t. Even if we were able to get a bomb onto the surface of an incoming object, there is little hope of it doing any good (whether we get Bruce Willis to drop it off or launch it ICBM style… or would that be IPBM, as in Interplanetary Ballistic Missile?). What if we are dealing with a near-Earth asteroid composed mainly of metal? A nuclear blast might just turn it into a hot radioactive lump of metal. What if the comet is simply a collection of loosely bound pieces of rock? The force of the blast will probably be absorbed as if nothing happened. In most cases, and if we are faced with an asteroid measuring 10 km across (i.e. a dinosaur killer), it would be like throwing an egg at a speeding train and expecting it to be derailed. There are of course a few situations where a nuclear missile might work too well; blowing the object up into thousands of chunks. But in this case it would be like making the choice between being shot by a single bullet or a shot gun; it’s bad if you have one impact with a single lump of rock, but it might be worse if thousands of smaller pieces make their own smaller impacts all over the planet. If you ever wondered what it might be like to be sandblasted from space, this might be the way to find out! There may be a few situations where nuclear missiles are successful, but their use would be limited.

Advantage Ext – a2 Radiation Not That Bad

Any risk of radiation poisoning means you vote neg – There are no doses that are safe.

Vines and Petty 2005

Vanee, Megan, “Health Risks from Exposure to Low Levels of Ionizing Radiation”, National Research Council, June 29, http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11340

A preponderance of scientific evidence shows that even low doses of ionizing radiation, such as gamma rays and X-rays, are likely to pose some risk of adverse health effects, says a new report from the National Academies' National Research Council. The report's focus is low-dose, low-LET -- "linear energy transfer" -- ionizing radiation that is energetic enough to break biomolecular bonds. In living organisms, such radiation can cause DNA damage that eventually leads to cancers. However, more research is needed to determine whether low doses of radiation may also cause other health problems, such as heart disease and stroke, which are now seen with high doses of low-LET radiation. The study committee defined low doses as those ranging from nearly zero to about 100 millisievert (mSv) -- units that measure radiation energy deposited in living tissue. The radiation dose from a chest X-ray is about 0.1 mSv. In the United States, people are exposed on average to about 3 mSv of natural "background" radiation annually. The committee's report develops the most up-to-date and comprehensive risk estimates for cancer and other health effects from exposure to low-level ionizing radiation. In general, the report supports previously reported risk estimates for solid cancer and leukemia, but the availability of new and more extensive data have strengthened confidence in these estimates. Specifically, the committee's thorough review of available biological and biophysical data supports a "linear, no-threshold" (LNT) risk model, which says that the smallest dose of low-level ionizing radiation has the potential to cause an increase in health risks to humans. In the past, some researchers have argued that the LNT model exaggerates adverse health effects, while others have said that it underestimates the harm. The preponderance of evidence supports the LNT model, this new report says. "The scientific research base shows that there is no threshold of exposure below which low levels of ionizing radiation can be demonstrated to be harmless or beneficial," said committee chair Richard R. Monson, associate dean for professional education and professor of epidemiology, Harvard School of Public Health, Boston. "The health risks – particularly the development of solid cancers in organs – rise proportionally with exposure. At low doses of radiation, the risk of inducing solid cancers is very small. As the overall lifetime exposure increases, so does the risk." The report is the seventh in a series on the biological effects of ionizing radiation.

Advantage Frontline – Disarm

Nuclear weapons are inevitable due to regional security concerns – U.S. action is irrelovent.

Carpenter 2009

Ted Galen, vice president for defense and foreign-policy studies at the Cato Institute, is the author of eight books on international affairs, Proliferated Nonsense, http://www.nationalinterest.org/Article.aspx?id=21500

All of those countries embarked on nuclear programs because of acute regional and extra-regional security concerns. Israel worries about the huge demographic edge enjoyed by its Islamic neighbors, and the prospect that the Jewish state’s edge in conventional military capabilities will gradually erode. Pakistan worries about the growing economic and military power of its larger neighbor, India. New Delhi, for its part, not only distrusts Pakistan, but frets about China’s geostrategic ambitions. All of those countries regard their nuclear arsenals as their ace in the hole, guaranteeing not only their regional status, but in some cases their very existence. They are highly unlikely to relinquish such a tangible insurance policy in exchange for paper security promises from the United Nations or any other source. The incentives are at least as strong for Iran and North Korea to join the ranks of nuclear-weapons powers. As a Shiite country, Iran is surrounded by hostile Sunni neighbors—as well as its arch-nemesis, Israel. Tehran also has reason to fear the United States. Iranian leaders see how Washington has treated nonnuclear adversaries since the end of the cold war. If the U.S. mugging of Serbia didn’t convey the message sufficiently, Iran had a ringside seat to the ouster of Saddam Hussein’s regime. It was not a manifestation of paranoia for the Iranian leadership to conclude that the only way to prevent Iran becoming the next item on Washington’s regime-change agenda was to develop a nuclear deterrent. North Korea appears to have reached a similar conclusion.

Advantage Frontline – Disarm

**Nuclear weapons are good – They promote collective survival by uniting the world under one possible universal fate.**

Lifton 1985

Robert Jay, Toward a Nuclear-age Ethos, Bulletin of Atomic Scientists, August

We either survive or die as a species. **Nuclear weapons create a universally shared fate – a technologically imposed unity of all humankind**. The message of this shared fate, from any American to a Soviet counterpart, is simple and primal: If I die, you die; if you survive, I survive. The **principle of shared fate applies to nations no less than to individuals**. The United States and the Soviet Union are simultaneously terrorists and hostages. As in the case of a airplane hijacked in flight, the terrorist’s use of his own weaponry will kill him as certainly as it will his hostages. **This shared fate highlights as nothing else does the pragmatic dimension of nuclear-weapons issues and** of **survival** itself. At the same time it can throw us back on not just individual but collective humanity, on an evolving ethic of mutual responsibility, again as both individuals and nations, for shared life. **As pragmatism and moral imagination combine, the United States and the Soviet Union may be able to think less in terms of “the enemy”—the real enemy to both is nuclear extinction – and more in terms of committed partnership in survival**. **Collective human power can bring about change, awareness, and ultimately human survival**.

Advantage Frontline – Disarm

**Conventional deterrence is insufficient to preserve American primacy.**

Beljac 2007

Dr. Marko, PhD from Monash University, The Case for Minimum Nuclear Deterrence, Science and Global Security, http://scisec.net/?p=154

During the Cold War the purpose of nuclear weapons was to provide a shield behind which the US was able to employ conventional firepower during regional conflicts. The proliferation of nuclear weapons, especially in the context of the “revolution in military affairs”, serves to undermine this traditional function of US nuclear weapons. One of the pillars of US strategic primacy has been nuclear weapons. For the elder statesmen a world with no nuclear weapons would be a world where nuclear weapons would not “cramp our style” as Kenneth Waltz, the dean of academic international relations, puts it. This case is flawed because no state that is potentially on the receiving end of US attack would want to voluntarily make itself vulnerable. This is not an inhibiting factor just in the case of regional “rogue states.” The Russians and Chinese greatly fear that “conventional counterforce” could make them more amenable to US coercion. A replay of the Georgian/South Ossetian conflict in a nuclear free world might well have had a different result for Moscow. The potential impact that a nuclear free world would have on Beijing’s ability to unify Taiwan with the homeland might well be no less stark. Moreover, conventional counterforce would surely not be a welcome prospect given increasing concerns about energy security. There is a nexus between the overall nature of the US strategic posture and nuclear weapons that is not addressed in the elite case for nuclear abolition. To the extent that this nexus is unaddressed the case for abolition will remain flawed. None of the former senior state and military officials show any sign of wanting to blunt US conventional military superiority and the forward operational doctrines that under gird this superiority; to the contrary abolition serves to promote such a strategic posture.

Advantage Frontline – Disarm

Nuclear weapons solve wars and are key to strategic deterrence.

Ross 2009

Andrew L., director of the Center for Science, Technology, and Policy and professor of political science at University of New Mexico, http://www.fpri.org/footnotes/1405.200905.ross.nuclearweaponsintlpolitics.html

It has been about deterrence and how we think about deterrence rather than war-fighting. Deterrence became nuclear weapons’ central role. Some, such as Bernard Brodie in 1946, recognized that very early on. Over time, a very high level of strategic interdependence developed among the states that possessed nuclear weapons, at least among those that possessed large quantities of them—the U.S. and USSR were very sensitive to each other’s nuclear moves. Some argue that nuclear weapons are responsible for what historian John Lewis Gaddis called the “long peace” of the Cold War. We have not seen a major power war since August 1945. Gaddis and other analysts argue that this is a direct result of the nuclear revolution. So we have seen a revolution in strategic, not merely military, affairs.

Advantage Ext – Nukes Inev

Even complete U.S. and Russian Disarmament won’t get rid of nuclear weapon use.

Kyl and Perle 2009

Jon, Republican senator from Arizona, and Richard, fellow at the American Enterprise Institute, was assistant secretary of defense in the Reagan administration, Our Decaying Nuclear Deterrent, http://online.wsj.com/article/SB124623202363966157.html

There is a fashionable notion that if only we and the Russians reduced our nuclear forces, other nations would reduce their existing arsenals or abandon plans to acquire nuclear weapons altogether. This idea, an article of faith of the "soft power" approach to halting nuclear proliferation, assumes that the nuclear ambitions of Kim Jong Il or Mahmoud Ahmadinejad would be curtailed or abandoned in response to reductions in the American and Russian deterrent forces -- or that India, Pakistan or China would respond with reductions of their own. This is dangerous, wishful thinking. If we were to approach zero nuclear weapons today, others would almost certainly try even harder to catapult to superpower status by acquiring a bomb or two. A robust American nuclear force is an essential discouragement to nuclear proliferators; a weak or uncertain force just the opposite. George Shultz, William Perry, Henry Kissinger and Sam Nunn have, on this page, endorsed the distant goal -- about which we remain skeptical -- of a nuclear-free world. But none of them argues for getting there by neglecting our present nuclear deterrent. The Perry-Schlesinger Commission has provided a path for protecting that deterrent. Congress and the president should follow it, without delay.

Advantage Ext – A2 Conventional Fillin

Conventional weapons cannot fill in for nuclear primacy.

Schneider 2008

Mark, National Institute for Public Policy, “The Future of the U.S. Nuclear Deterrent,” Comparative Strategy, Volume 27, Issue 4, July 2008, pages 345 - 360

Why can't the United States deter WMD (nuclear, chemical, biological) attack with conventional weapons? The short answer is that conventional weapons can't deter a WMD attack because of their minuscule destructiveness compared with WMD, which are thousands to millions of times as lethal as conventional weapons. Existing WMD can kill millions to hundreds of millions of people in an hour, and there are national leaders who would use them against us if all they had to fear was a conventional response. The threat of nuclear electromagnetic pulse (EMP) attack, as assessed by a Congressional Commission in 2004, is so severe that one or at most a handful of EMP attacks could demolish industrial civilization in the United States. The view that conventional weapons can replace nuclear weapons in deterrence or warfighting against a state using WMD is not technically supportable. Precision-guided conventional weapons are fine substitutes for nonprecision weapons, but they do not remotely possess the lethality of WMD warheads. Moreover, their effectiveness in some cases can be seriously degraded by counter-measures and they clearly are not effective against most hard and deeply buried facilities that are associated with WMD threats and national leadership protection. If deterrence of WMD attack fails, conventional weapons are unlikely to terminate adversary WMD attacks upon us and our allies or to deter escalation.

Disad Links – Space Weapons

Nuclear space technology results in offensive weapons capabilities and there are a number of superior alternatives to stop NEO.

Rowe 2008

Aaron, Nukes Are Not the Best Way to Stop an Asteroid, July 2, http://www.wired.com/wiredscience/2008/07/nukes-are-not-t/

Nuclear weapons could be used to stop earth-bound asteroids, but in most instances, they are not the best option, said Apollo astronaut Rusty Schweickart during a public lecture this Wednesday in San Francisco. The venerable scientist explained that all but the largest heavenly bodies can be redirected by rear-ending or towing them with an unmanned spacecraft. But last year, NASA issued a report stating that using nukes is the best strategy to prevent a catastrophic collision with earth. Although Schweickart has a great deal of faith in the agency, enough to risk his life piloting their lunar lander, he feels that they issued the misleading statement — under immense political pressure. It was a nefarious excuse to put nuclear weapons in space. His own organization, the B612 Foundation, intends to use gentler tactics to alter the course of an asteroid by 2015.

Disad Links – Space Weapons/Impact

**Nuclear technology in space results in weaponization and threatens global survival.**

Gagnon 2003

Bruce K., coordinator of the Global Network Against Weapons & Nuclear Power in Space, “Nuclear Power In Space And The Impact On Earth's Ecosystem,” Space Daily, Jan. 27

The Global Network Against Weapons & Nuclear Power in Space maintains that just like missile defense is a Trojan horse for the Pentagon's real agenda for control and domination of space, NASA's nuclear rocket is a Trojan horse for the militarization of space. NASA's new chief, former Navy Secretary Sean O'Keefe said soon after Bush appointed him to head the space agency that, "I don't think we have a choice, I think it's imperative that we have a more direct association between the Defense Department and NASA. Technology has taken us to a point where you really can't differentiate between that which is purely military in application and those capabilities which are civil and commercial in nature." In the end hundreds and hundreds of billions of dollars will be wasted on plans for the nuclearization and weaponization of space. In order to fund these missions Bush and Congress will have to cut programs like social security, education, health care, child care, public transit and environmental protection. In the name of progress and security the lives of future generations will become more insecure. For the third year in a row the Global Network (GN) will organize two days of protests on February 3-4, 2003 in Albuquerque, N.M. at the 20th Annual Symposium on Space Nuclear Power & Propulsion. This event draws the top players from NASA, DoE, DoD, nuclear academia and nuclear aerospace each year to plan the push of nuclear power into space. Hundreds of middle and high school students are brought to the symposium for indoctrination and the GN has been able to speak to many of these young people at our protests. NASA, DoE, and the Pentagon are not asking the taxpaying public if we want to suffer the risk and costs of nuclear power in space. Their corporate and military interests make it necessary to push ahead without real citizen input. Scientists and technologists are out of control. Their plans now literally threaten the life of the entire planetary ecosystem. The time has come for vigorous global public debate around the space nuclear power issue.

Disad Links – Politics/NASA Funding

Utilizing nuclear technology in space results in accidents and public backlash that will tank NASA.

Gagnon 2003

Bruce K., coordinator of the Global Network Against Weapons & Nuclear Power in Space, “Nuclear Power In Space And The Impact On Earth's Ecosystem,” Space Daily, Jan. 27

Ultimately NASA envisions mining colonies on the Moon, Mars, and asteroids that would be powered by nuclear reactors. All of the above missions would be launched from the Kennedy Space Center in Florida on rockets with a historic 10% failure rate. By dramatically increasing the numbers of nuclear launches NASA also dramatically increases the chances of accident. During the 1950s and 1960s NASA spent over $10 billion to build the nuclear rocket program which was cancelled in the end because of the fear that a launch accident would contaminate major portions of Florida and beyond. NASA's expanded focus on nuclear power in space "is not only dangerous but politically unwise," says Dr. Michio Kaku, professor of nuclear physics at the City University of New York. "The only thing that can kill the U.S. space program is a nuclear disaster. The American people will not tolerate a Chernobyl in the sky." "NASA hasn't learned its lesson from its history involving space nuclear power," says Kaku, "and a hallmark of science is that you learn from previous mistakes. NASA doggedly pursues its fantasy of nuclear power in space." Since the 1960s there have been eight space nuclear power accidents by the U.S. and the former Soviet Union, several of which released deadly plutonium into the Earth's atmosphere. In April, 1964 a U.S. military satellite with 2.1 pounds of plutonium-238 on-board fell back to Earth and burned up as it hit the atmosphere spreading the toxic plutonium globally as dust to be ingested by the people of the planet. In 1997 NASA launched the Cassini space probe carrying 72 pounds of plutonium that fortunately did not experience failure. If it had, hundreds of thousands of people around the world could have been contaminated. Last year the Department of Energy (DoE) and NASA announced that due to plans for more nuclear power in space, present facilities must be expanded to handle the expected growth.

I-Law CP – Facilitates Development

Amending international law helps the development of Nuclear Pulse Propulsion technology.

Schweitzer 2009

Curtis, Writer, Composer & Political Researcher, Resurrecting Orion, April 27th, http://curtisschweitzer.net/blog/?p=2546

Amending the partial test-ban treaty is the most logical first step. The treaty must be re-written to except peaceful nuclear detonations from the ban. The failure to make the distinction between weapons testing and peaceful means (ala [Operation Plowshare](http://en.wikipedia.org/wiki/Operation_Plowshare)) of using nuclear detonations is both irrational and a hindrance to scientific progress. Orion-like usage of nuclear weapons is not without risk, and countries that wish to develop Orion-like programs must be allowed to test in order to fully understand the risks. (It is worth noting that Freeman Dyson’s original studies on nuclear-pulse propulsion predicted some life-threatening dangers, but that further progress on the program promised to reduce these risks significantly). Computer models and modern methods of researching the effects of nuclear blasts can only go so far– if humankind ever wants to move forward on serious intrasolar exploration, at some point, we will need to detonate at least some nuclear devices in order to launch a nuclear-pulse propelled vehicle. Making this a reality first means amending international law to allow it.