## A2: Spending

### Case OW - Funding concerns are irrelevant when survival is on the line.

Tom Jones 2011 planetary scientist, four-time shuttle astronaut, consultant, author, and speaker. His latest book is National Geographic’s Planetology: Unlocking the Secrets of the Solar System “Steps for Planetary Defense” Ad Astra Spring 2011 http://www.space-explorers.org/committees/NEO/Ad\_Astra\_Planetary\_Defense\_Jones.pdf

The White House and Congress will decide this year on whether NASA should receive new funding for planetary defense research. Fiscally, times are tough, but now is the time for policy makers to recognize that planetary defense, human exploration, and scientific understanding of NEOs are synergistic and mutually supportive activities. Pursuing all three areas of NEO activity strengthens NASA’s relevance to society and involves the agency in addressing a fundamental human need – survival.

## A2: Warming OW

### Their warming OW evidence only applies if we know for sure that NEOs won’t hit – we can’t know without detection. The case OW

Lloyd 2010 Robin “Competing Catastrophes - Asteroid Impact or Climate Change?” Scientific American <http://www.scientificamerican.com/article.cfm?id=asteroid-impact-climate-change>

Human risk assessments for asteroid impacts are confusing in part because there has never been an asteroid impact in historic times that has caused even a local disaster (setting aside the 1908 flattening of more than 2,000 square kilometers of sparsely populated taiga near the Tunguska River in Siberia), let alone a global catastrophe. Nevertheless, scientists can estimate the risk and the frequency of such events quite well, Harris says. Here is a rough outline of how it's done, he says: "In round numbers, [this risk] is dominated by very large events that would kill about a billion people, and happen about once in a million years—thus, in round numbers, about 1,000 per year. Present [NEO] surveys have found about 90 percent of that risk, and provided assurance that no such event will happen in the next century or so from the 90 percent we have found. So the leftover short-term risk is around 100 [per] year, as tabulated." Harris says he agrees with much of what Boslough wrote in Appendix D: "It was important as a matter of 'due process,' the scientific endeavor cannot tolerate suppression of dissent. On the other hand, it is also unfortunate because…it has distracted attention from the central messages of the report." The distraction is unfortunate, Boslough says, adding that he only insisted on the minority opinion because it was more important to include the climate change information than to avoid the potential for distraction. The report, which came out in January and with which Boslough otherwise fully agrees, reveals that the scientific inventory of Earth-threatening space objects (asteroids and comets), especially the smaller ones that are most likely to impact our planet, is far from complete and unlikely to improve significantly without a greatly increased funds for NEO search programs. And our preparedness, if scientists found a moderate to large asteroid with our name on it, is weak—it'd take at least a decade to mount a space mission to deflect the object. And that might not be soon enough.

## Leadership Add – on

### Plan Solves US leadership –

Garretson and Kaupa, 8 [ Lieutenant Colonel Garretson is chief, Future Science and Technology Exploration Branch, Headquarters USAF Future Concepts and Transformation, Washington, DC. Major Kaupa, stationed at Edwards AFB, California, is an operational test pilot and test director for the chief of staff of the Air Force’s top-priority acquisition program—the KC-45A, Air & Space Power Journal - Fall 2008, “ Planetary Defense Potential Mitigation Roles of the Department of Defense,” http://www.airpower.maxwell.af.mil/airchronicles/apj/apj08/fal08/garretson.html]

The United States reaps significant economic benefits by providing international security. We have the most to gain by maintaining security and the most to lose if it fails. By visibly pursuing the capability to defend the planet, we make ourselves increasingly essential to international security. Furthermore, we will likely have to pay the bill anyway. The humanitarian crisis that could ensue from an impact with a 300-meter asteroid could easily dwarf the Asian tsunami of 2004. The humanitarian supply, airlift, sealift, and rebuilding costs would be staggering. Economic losses to US investors, huge costs to US insurers, and a possible recession or depression resulting from the loss of a city or nation would likely occur. Despite concerns about the expense of developing such a planetary-defense system, it would translate into a competitive advantage for the United States. Solving difficult problems would create US intellectual capital, industrial capacity, and new technical areas of leadership critical to maintaining our lead in space.

### U.S. space leadership is a pre-condition for global hegemony

Young et. al, 8 [ Mr. A. Thomas Young, Chairman Lieutenant General Edward Anderson, USA (Ret.) Vice Admiral Lyle Bien, USN (Ret.) General Ronald R. Fogleman, USAF (Ret.) Mr. Keith Hall General Lester Lyles, USAF (Ret.) Dr. Hans Mark, “ Leadership, Management, and Organization for National Security Space,” Institute for Defense Analyses, July 2008 <http://www.armyspace.army.mil/ASJ/Images/National_Security_Space_Study_Final_Sept_16.pdf>]

The IAP’s assessment, our findings, and our recommendations for aggressive action are based on the understanding that space-based capabilities are essential elements of the nation’s economic infrastructure and provide critical underpinnings for national security. Space-based capabilities should not be managed as derivative to other missions, or as a diffuse set of loosely related capabilities. Rather, they must be viewed as essential for restoring and preserving the health of our NSS enterprise. NSS requires top leadership focus and sustained attention. The U.S. space sector, in supporting commercial, scientific, and military applications of space, is embedded in our nation’s economy, providing technological leadership and sustainment of the industrial base. To cite one leading example, the Global Positioning System (GPS) is the world standard for precision navigation and timing, directly and indirectly affecting numerous aspects of everyday life. But other capabilities such as weather services; space-based data, telephone and video communications; and television broadcasts have also become common, routine services. The Space Foundation’s 2008 Space Report indicates that the U.S. commercial satellite services and space infrastructure sector is today approximately a $170 billion annual business. Manned space flight and the unmanned exploration of space continue to represent both symbolic and substantive scientific “high ground” for the nation. The nation’s investments in the International Space Station, the Hubble Telescope, and scientific probes such as Pioneer, Voyager, and Spirit maintain and demonstrate our determination and competence to operate in space. They also spark the interest of the technical, engineering, and scientific communities and capture the imaginations of our youth. 3 The national security contributions of space-based capabilities have become increasingly pervasive, sophisticated, and important. Global awareness provided from space—including intelligence on the military capabilities of potential adversaries, intelligence on the proliferation of weapons of mass destruction, and missile warning and defense—enables effective planning for and response to critical national security requirements. The communications bandwidth employed for Operation Iraqi Freedom today is over 100 times the bandwidth employed at the peak of the first Gulf war. Approximately 80 percent of this bandwidth is being provided by commercial satellite capacity. Military capabilities at all levels—strategic, operational, and tactical— increasingly rely upon the availability of space-based capabilities. Over the recent decades, navigation and precision munitions were being developed and refined based on space-based technologies. Space systems, including precision navigation, satellite communications, weather data, signals intelligence, and imagery, have increasingly provided essential support for military operations, including most recently from the very first days of Operation Enduring Freedom in Afghanistan. Similarly, the operational dominance of coalition forces in the initial phase of Operation Iraqi Freedom provided a textbook application of the power of enhancing situational awareness through the use of space-based services such as precision navigation, weather data management, and communications on the battlefield. These capabilities are continuing to provide major force-multipliers for the soldiers, airmen, sailors, and marines performing stabilization, counter-improvised explosive device (IED), counterterrorism, and other irregular warfare missions in Iraq, Afghanistan, and arou nd the world. As the role and importance of space-based capabilities for military operations grows, the users are demanding that they be more highly integrated with land-, sea-, and air-based capabilities. During the first decades of the Cold War, the premier applications of space could be exemplified by the highly specialized systems that enabled exposed photographic film to be parachuted from space, developed and analyzed by intelligence experts, and rushed to the situation room in the White House for strategic purposes. Space-based capabilities were uniquely capable of providing visibility into areas of denied access. Today and in the future, the employment of space-based capabilities will increasingly support military operations. And for all users, the employment of spacebased capabilities will be more accurately exemplified by sophisticated database searches of a range of relevant commercially available and specialized national security digital information, using tools that integrate such information across all sources. For all the reasons cited here—military, intelligence, commercial, scientific— there can be no doubt that continued leadership in space is a vital national interest that merits strong national leadership and careful stewardship.

### Nuclear war

**Khalilzad ’95** (Zalmay, RAND policy analyst, Spring, The Washington Quarterly, Vol. 18, No. 2, “Losing the Moment?”)

Under the third option, the United States would seek to retain global leadership and to preclude the rise of a global rival or a return to multipolarity for the indefinite future. On balance, this is the best long-term guiding principle and vision. Such a vision is desirable not as an end in itself, but because a world in which the United States exercises leadership would have tremendous advantages. First, the global environment would be more open and more receptive to American values -- democracy, free markets, and the rule of law. Second, such a world would have a better chance of dealing cooperatively with the world’s major problems, such as nuclear proliferation, threats of regional hegemony by renegade states, and low-level conflicts. Finally, U.S. leadership would help preclude the rise of another hostile global rival, enabling the United States and the world to avoid another global cold or hot war and all the attendant dangers, including a global nuclear exchange. U.S. leadership would therefore be more conducive to global stability than a bipolar or a multipolar balance of power system.

## Ptx Link Turn

### Link Turn - Asteroid surveys popular – framed as science and discovery

Friedman, 11 [Lou, recently stepped down after 30 years as Executive Director of The Planetary Society. He continues as Director of the Society's LightSail Program and remains involved in space programs and policy. Before co-founding the Society with Carl Sagan and Bruce Murray, Lou was a Navigation and Mission Analysis Engineer and Manager of Advanced Projects at JPL, “ Merging human spaceflight and science at NASA,” <http://www.thespacereview.com/article/1775/1>]

I really liked what NASA Administrator Charlie Bolden had to say about the news last week that the Kepler mission had discovered a plethora of possible planets around other stars. Some of them are candidates for being Earth-like in size, orbit, and maybe even composition. Bolden said, “In one generation we have gone from extraterrestrial planets being a mainstay of science fiction, to the present, where Kepler has helped turn science fiction into today’s reality. These discoveries underscore the importance of NASA’s science missions, which consistently increase understanding of our place in the cosmos.” That last sentence captures the huge dichotomy which is NASA. From its very beginning to the present day, NASA provides important, exciting, and popular new discoveries that increase understanding of our place in the cosmos. As such, it remains a symbol of can-do for America and inspiration for the world. Best of all, NASA substantially increases the body of knowledge so important to educating the public, especially schoolchildren, about our planet and our universe. Unfortunately, there is another side to NASA’s story—the human spaceflight program stuck in Earth orbit, mired in politics, and drifting from proposal to proposal, never alighting on one long enough to have a clear purpose. It doesn’t have to be this way. For years, I, along with others, have been calling for more integration of science and exploration. With some justification, many science advocates fear such a melding, worrying that integration would mean their projects would be eaten up by the larger human spaceflight program. That is a legitimate concern if human spaceflight remains without a science or exploration goal. Instead of human spaceflight swallowing science, I’d like to see the reverse: science swallowing human spaceflight by focusing it on exploration. Make exploration more than the name of a program office. The bollixing up of NASA’s program planning by last year’s Congress and the emphasis on budget cuts by this year’s Congress create a severe challenge for the future of human spaceflight. But that challenge also creates an opportunity. Perhaps now is the time to return to that post-Columbia accident debate about the purpose of human spaceflight, to examine what is worth the high cost and high risk of humans in space. I have no doubt that the answer will remain what it has always been when those debates were held: the exploration of other worlds. Much has been written about shrinking NASA’s Apollo legacy infrastructure. That has proved politically impossible as members protect local interests of NASA centers and industry. But there is a shift now, propelled by reduced spending and pressures for reduced government. One possible result is putting a lid on NASA spending and then pushing the lid down to make everything smaller. That would be too bad: goals, missions, accomplishments, and NASA’s very purpose would all diminish. Instead, perhaps we can think about what the public cares about from the space program: scientific discovery, new achievements, and inspiration. Perhaps we can examine what policy makers really want from our space program when they use that vaunted phrase, “American leadership.” Doing the same things on a reduced budget doesn’t sound like American leadership. Leading other nations in exploration of the universe—and in understanding our own planet and place in the cosmos—does. If we merge human exploration into science, then admittedly we will reduce some near-term human space program expenses. But that is going to happen anyway. NASA is already being pushed to get out of transportation and focus on exploration. We can build a stronger and more purposeful human program by involving human spaceflight in the programs that are making exciting discoveries about other worlds and our own. This huge step involves some huge shifts. The biggest shift is the first one: that of the paradigm. Merging human spaceflight mission development into science planning would create enormous program, institutional, and infrastructure upheavals. We have to start from the top, defining our goals and objectives. The observation, monitoring, and understanding of Earth as a planet is one goal. Another is learning more about near-Earth objects, including the discovery, characterization, and use of NEOs, as well as protecting Earth from them . The exploration and possible settlement of Mars is an obvious third goal, while the fourth is the one that Mr. Bolden mentioned, understanding our place in the cosmos. My successor at The Planetary Society, Bill Nye, sums it up by saying we must “know our place in space.” Those goals all have homes in the Science Mission Directorate. Would we dare put the human mission planning in those homes? Many scientists pooh-pooh human spaceflight, and their response might be to cancel it. But most of the scientists involved in space exploration understand that humans are part of that exploration. Despite the joys of finding extrasolar planets, exploring new canyons and plains on Mars, seeing the edge of the Universe, and learning about our near-Earth environment, it’s my view that NASA is in crisis. Its public image is fuzzy and uncertain, and all the political pressures are negative. But despite that crisis, the agency is strong right now: performing missions brilliantly and advancing science and technology. The time to deal with crisis is when you are strong. Now is the time for some new thinking where human spaceflight fits in NASA’s future.

### Asteroid detection popular – spun as science

Worden, 2000 [ Brigadier General S. Pete Worden, “ NEOS, PLANETARY DEFENSE AND GOVERNMENT - A VIEW FROM THE PENTAGON,” 7 February 2000, <http://abob.libs.uga.edu/bobk/ccc/ce020700.html>]

What then should we do? What role should the US Government, and specifically the US DoD play in what everyone agrees is an international concern? I believe we in the US DoD can and should agree to modify our space surveillance systems to identify and track all potentially threatening NEOs--probably down to about the 100 meter class. In parallel, in situ studies of NEOs using low-cost microsatellite missions should begin immediately. These missions can and should involve NASA, ESA, other European space agencies as well as the US DoD. These missions can use new technology to rendezvous, inspect, sample, and even impact NEOs to study their composition and structure. With an estimated cost of about $10-20M per mission, including data reduction and launch, this is an affordable program. Here is where I would focus the growth of official interest in NEOs as evidenced by the recent UK decision to stand up a formal program. And finally, I would propose focusing on the very small end of NEOs--100 meters diameter or less. At any given time there are probably tens of objects 10 meters or larger in cislunar space. These are easily accessible to the low-cost microsatellite mission. Should we worry now about mitigating the NEO hazard? I would say no, until a bona fide threat emerges. This will avoid much of the political consternation that has arisen in the past from nuclear weapon experts advocating weapons retention and even testing in space. After all, we can't reliably divert an NEO until we know much more about its structure. This we'll get from a decade of dedicated microsatellite missions. Some of these missions may even have as a side experiment moving very small (10-50 meter class) NEOs by impacting them. This could give us much of the necessary experience should a true threat emerge in the near future. Another benefit of a focused international NEO space mission suite is public awareness and enthusiasm. From a scientific standpoint, these are primordial objects--the stuff of which we were made. People throughout the world, as well as the entire scientific community, will truly embrace such an exciting endeavor. Moreover, space visionaries often look to the NEOs as the raw material of eventual space industrialization. We originally chose the title "Clementine" for the 1994 lunar and NEO probe launched by the DoD for this purpose. An old American song about a frontier miner's daughter, Clementine, was the origin of the mission's name. We hoped to evoke not only the spirit of the frontier but also to leverage the appeal that valuable lunar and asteroid mineral resources might have.

### Plan is popular – no solution to NEO strike is politically unpalatable.

Reich, 2010 [ Eugenie covers physics, science policy, and alleged scientific misconduct. She has published a book on scientific fraud and was a Knight Science Journalism Fellow at MIT. Before joining Nature, she was a features editor at New Scientist and a researcher at the BBC. She has a BA in physics and philosophy from the University of Oxford., “ NASA panel weighs asteroid danger,” 8 September 2010 | Nature 467, 140-141 (2010) ]

That will create a new problem: if the pace of NEO detections (see graph) grows but precision tracking of orbits lags behind, observers will start to find more rocks — perhaps a few per year — that seem, at first, to have a significant chance of hitting Earth, say panel members. "I don't think that issue has been understood outside the NEO community," says Lindley Johnson, NEO programme officer at NASA and a member of the panel. Launching missions to track or deflect all potential asteroid threats will be prohibitively expensive, but even a small probability of regional or global devastation may not be politically palatable.One solution from the panel is to increase the amount that the United States invests in NEO detection and tracking from the current $5.5 million a year. The panel may also recommend the launch of a survey telescope into a solar orbit similar to that of Venus. It would orbit faster than Earth and, looking outwards, would see asteroids in Earth-crossing orbits more often than would ground-based instruments (see diagram). This could improve follow-up observations, narrow estimated trajectories and remove as many asteroids as possible from the threat list. It could also spot and track asteroids on the sunward side of Earth, removing a worrisome blind spot in ground-based surveys. "It is a wonderful rapid technique to track bodies down to 140 metres and smaller," says Tom Jones, a former astronaut and panel co-chair.