INHERENCY ANSWERS

The "Inherency Answers" part of this file should be used to answer the 1AC's "Observation I: Inherency" contentions. The Inherency Answers are called a "1NC Inherency Frontline." These pieces of evidence should be read during the 1st Negative Constructive.

1NC INHERENCY FRONTLINE

1. INTERNATIONAL SPACE COOPERATION EXISTS IN THE STATUS QUO – THERE IS NO INHERENT PROBLEM WITH SPACE DEBRIS

Nicholas Johnson, Chief Scientist for Orbital Debris, NASA, 2010

[Orbital Debris: The Growing Threat to Space Operations, p.8]

Although not rising to the status of an international treaty, the UN space debris mitigation guidelines are recommended for implementation via national procedures. For example, the UN guidelines are compatible with the U.S. Orbital Debris Mitigation Standard Practices, which are implemented for government-sponsored space missions through directives of NASA and the Department of Defense and for commercial space operations through the regulations of the Department of Transportation, the Federal Communications Commission, and the Department of Commerce. Several other nations have invoked similar, non-voluntary orbital debris mitigation requirements.

2. THE U.S. AND INDIA SHOULD CREATE A VOLUNTARY CODE OF CONDUCT IN OUTER SPACE. THE U.S. SHOULD NOT DO THE PLAN ALONE

Karl Inderfurth, Prof. GWU, Raja Mohan, Libr of Cong chair in foreign policy, 11.20.11

[www.ft.com/cms/s/0/87161d80-d794-11de-b578-00144feabdc0.html]

Fourth, space governance. The US and India should work to forge a consensus on limiting space debris, improving “space situational awareness” for avoiding hazards, and ensuring unhindered operation of the space assets of all nations. Creating a new voluntary code of conduct in outer space could mark the start of an effort to bring order to the global commons.

HARM ANSWERS

The "Harms Answers" part of this file should be used to answer the 1AC's "Observation II: Harms" contentions. The Harms Answers are called a "1NC Harms Frontline." These pieces of evidence should be read during the 1st Negative Constructive.

1NC HARMS FRONTLINE

1. **SPACE DEBRIS IS NOT A TREAT – IF IT WAS, THE PRIVATE SECTOR WOULD HAVE DEVELOPED A SOLUTION**

Dave Baiocchi, National Defense Research Institute, RAND, 2010

[Confronting Space Debris, RAND Publication, p. 62]

The current lack of private (nongovernment) funding toward debris remedies is particularly telling. Today, the majority ownership of operational space assets (as a percentage of the total operational population) has shifted from government to commercial industry. 2 For this new majority of commercial stakeholders, "the imperative to create shareholder value entails that any investment in a technical system be guided by its value creation potential" (Brathwaite and Saleh, 2009). In other words, if debris was deemed to represent an unacceptable risk to current or future operations, a remedy would already have been developed by the private sector.

2. **KESSLER SYNDROME IS OFTEN EXAGGERATED – THE AFFIRMATIVE'S HARMS ARE UNLIKELY TO OCCUR**

Donald Kessler, Nicholas Johnson, retired senior NASA Scientists, February 6, 2010

[The Kessler Syndrome: Implications to Future Space Operations, American Astronautical Society, Conference, AAS 10-016 p. 2]

A segment of the Japanese animated TV series *Planetes*,2 set in the year 2075, is an example of a popular definition of the Kessler Syndrome that includes both factual and exaggerated com- ponents. While an episode appropriately defines the Kessler Syndrome as the cascading of frag- ments from collisions breaking up other intact objects at an increasing rate, it goes on to say that, once initiated, ".... billions of other pieces [would be generated] in a very short time [and] the Earth would be surrounded by debris .... completely cut off from space." In general, collisional cascading is a slow process, but very much depends on the population density and size of the ob- jects in orbit. Current population densities would require decades to produce a significant change in the small debris environment, and much longer to approach a condition where the Earth might be "completely cut off from space".

1NC HARMS FRONTLINE

3. THE TIMEFRAME FOR THE AFFIRMATIVE IS SLOW – EXPERTS SAY NO IMMEDIATE ACTION IS NECESSARY

Leonard Davis, former editor, Ad Astra and Sapce World Magazine, May 9, 2011
[http://www.space.com/11607-space-junk-rising-orbital-debris-levels-2030.html]

The good news is that no immediate action is necessary in terms of removing debris objects, (Marshall) Kaplan (orbital debris expert at Johns Hopkins University Applied Physics Laboratory) advised, as experts estimate that the situation will not go unstable anytime soon.

SOLVENCY ANSWERS

The "Solvency Answers" part of this file should be used to answer the 1AC's "Observation III: Solvency" contentions. The Solvency Answers are called a "1NC Solvency Frontline." These pieces of evidence should be read during the 1st Negative Constructive. The pieces of evidence marked "Solvency Ext." should be read during the negative block, either in the 2nd Negative Constructive or during the 1st Negative Rebuttal.

1NC SOLVENCY FRONTLINE

1. **DEBRIS REMOVAL SYSTEMS REQUIRE YEARS OF TESTING AND FACE TECHNICAL, ECONOMIC, POLITICAL AND LEGAL BARRIERS**

Megan Ansdell, Space Policy Institute, GWU, Spring 2010

[Journal of Public and International Affairs, Princeton, vol 21, p 15]

There are substantial technical, economic, political, and legal barriers to developing, deploying, and operating active debris removal systems. Many current concepts rely on unproven technology, which means they will require substantial time and money to develop and deploy. The quantity of time and money required will vary with each concept, and detailed estimations are not publicly available because of the nascent state of the field. However, as a rough point of reference, it costs around $10,000 per kilogram to launch anything into orbit, making the cost of merely launching many of the aforementioned systems on the order of millions of dollars. Moreover, flagship missions at NASA, depending on their size, take five to ten years to plan, develop, and launch.

2. **THE PLAN DOES NOT SOLVE – THERE IS NO CLEAR POLICY ON THE NATIONAL OR INTERNATIONAL LEVELS**

Megan Ansdell, Space Policy Institute, GWU, Spring 2010

[Journal of Public and International Affairs, Princeton, vol 21, p 15]

There is also a lack of clear policy on both national and international levels. Space-faring countries and the United Nations have only adopted mitigation guidelines and have not cited the development of active debris removal systems as part of their space policies. Moreover, there has been a lack of discussion about what entity is responsible for financing and operating these systems. This is a complicated issue as some nations have created more debris than others, yet all space-faring nations and users of satellites services would benefit from space debris clean up.

3. **THE PLAN WON'T SOLVE – REMOVAL SYSTEMS DO NOT SOLVE DENSE OBJECTS**

Jon Cartwright, Nature News, March 15, 2011

[http://www.nature.com/news/2011/110315/full/news.2011.161.html]

All the experts in space debris contacted by Nature said that the new proposal is feasible, but still has problems. "It'll be ineffective against dense objects that are too heavy to move," says William Priedhorsky of Los Alamos National Laboratory in New Mexico. "To use a medical analogy, they propose not to cure the disease, but to manage it."

1NC SOLVENCY FRONTLINE

4. THE AFFIRMATIVE'S EVIDENCE IS WRONG – NASA DOES NOT BELIEVE ACTION SHOULD BE TAKEN NOW

Duncan Graham-Rowe, The Sunday Times, may 28, 2010

[http://www.timesonline.co.uk/tol/news/science/eureka/article7139037.ece]

How you define the point at which Earth's orbit will become unusable very much depends on your perception of what risks are acceptable. From NASA's perspective, there is still plenty of time. "We're talking about hundreds of years of doing nothing before it gets to be a serious issue," says Johnson.

5. THE AFFIRMATIVE DOES NOT SOLVE THE ROOT CAUSE OF COLLISIONS – THE ORBITAL DEBRIS ENVIRONMENT

Nicholas Johnson, Chief Scientist for Orbital Debris, NASA, 2010

[Orbital Debris: The Growing Threat to Space Operations, p. 7]

On the other hand, over 99% of the risk to operational spacecraft from collisions with orbital debris comes from objects too small to track on a routine basis, *i.e.,* smaller than 10 cm. Hence, only an improvement in the orbital debris environment itself can dramatically reduce the risks to operational spacecraft.

6. THE PLAN IS ILLEGAL – IT DOES NOT SOLVE

New Scientist Magazine, September 15, 2010

[http://www.newscientist.com/article/mg20727772.300-space-junk-hunting-zombies-in- outer-space.html]

Then there are the legal issues around space debris. Under maritime law, anyone can remove an abandoned ship without the owner's permission. Not so for space vehicles, as stipulated in the 1967 Outer Space Treaty. "Once you put it up there, it is yours for life," says James Dunstan, a lawyer specialising in issues to do with space and founder of Mobius Legal Group in Washington DC. So the US may not remove a Russian satellite from orbit with impunity, even if that satellite were completely dead and presenting a danger to working spacecraft.

SOLVENCY EXT.

THE U.S. IS AN UNRELIABLE STRATEGIC PARTNER – THE PLAN WILL NOT SOLVE WITH U.S. FEDERAL GOVERNMENT ACTION.

J. Walter Faulconer, Strategic Space Solutions, 2010

[Space Policy, volume 26, pp. 143-151]

Some suggest the USA is an unreliable partner because its political processes and tradition of biennial and quadrennial elections bring uncertainty to international agreements. For example, in 2004 President George W. Bush unveiled his Vision for Space Exploration which put a near-term emphasis on returning humans to the Moon. Inter- national partners, especially in Europe did not immediately embrace this policy because they were more interested in performing Mars missions. However, after four years of international workshops, bilateral meetings, then intense hectoring and haggling, a collective "global vision" was forged with prospective partners, especially ESA. The new global vision outlined important roles for the partners to return to the Moon and reinvigorate lunar exploration. ESA worked to cajole its members to program funds to support the Vision. Then, just as ESA was announcing that its membership had synched its planning and programming roadmap to match the Vision's, the USA, led by a newly elected internationalist president, announced interest in a radically different plan, that recently identified by the Augustine committee. The USA is now in the process of abandoning the Vision's "lunar base" concept and moving to a "flexible path" to manned space exploration. The change has devastated the ESA partners. Similarly, about-turns and difficulties have been experienced in collaborative work on Russian rocket engines following the collapse of the USSR.

THE PLAN WILL FAIL – IT IS TOO COMPLICATED

J. Walter Faulconer, Strategic Space Solutions, 2010

[Space Policy, volume 26, pp. 143-151]

Designing and manufacturing increasingly interoperable plat- forms, performing cooperative planning, and executing satellite operations are complicated by U.S. law and policy that imposes controls on the release of sensitive technologies and operations. Indeed, important technologies and information relating thereto may be determined by the US government to be non-releasable, even to allies and close partners. This is not just a US phenomenon; other nations have their own laws and policies that clamp down on technology transfers and specific relations with other nations.

SOLVENCY EXT.

ACTIVE REMOVAL WILL NOT SOLVE
Brian Weeden, Secure World Foundation, February 2011
[Space Policy, volume 27, pp. 38-77, February 2011]
Active removal of large space debris objects requires different technologies and techniques compared with removal of small debris objects. Given the likelihood of limited funding for debris removal operations, it will probably be necessary to prioritize removal of one category over the other in the near term.

ACTIVE REMOVAL WILL NOT SOLVE BIG OBJECTS IN SPACE
Brian Weeden, Secure World Foundation, February 2011
[Space Policy, volume 27, pp. 38-77, February 2011]
Within the categories of large or small objects, there are additional arguments over which objects should be prioritized for removal. This is an important consideration to maximize the benefit of costly ADR operations. The more massive an object is, the greater the amount of debris it can generate if involved in a catastrophic collision. Thus, several prominent space debris scientists argue that mass times collision probability (MPc) is the best metric for determining which large debris objects should be removed. However, there are two concerns with this approach. The first is the calculation of collision probability, which can vary depending on the model and technique used and thus can be open to debate.

ACTIVE REMOVAL WILL NOT SOLVE THE INHERENT RISKS OF SPACE EXPLORATION AND SPACE TRAVEL
Brian Weeden, Secure World Foundation, February 2011
[Space Policy, volume 27, pp. 38-77, February 2011]
All ADR techniques require some level of interaction with a space debris object, and this poses inherent risks. The harsh space environment can degrade the materials and structures of objects, making them fragile to physical contact or sudden acceleration. Debris objects such as rocket upper stages or spacecraft may have residual fuel or energy sources which could explode if disturbed. Even for benign debris objects, ADR requires precision tracking and orbit estimation to enable either rendezvous or targeting. Rendezvous operations, and in particular uncooperative rendezvous, are complicated procedures made more difficult by their remote nature.