# 1NC vs Westwood AP

## 1NC – 2NR

#### Warming doesn’t trigger extinction

* peer-reviewed journal shows IPCC exaggeration
* history proves resilience
* no extinction- warming under Paris goals
* rock breaking strategy could offset warming

IBD 18 [Investors Business Daily, Citing Study from Peer reviewed journal by Lewis and Curry, “Here's One Global Warming Study Nobody Wants You To See”, 4/25/18, https://www.investors.com/politics/editorials/global-warming-computer-models-co2-emissions/]

Settled Science: A new study published in a peer-reviewed journal finds that climate models exaggerate the global warming from CO2 emissions by as much as 45%. If these findings hold true, it's huge news. No wonder the mainstream press is ignoring it.

In the study, authors Nic Lewis and Judith Curry looked at actual temperature records and compared them with climate change computer models. What they found is that the planet has shown itself to be far less sensitive to increases in CO2 than the climate models say. As a result, they say, the planet will warm less than the models predict, even if we continue pumping CO2 into the atmosphere.

As Lewis explains: "Our results imply that, for any future emissions scenario, future warming is likely to be substantially lower than the central computer model-simulated level projected by the (United Nations Intergovernmental Panel on Climate Change), and highly unlikely to exceed that level.

How much lower? Lewis and Curry say that their findings show temperature increases will be 30%-45% lower than the climate models say. If they are right, then there's little to worry about, even if we don't drastically reduce CO2 emissions.

The planet will warm from human activity, but not nearly enough to cause the sort of end-of-the-world calamities we keep hearing about. In fact, the resulting warming would be below the target set at the Paris agreement.

This would be tremendously good news.

The fact that the Lewis and Curry study appears in the peer-reviewed American Meteorological Society's Journal of Climate lends credibility to their findings. This is the same journal, after all, that recently published widely covered studies saying the Sahara has been growing and the climate boundary in central U.S. has shifted 140 miles to the east because of global warming.

The Lewis and Curry findings come after another study, published in the prestigious journal Nature, that found the long-held view that a doubling of CO2 would boost global temperatures as much as 4.5 degrees Celsius was wrong**.** The most temperatures would likely climb is 3.4 degrees.

It also follows a study published in Science, which found that rocks contain vast amounts of nitrogen that plants could use to grow and absorb more CO2, potentially offsetting at least some of the effects of CO2 emissions and reducing future temperature increases.

#### Warming is key to increased global food supply – it’s likely now and adaptation solves their impacts

Ridley 13 [(Matt, a British journalist and businessman. Ridley is best known for his writings on science, the environment, and economics.) “Why climate change is good for the world” Spectator, 10/19/2013] BC

The greatest benefit from climate change comes not from temperature change but from carbon dioxide itself. It is not pollution, but the raw material from which plants make carbohydrates and thence proteins and fats. As it is an extremely rare trace gas in the air — less than 0.04 per cent of the air on average — plants struggle to absorb enough of it. On a windless, sunny day, a field of corn can suck half the carbon dioxide out of the air. Commercial greenhouse operators therefore pump carbon dioxide into their greenhouses to raise plant growth rates.

The increase in average carbon dioxide levels over the past century, from 0.03 per cent to 0.04 per cent of the air, has had a measurable impact on plant growth rates. It is responsible for a startling change in the amount of greenery on the planet. As Dr Ranga Myneni of Boston University has documented, using three decades of satellite data, 31 per cent of the global vegetated area of the planet has become greener and just 3 per cent has become less green. This translates into a 14 per cent increase in productivity of ecosystems and has been observed in all vegetation types.

Dr Randall Donohue and colleagues of the CSIRO Land and Water department in Australia also analysed satellite data and found greening to be clearly attributable in part to the carbon dioxide fertilisation effect. Greening is especially pronounced in dry areas like the Sahel region of Africa, where satellites show a big increase in green vegetation since the 1970s.

It is often argued that global warming will hurt the world’s poorest hardest. What is seldom heard is that the decline of famines in the Sahel in recent years is partly due to more rainfall caused by moderate warming and partly due to more carbon dioxide itself: more greenery for goats to eat means more greenery left over for gazelles, so entire ecosystems have benefited.

Even polar bears are thriving so far, though this is mainly because of the cessation of hunting. None the less, it’s worth noting that the three years with the lowest polar bear cub survival in the western Hudson Bay (1974, 1984 and 1992) were the years when the sea ice was too thick for ringed seals to appear in good numbers in spring. Bears need broken ice.

Well yes, you may argue, but what about all the weather disasters caused by climate change? Entirely mythical — so far. The latest IPCC report is admirably frank about this, reporting ‘no significant observed trends in global tropical cyclone frequency over the past century … lack of evidence and thus low confidence regarding the sign of trend in the magnitude and/or frequency offloads on a global scale … low confidence in observed trends in small-scale severe weather phenomena such as hail and thunderstorms’.

In fact, the death rate from droughts, floods and storms has dropped by 98 per cent since the 1920s, according to a careful study by the independent scholar Indur Goklany. Not because weather has become less dangerous but because people have gained better protection as they got richer: witness the remarkable success of cyclone warnings in India last week. That’s the thing about climate change — we will probably pocket the benefits and mitigate at least some of the harm by adapting. For example, experts now agree that malaria will continue its rapid worldwide decline whatever the climate does.

Yet cherry-picking the bad news remains rife. A remarkable example of this was the IPCC’s last report in 2007, which said that global warming would cause ‘hundreds of millions of people [to be] exposed to increased water stress’ under four different scenarios of future warming. It cited a study, which had also counted numbers of people at reduced risk of water stress — and in each case that number was higher. The IPCC simply omitted the positive numbers.

Why does this matter? Even if climate change does produce slightly more welfare for the next 70 years, why take the risk that it will do great harm thereafter? There is one obvious reason: climate policy is already doing harm. Building wind turbines, growing biofuels and substituting wood for coal in power stations — all policies designed explicitly to fight climate change — have had negligible effects on carbon dioxide emissions. But they have driven people into fuel poverty, made industries uncompetitive, driven up food prices, accelerated the destruction of forests, killed rare birds of prey, and divided communities. To name just some of the effects. Mr Goklany estimates that globally nearly 200,000 people are dying every year, because we are turning 5 per cent of the world’s grain crop into motor fuel instead of food: that pushes people into malnutrition and death. In this country, 65 people a day are dying because they cannot afford to heat their homes properly, according to Christine Liddell of the University of Ulster, yet the government is planning to double the cost of electricity to consumers by 2030.

As Bjorn Lomborg has pointed out, the European Union will pay £165 billion for its current climate policies each and every year for the next 87 years. Britain’s climate policies — subsidising windmills, wood-burners, anaerobic digesters, electric vehicles and all the rest — is due to cost us £1.8 trillion over the course of this century. In exchange for that Brobdingnagian sum, we hope to lower the air temperature by about 0.005˚C — which will be undetectable by normal thermometers. The accepted consensus among economists is that every £100 spent fighting climate change brings £3 of benefit.

So we are doing real harm now to impede a change that will produce net benefits for 70 years. That’s like having radiotherapy because you are feeling too well. I just don’t share the certainty of so many in the green establishment that it’s worth it. It may be, but it may not.

#### Food insecurity causes failed states and nuclear war – extinction

DeFeo 17 [(Michael, Regional Organizing Director at Arizona Democratic Party who graduated in 2019 with a bachelor’s degree in political science from Gettysburg College) “Food Insecurity and the Threat to Global Stability and Security in the 21st Century” Inquires Journal, 2017] BC

Poor Institutional Capacity

Although the developed world experiences food insecurity, it is the lack of infrastructure and government institutions in developing countries that contribute to civil wars and state fragility. Foreign exchange shortages can provoke food and fuel scarcities that force governments to spend less on essential services and public goods. Accordingly, citizens see their medical and educational entitlements melt away. Such circumstances create breeding grounds for internal conflict.

All violent conflicts destroy land, water, and social resources for food production. Developing countries do not have massive industrial machines that can remedy such losses, therefore, the population will suffer. Food insecurity is a recruitment tool for violent extremist groups. Promising food and water to a starving population, especially in urban areas, makes recruiting young and disgruntled youth easier (Messer & Cohen, 2015). Syria had limited institutional capacity to deal with the mass displacement, and that lead to a civilian revolt and recruitment into the Islamic State.

Countries that fail to provide their people with basic services often experience gross economic inequality, and even human-rights violations, as was the case in both Syria and Sudan. Both countries are classified as Least Developed Countries (LDCs). LDCs are distinguished not just by their widespread poverty, but also by their structural weaknesses in economic, institutional, and human resources that make them unable to maintain stability during a drought. The combination of drought and political instability or violence led to famine in Somalia (another LDC) in 2011. Even with urgent humanitarian action, the country still plunged into chaos and violence (Messer & Cohen, 2015). Severe drought, like Somalia's, may result in crop failure in major food producing areas, which in turn is a significant threat to social stability and peace (Wischnath, 2014).

Sometimes droughts of exceptional severity (and the civil unrest that follows) are attributed to climate change, especially in particularly arid regions. Scholars are divided on whether climate change actually impacts civil conflict. That is why African countries like Somalia and Sudan are prime case studies. Africa has the lowest percentage of irrigated land in the world. Agriculture is the most important sector of most African countries. Very high percentages of civilians in African countries live in rural areas. Those characteristics combined with low economic and state capacity make African, particularly sub-Saharan African countries the most vulnerable to climate change and civil instability. Africa experiences more civil conflict than other parts of the world, therefore, it is possible to argue that a lack of climate variability effect on civil conflict in Africa would make it unlikely to cause civil conflict in other parts of the world (Koubi et al., 2012). Secretary-General of the United Nations, Ban Ki-moon attributed the conflict in Darfur to an ecological crisis arising “at least in part from climate change” (Ki-moon, 2007). The Fourth Report of the Intergovernmental Panel on Climate Change assessed that climate change will continue to worsen. As it does, it will increase food shortages, which may lead to conflict (AR4, 2007). The report also stated that forced displacement and rising social instability is the most likely result of food insecurity. This is almost exactly what happened in Syria. The first step towards conflict might be food riots, which often occur during a food shortage or when there is an unequal distribution of food. These are usually caused by food price increases, food speculation, transport problems, or extreme weather. In 1977, Egyptians became so desperate for food that they attacked shops, markets, and government buildings just to obtain bread and grain (Paveliuc-Olariu, 2013).

Moreover, civil war can create economic opportunities for certain groups, so they try to avoid resolving the conflict. Urban elites in Somalia profited tremendously off of internal conflict because of the absurd amount of foreign aid that was pumped into the country and then largely stolen (Shortland, Christopoulou, & Makatsoris, 2013). Once a country experiences a food shortage, it may lead to protests, riots, and violence. This all contributes to state instability, but it is not the state alone that suffers. If one country fails, it creates a crisis that could destabilize an entire region.

State Failure and the Threat to Regional Stability

Although fragile governments in developing countries are at a heightened risk for internal conflict that could topple them, that risk also threatens the country’s neighbors. After the Soviet Union collapsed in 1991, Afghanistan found itself alone in regional trade. Without a guaranteed source of cereal, the government had to turn to Iran and Pakistan for support in order to avoid its own collapse (Clarke, 2000). Unlike Afghanistan, many other developing countries have been unable to work together on food and water security. Thirteen of the twenty-two members of the Arab League rank among the most water-scarce nations on the planet. Food cannot be grown without water. The majority of the world is engaged in some sort of agreement with neighboring countries to share water supplies, but thirty-seven countries still do not share their water resources (El Hassan, 2014). Lack of cooperation can cause civil as well as interstate conflict. South Sudan legally has no share of the Nile River and the effects of that lack of water access have been mass starvation and violence.

The effects of climate change, water shortages, and mass migrations have resulted in acute food insecurity not just in Syria, but across the region (El Hassan, 2014). Food insecurity, plus an increase in the prices of staple foods have destabilized much of the area. The Arab Spring was the beginning of multiple conflicts that have affected countries like Syria, Egypt, and Libya. In Syria, food insecurity resulted in mass violence and has now created an international crisis involving multiple world powers.

Food insecurity is such a threat to entire regions because people cannot live without food and people want to live. When a region experiences food scarcity and that population feels threatened by hunger, it will relinquish dependency on any political authority and take up arms in order to ensure its well-being (Paveliuc-Olariu, 2013). This is human survivalism. It is important for developing countries in areas that are at risk for food insecurity to formulate policy that ensures aid goes to the food insecurity hotspots so as to maintain stability.

South Sudan experienced what happens when countries do not work together to feed their people. After gaining its independence from Sudan in 2011, 360,000 South Sudanese refugees returned to the country. This influx of human beings, coupled with drought conditions exacerbated economic strain and drove food prices up. The increases were the result of trade restrictions between Sudan and South Sudan. The overall reason for the food crisis, however, was the government's preoccupation with fighting a political and quasi-ethnic civil war rather than negotiating fair access to the Nile River (Tappis et al., 2013). Because of South Sudan’s weak institutions, it has done little to address the food shortage. That inability to solve the problem fuels insurgent recruitment that continues the bloodshed in South Sudan. The conflict is keeping regional rivalries alive with Uganda, Kenya, Ethiopia, and Sudan; all of whom have attempted to intervene in South Sudan militarily to bring about stability (Council on Foreign Affairs 2016). Aside from South Sudan, multiple conflicts across Africa are consuming massive amounts of diplomatic, political, and humanitarian resources in a region that faces a multitude of threats.

South Sudan, Somalia, and Syria are all failing states that are experiencing huge food shortages, humanitarian crises, and most importantly, extreme civil violence. South Sudan is mired in a civil war. Somalia is controlled by warlords and terror organizations. Syria has both of those problems. Conflict has turned these countries into “breeding grounds of instability, mass migration, and murder” rather than sovereign states with a monopoly on violence and control over their borders (Rotberg, 2002). To be sure, failing states are a concern because of their ability to destabilize entire regions, but states at risk for failure are also very important. Countries like Pakistan that are politically unstable and have food and water shortages could result in uncontrollable civil upheaval (The Fund for Peace, 2016).

Global Consequences of State Failure

Failing states and destabilized regions are not just a problem for the developing world. They are a very real concern for the United States and other developed countries as well. The Islamic State fed off of the Syrian Civil War and helped destabilize Iraq, Syria, Libya, and even Afghanistan and the Philippines. They have at also inspired terror attacks in Europe and the United States. They are a threat to both the developed and developing world. State instability allows them to recruit and train without government interference, which in turn allows them to plan attacks outside the region. An important source of income for the Islamic State has been agriculture from Iraq and Syria. While this revenue has received less media attention than oil extraction, it is still an important part of their economy (Jaafar & Woertz, 2016). It is also a key aspect of their political legitimacy because it allows them to feed their soldiers and those they control. Controlling some of the most fertile regions of the two countries has also helped the Islamic State starve off areas that have resisted them (Jaafar & Woertz, 2016). If Syria or Iraq are ever going to stabilize, those breadbaskets must be retaken and the food must reach the civilians in the cut off areas.

In the 20th century, state failure had few implications for international peace and security. Thanks to globalization, that is no longer the case. Failed states pose a threat to themselves, their neighbors, and the entire international community (Rotberg, 2002). Islamic State - inspired terror attacks in Belgium and France are a direct result of state collapse in Syria and Iraq. Preventing states from failing, rather than having to intervene militarily when they do, ought to be a top priority in the foreign policy of rich nations. Although the situations in Syria, Somalia, and South Sudan seem beyond repair, nation-building projects have had success in the past. Tajikistan, Lebanon, Cambodia, Kosovo and East Timor are all examples of relatively successful attempts to put failing states back on the right track (Rotberg, 2002). Developed countries must have the political will to ensure that people in developing countries are fed so that they remain pacified. It is often severe food insecurity that precedes ethnic or religious violence, as has been the case in South Sudan, therefore, adequate food is paramount to avoiding humanitarian crises that accompany ethnic and sectarian conflict (The Economist, 2016).

While it is true that many developed countries, especially the United States, are weary of providing so much financial aid and intervening militarily in war-torn, developing countries, it is imperative that the rich do not abandon the poor to a fate of internal destruction. Money must not be thrown blindly towards humanitarian crises and military intervention must be the last resort. Developed countries provided $1.4 billion for humanitarian aid in South Sudan in its first year of independence, but without specific conditions, that money went to kleptocrats rather than infrastructure projects or public services (The Economist, 2016).

Paying to help developing nations is expensive and will continue to be so. Afghanistan and Iraq are proof of that. But the war on terror, repeated military intervention, and humanitarian aid are expensive as well. In 2002, Robert Rotberg suggested that a new Marshall Plan was required for places like Afghanistan, the DRC, Sierra Leone, Somalia, and Sudan. If it is true that food and water security are the keys to keeping relative peace in new and developing countries and their collapse threatens the safety of the developed world, it seems logical that assisting those countries is wise.

In 1999, Susan L. Woodward argued that military leaders focus too much on force versus force combat rather than the issues of insurgency and terrorism in failed states. In 2017, military leaders have adjusted their strategies accordingly. Woodward believed that globalization made states less important, but their failure would still be felt around the world. Failed states cannot exercise their monopoly on violence and they cannot control their borders, thus threatening more than just the failed state (Woodward, 1999). Because state failure is so consequential, the United States military must continue to look into measures it can take to prevent it.

The Threat of the Future

Finally, the threats from

food shortages in South Sudan, Somalia, Afghanistan, Iraq, and Syria are important to the United States and the international community at large, but there is one country that, while it is not a failing state right now, could easily become one if the wealthy nations of the world do not ensure its stability. That country is Pakistan. The Fund for Peace ranked Pakistan as the 14th most fragile state in the world in 2016, giving it a “High Alert” designation for state failure (The Fund for Peace, 2016). Its Demographic Pressure Indicator was an 8.9 - 10.2 Although it improved by one-tenth of a point last year, its decade trend is worse by seven-tenths of a point and its five-year trend is worse by four-tenths of a point, suggesting that the food situation is actually worsening overall (The Fund for Peace, 2016). If internal conflict and potential state failure at its most basic level begins with food and water insecurity, then Pakistan could become a real problem very soon.

Considering the risk of state failure, Pakistan poses the greatest threat to the rest of the world because of the existence of nuclear weapons within the country. Pakistan is not a member of the Nuclear Non-Proliferation Treaty, yet it has about 120 nuclear weapons. It also has a Shaheen 1A ballistic missile that can reach targets 550 miles away (Pakistan Defence, 2015). Should a food crisis arise in Pakistan that results in civil war and governmental collapse, those weapons could end up in the hands of a group that intends to use them maliciously as an act of terror. That prospect should be incentive enough for the developed countries to realize that they cannot and must not leave food insecure countries to devour themselves.

While it is difficult to argue that food insecurity immediately and directly causes civil conflict, there is no denying that people need food and water and will fight to survive. In South Sudan, ethnic and political armies fight one another. In Syria, rebels and government forces fight each other while also fighting the Islamic State. And in Somalia, warlords and their armies fight. The Syrian Civil War began six years ago after a water shortage forced thousands of migrants into urban centers. Developing countries tend to be most affected by climate change, poor governance, and food price increases. Therefore, they are the most prone to instability that may lead to outright violence. Without the wherewithal to handle civil conflict, these countries may become fragile or even failing states. Once that happens, they represent a threat not just in their region of influence, but the whole world. That is why the developed Western nations must pay attention and provide aid to the developing world in order to maintain stability. There will be more food crises in developing countries in the future, but if the North has the strength to continue aiding the South, perhaps it will be able to curb mass starvation and avoid the horrendous violence that consumes starving countries.

## 1NC – DA

#### Commercial space stations are the future of tourism and commerce---NASA and countries is transitioning to private stations.

Frey 1-6 (, T., 2022. Private Space Stations: The Future Portals for Private Space Commerce and Tourism. [online] Futurist Speaker. Available at: <https://futuristspeaker.com/future-trends/private-space-stations-the-future-portals-for-private-space-commerce-and-tourism/> [Accessed 30 January 2022].)-rahulpenu

Private Space Stations: The Future Portals for Private Space Commerce and Tourism

The future of space research and development is tied to private enterprise – specifically private space stations. Now that government-funded programs have proven basic concepts about getting to and living/working in space, NASA and agencies from other countries will continue to turn many aspects of space station work over to private companies.

The International Space Station (ISS) will be unusable by the end of this decade and at that point NASA and other countries will resort to renting space on privately owned, earth orbiting stations.

NASA is hedging its bets and providing grants to several private companies in hopes of jump starting and accelerating their development of private space stations. No doubt any of these companies will be honored to have NASA as a primary tenant, but they’re setting their sights even higher – literally.

Space Flight Tourism Has Begun

We’ve already broken the public-private barrier with tourist excursions for low-earth, brief or multi-day orbital flights. The Russians have been making their Soyuz vehicle available for ferrying private citizens to the ISS for more than a decade.

Now, in addition to ferrying crews to the ISS for NASA, SpaceX also is using its equipment to provide multi-day orbital flights for private citizens. Late last year, SpaceX hosted four space tourists for a three-day orbiting tour.

Space Destination Tourism

Axiom Space, one of the companies supported by NASA, is planning to rent out the SpaceX vehicle from Elon Musk’s team to transport company clients to an eight-day literal “around the world” orbital flight cruise aboard the ISS. This represents the second phase of the space tourism industry – to deliver space tourists to orbiting modules and stations. We’re there already of course, but these programs are in their infancy.

When the ISS goes out of commission, we’ll see private space stations take up the slack – both for NASA’s important work and for wealthy space tourists’ once-in-a-lifetime experiences. Axiom has a leg up on this venture, as it’s planning to attach a module to the ISS for several years before detaching it to form the basis of its own private space station.

Orbital Vacations

Over time, space station tourists won’t be content to live even for a few days in a lab-like environment – the kind we’re used to seeing on videos from the ISS.

Private, orbiting space stations will be upgraded. They won’t be luxurious at first, but they’ll have slightly upgraded sleeping pods and small common areas for lounging instead of working.

NASA will still have its labs and astronaut quarters on board. The tourists will need to stay in their own area, although some will want to do more than look out the window for days at a time and will volunteer to participate in research after receiving some on-the-ground training before liftoff.

The Next Frontier

The next step in the space tourism progression is to break beyond the Earth orbit and place space facilities in other locations – orbiting the Earth’s moon or on the moon itself.

We’ll also see space vacations and research destinations in non-planet orbiting space.

Supporting Space Commerce

Down the road even further, space workers for commercial ventures will become another category of private citizen astronauts. These workers will be hopping from one private space station to the next as space station entrepreneurs place facilities at ever-more distant waypoints in space. Tasks like asteroid mining will be done by robots, of course, but in some cases, human intervention at the mining location may be needed to keep things progressing. These private space stations will serve as staging areas, regional offices, and warehouses.

Space Highways

It’s not too hard to imagine that eventually, along well-established routes to commercial areas in space and to other planets, we’ll see the emergence of additional space structures – hardly space “stations” anymore – with specific functions. Passing vehicles will dock to resupply, make deliveries, make repairs, refresh crews and passengers, and provide almost the same variety of services you’d expect to see along a U.S. interstate highway.

Even further into the future, we’ll see scheduled flights from earth to the larger space communities and then between those locations, similar to the familiar hub and spoke arrangements used by the world’s airlines today. As we scale these operations, space recreation and tourism will be open to far more of Earth’s citizens.

These flights will be even more necessary when people (originally workers on those remote outposts) choose to remain in space-based facilities indefinitely, purchasing or renting accommodations – maybe as retirement destinations.

Will Space Remain International?

At this time, the U.S., China, India, Russia, the UK, Japan, the UAE and maybe a few other nations have or conceivably could develop the capability to push into space for tourism or commerce.

But who owns space? Will we see any borders or territorial claims? Back in 1960, the United Nations determined that space was truly wide open. No country could lay claim to any areas or create any borders.

Will today and tomorrow’s nations abide by that? This neutrality principle might be tested as structures emerge on the moon and Mars and as we’re able to easily reach areas of space with valuable resource-laden asteroids. We may also come across some entities that come from other parts of the universe who would beg to differ about that jurisdiction of the UN!

Baby Steps So Far Are an Exciting Promise of What’s to Come

With these kinds of futuristic images in mind, it’s easy to see that what’s happened in the past decade and what will take place in the next few years are important steps, but they’re still just baby steps.

What needs to and will happen, though, is that as more and more tourist space flights occur on private vehicles and more and more private residents spend a few days at a time on the ISS and later the private space stations, people and investors will be convinced that futuristic, recreational space travel and residency is no longer science fiction but a legitimate, future personal and business opportunity. The Jetsons won’t seem as far fetched as they did 60 years ago.

In 2022, we’ll see a remarkable surge in this direction with more visitors going to space and to the ISS, along with breakthroughs in how to build and integrate structures in space. As long as we don’t see any major catastrophes (unfortunately, they’re almost inevitable and it’s important we keep them in perspective and learn from them when they happen), we’ll see growing confidence in the viability of recreational space travel.

Ten years from now, even if you’re not ready to book a hotel stay near Mars, you should buy a ticket for an Earth orbit trip or make reservations for a once-in-a-lifetime space station vacation. That’s where you’re going to see the greatest shows off Earth.

#### Tourism makes low-gravity research accessible which results in critical physiological science innovation.

Caplan and Lindsay 17 Nick Caplan and Kirsty Lindsay 7-29-2017 "Space Tourism Could Help Boost Science and Health Research — Here's How" <https://www.space.com/37503-space-tourism-could-help-boost-science-health-research.html> (Nick graduated from the University of Birmingham with a PhD in Biomechanics)//Elmer

Perhaps one day we will see research teams launching groups of participants to spend a few weeks or months aboard a space hotel in order to study medical interventions that would slow the ageing process on Earth, and to help the human species colonise the Moon or even Mars. Research dating back to the early years of the space race has led to technologies that benefit us all. Many scientific discoveries have come since the arrival of inhabitable space stations that act as orbital laboratories. NASA’s first space station Skylab helped understand the effects on the human body of spending months in space and paved the way for the International Space Station. A huge number of research studies have been completed on the ISS since the year 2000 in the areas of human physiology, biology, biotechnology, physical science and earth and space science. These studies have led to discoveries such as enhanced protein crystal growth for drug development, efficient combustion of fuel droplets, and an understanding of the effects of long duration exposure to microgravity on the human body, revealing that spaceflight has effects similar to ageing on Earth. Despite much human physiological research being carried out in space, it has one major limitation – there are simply not enough humans currently going to space to act as research participants, leading to difficulties in research design. In fact, only 550 or so humans have ever been into space since Russian cosmonaut Yuri Gagarin first orbited the Earth in 1961. Human physiological experiments in space tend to have very small participant numbers (for example, the NASA twins study) or they have to take place over many years. Could the boom in commercial human spaceflight accelerate the speed of human physiological discoveries in space? We certainly think so.

#### Physiology key to manage new Diseases.

APS 20 5-21-2020 "How Physiologists Are Helping Patients Recover from COVID-19" <https://ispyphysiology.com/2020/05/21/how-physiologists-are-helping-patients-recover-from-covid-19/> (American Physiology Society)//Elmer

Understanding Physiology Is Critical to Fighting COVID-19 For each of the new treatments and devices created to combat COVID-19, it is critical to make sure they are safe to use in people. This is where understanding of human physiology is very important. For instance, treatment with remdesivir can reduce the amount of the virus in your body and has helped people who are severely ill with COVID-19 recover faster. But the drug is known to damage the liver and the immune system, so it is very important to know how well a patient’s liver and immune system are functioning before using it as a treatment. Even as I write this, there are new findings that COVID-19 directly affects not only the lungs but also the brain, kidneys, blood vessels and blood cells. This makes treatment of COVID-19 very difficult. Scientists and bioengineers need to take into consideration how the different organs of the body coordinate to keep you alive and healthy—the knowledge of how all the organs, tissues and cell work together in health and disease is the basis of physiological study. The trouble with finding the best treatment for COVID-19 is that the symptoms are so different from one person to the next. Children seem to be less vulnerable to COVID-19, older people are more vulnerable and some young adults are dying from strokes caused by the coronavirus rather than respiratory issues. As we find out more about how COVID-19 affects the body, it is clear that there will be more than one best way to fight it. In my eyes, the COVID-19 pandemic has highlighted the value of scientific research, especially research that helps us understand human physiology. In a few short months, scientists have sequenced the genome of the virus, discovered how SARS-CoV-2 infects cells by attaching its “spikes” to a protein on cells and developed new potential treatments. It will be the research physiologist’s job to study and understand how to best use these medicines and devices to treat COVID-19 patients.

#### Disease causes Extinction.

Bar-Yam 16 Yaneer Bar-Yam 7-3-2016 “Transition to extinction: Pandemics in a connected world” <http://necsi.edu/research/social/pandemics/transition> (Professor and President, New England Complex System Institute; PhD in Physics, MIT)//Elmer

Watch as one of the more aggressive—brighter red — strains rapidly expands. After a time it goes extinct leaving a black region. Why does it go extinct? The answer is that it spreads so rapidly that it kills the hosts around it. Without new hosts to infect it then dies out itself. That the rapidly spreading pathogens die out has important implications for evolutionary research which we have talked about elsewhere [1–7]. In the research I want to discuss here, what we were interested in is the effect of adding long range transportation [8]. This includes natural means of dispersal as well as unintentional dispersal by humans, like adding airplane routes, which is being done by real world airlines (Figure 2). When we introduce long range transportation into the model, the success of more aggressive strains changes. They can use the long range transportation to find new hosts and escape local extinction. Figure 3 shows that the more transportation routes introduced into the model, the more higher aggressive pathogens are able to survive and spread. As we add more long range transportation, there is a critical point at which pathogens become so aggressive that the entire host population dies. The pathogens die at the same time, but that is not exactly a consolation to the hosts. We call this the phase transition to extinction (Figure 4). With increasing levels of global transportation, human civilization may be approaching such a critical threshold. In the paper we wrote in 2006 about the dangers of global transportation for pathogen evolution and pandemics [8], we mentioned the risk from Ebola. Ebola is a horrendous disease that was present only in isolated villages in Africa. It was far away from the rest of the world only because of that isolation. Since Africa was developing, it was only a matter of time before it reached population centers and airports. While the model is about evolution, it is really about which pathogens will be found in a system that is highly connected, and Ebola can spread in a highly connected world. The traditional approach to public health uses historical evidence analyzed statistically to assess the potential impacts of a disease. As a result, many were surprised by the spread of Ebola through West Africa in 2014. As the connectivity of the world increases, past experience is not a good guide to future events. A key point about the phase transition to extinction is its suddenness. Even a system that seems stable, can be destabilized by a few more long-range connections, and connectivity is continuing to increase. So how close are we to the tipping point? We don’t know but it would be good to find out before it happens. While Ebola ravaged three countries in West Africa, it only resulted in a handful of cases outside that region. One possible reason is that many of the airlines that fly to west Africa stopped or reduced flights during the epidemic [9]. In the absence of a clear connection, public health authorities who downplayed the dangers of the epidemic spreading to the West might seem to be vindicated. As with the choice of airlines to stop flying to west Africa, our analysis didn’t take into consideration how people respond to epidemics. It does tell us what the outcome will be unless we respond fast enough and well enough to stop the spread of future diseases, which may not be the same as the ones we saw in the past. As the world becomes more connected, the dangers increase. Are people in western countries safe because of higher quality health systems? Countries like the U.S. have highly skewed networks of social interactions with some very highly connected individuals that can be “superspreaders.” The chances of such an individual becoming infected may be low but events like a mass outbreak pose a much greater risk if they do happen. If a sick food service worker in an airport infects 100 passengers, or a contagion event happens in mass transportation, an outbreak could very well prove unstoppable.

## 1NC – CP

#### CP: Private entities outside of the United States should not appropriate outer space via commercial space stations that replace the International Space Station.

#### Private entities in the United States should submit an environmental impact assessment of commercial space stations that replace the International Space Station to the UN Office of Outer Space Affairs for public comment, modification, and approval, then implement the approved version of the submitted proposal.

**Counterplan competes and creates the least environmentally damaging version of the aff.**

William R. **Kramer**, PhD Polisci/Futures Studies @ U of H Manoa, Currently HDR Inc. Extraterrestrial Environmental Analyst, **’14**, “Extraterrestrial environmental impact assessments A foreseeable prerequisite for wise decisions regarding outer space exploration, research and development” Space Policy 30 (2014) 215-222

To be most effective, all spacefaring nations and enterprises would voluntarily participate in assessing their extraterrestrial environmental impacts prior to undertaking actions in space. A hypothetical chronology of such a process might include: (1) Impact assessments are prepared by the action proponent and submitted to an impartial international panel or board; (2) The panel determines the assessment's sufficiency; (3) The assessment is published in an electronic or other format accessible to the public followed by a comment period; (4) The action proponent addresses comments and submits responses to the panel; (5) The panel publishes its approval or concerns; (6) The action proceeds, is **modified or is abandoned**; and (7) should the action proceed, periodic reports of the action's progress and impacts are filed for future reference in a digital format to allow broad access. The process would support the spirit of both **NEPA** to “fulfill the responsibilities of each generation as trustee of the environment for succeeding generations” (42 USC x4331(b)(1)) and Article 4(1) of the Moon Agreement's directive that “due regard shall be paid to the interests of present and future generations.” Given the likelihood that all states would appreciate the need for maintaining extraterrestrial environments and landscapes for both future research and exploitation, pressure from peer states and space industries may be sufficient to **encourage a trend of compliance**.

Such a review and approval system (perhaps similar to NEPA's relationship with the Council on Environmental Quality and its oversight function) could be attempted within the structure of the UN, such as within the **UN Office of Outer Space Affairs**. The spirit of an extraterrestrial environmental assessment program would be likely to fit within the mandate of the organization. However, amending the Outer Space Treaty or otherwise developing an administrative UN capacity to achieve the goals proposed in this paper would require a level of international commitment and cooperation that may be both lengthy and difficult to achieve. Spacefaring nations and international organizations are already invited to submit annual reports on their space activities and research to the UN Committee on the Peaceful Uses of Space, **so a precedent for reporting exists.** **Presently, however, reports tend to document positive actions and research, not details of extraterrestrial environmental impacts**.

**Extinction. EIA is key to preserve space resources, stop resource wars, and extra-terrestrial environmental damage.**

William R. **Kramer**, Hawaii Research Center for Futures Studies @ University of Hawaii, **'17**, In dreams begin responsibilities – environmental impact assessment and outer space development, ENVIRONMENTAL PRACTICE, VOL. 19, NO. 3, 128–138

**Benefits of extraterrestrial environmental impact assessment** Most publications regarding outer space resources maintain that those resources are nearly limitless, and many business models for exploitation do not imagine that resources on Mars, for example, will ever be exhausted (Lewis, 1996; Zubrin, 1996; Renstrom, 2016). Ever is a long time. While the statement may be figuratively true for some mineral ores that may last through an individual company’s project timeline, it is not necessarily true for long-term planning. **There will likely be competition for the rarest (most valuable) minerals**. Without some form of planning and regulation, they may be extracted in an inefficient and environmentally damaging manner and be **quickly depleted** (as exemplified by hydraulic mining for gold on Earth, which wasted much of the resource and resulted in extensive environmental damage) (Merchant, 1998).

How might resources be put to their highest and best use unless regulated? Both the Moon and Mars have water ice which will be **crucial for human survival**, but water also has lucrative industrial uses; it is potentially the raw material for manufacturing both rocket fuel and oxygen. **Conflicts over resource allocation** may be better addressed during an **assessment process** that seeks to balance highest and best use with discovery and first use. Who gains access to specific areas for mining becomes more problematic in that the Outer Space Treaty does not allow “ownership” of extraterrestrial territory; there is no guarantee that companies such as those listed previously will gain access to the most productive sites. The China National Space Administration is planning to place a crew on the Moon by 2024, so **competition for the best sites will be intense** (Kramer, 2015b; China Digital Times, 2012).

Space industries generally are not considering that their proposed actions may preclude alternative uses such as scientific research and human settlement. There will be a stream of not yet imagined uses that could be adversely affected or foreclosed. Many of the same conflicts between land use and human habitation experienced on Earth may emerge on extraterrestrial sites. On the Moon, for example, there are preferable sites for collecting solar energy. These “peaks of eternal light” are areas nearly always or constantly exposed to sunlight at the poles. They are very limited in both distribution and size (Elvis, Milligan, and Krolikowski, 2016). If a mining operation were to determine such areas suitable for their operations, or if mining created a constant plume of dust that would diminish the effectiveness of solar panels, how might such a situation be resolved?

Should potentially dangerous industries such as fuel manufacturing or storage be located near living areas? Would hydraulic fluid pipelines be closely monitored for leaks that may affect subsurface ice deposits mined for drinking water? How might vibrations from detonations affect unrelated structures or scientific instrumentation, such as telescopes? And how might a search for life, whether extinct or still living, be affected by human presence and our trail of bacteria and organic wastes? Humans’ biological pollution of Mars, for example, may greatly affect the results of any search for extraterrestrial life there (Kramer, 2009; McKay, 2009). Peter Doran of the Planetary Protection Subcommittee of the NASA Advisory Council offered, “The big issue with all missions to Mars is we don’t want to create a situation where we are impacting future life-detection science. Picture humans … walking around shedding microbes everywhere we go. Space suits as we know them do not take care of this problem (Mack, 2016).”

## 1NC – Case

#### No 1ar theory—still same amount of time and only 1 speech to answer theory—also only condo use reasonability

### 1NC – Multilat

#### Presumption – replace is one for one – private companies will circumvent the plan by saying that their space stations aren’t direct ISS replacements

Mirrium Webster n.d. [(Online dictionary) “replace” mirrium webster, No date. <https://www.merriam-webster.com/dictionary/replace>] RR

to take the place of especially as a substitute or successor

#### No P3 link— this assumes other countries investing like england and france, which isn’t the aff.

#### 3.No internal link to multilat – their evidence isn’t reverse causal – even if space station has historically enabled multilat, no reason why its absence would break relations between countries

#### Multilat fails--Coordinated response structurally impossible

Naim, 13 (Senior Fellow International Economics at Carnegie, 2-15-’13 (Moises, “The G20 is a Sad Sign of Our Uncooperative World” <http://www.carnegieendowment.org/2013/02/15/g20-is-sad-sign-of-our-uncooperative-world/fgvs>)

The reality is that, despite many commitments by national leaders, the capacity of nation-states to co-ordinate their responses has dwindled. Problems may have gone global but the politics of solving them are as local as ever. It is hard for governments to devote resources to problems beyond their national borders and to work with other nations to address these challenges – while painful problems at home remain unsolved. The changing landscape of global politics also plays a role. As the number and the interests of those sitting at the tables where agreements are negotiated have increased, the opportunities for consensus and concerted action have shrunk. Emerging powers such as the Brics (Brazil, Russia, India, China and South Africa), new international coalitions, and influential nongovernmental players are now demanding a say in the way the world handles its collective problems. Inevitably, when all these disparate and often conflicting interests need to be incorporated into any agreement, the resulting solutions fall short of what is needed to solve the problem. This is why global multilateral agreements in which a large number of countries deliver on co-ordinated commitments have become increasingly rare. When was the last time you heard that an agreement with concrete consequences was reached by a large majority of the world’s nations? I think it was 13 years ago – the Millennium Development Goals. Since then, almost all international summits have yielded meager results, most visibly those seeking to advance the global agendas on trade liberalisation and curbing global warming.

#### Space militarization is happening now – 1AC Cronk and Elvevold prove decades of cooperation over the ISS haven’t been able to deter Chinese and Russian counterspace capabilities – they don’t solve

#### Explicitly conceding that realism is true for the US, Russia, and China – that’s 1AC Elvevold – this means there’s no chance that multilat solves space militarization and disproves their Stokes evidence – 1AC Smith says P3 has been in place for decades and done zero to defuse space tensions – Immac reads yellow

. The successful model of public-private partnerships that has been used to transport both cargo and crew to the International Space station via the commercial purchase of launch services should be extended throughout cis-lunar space

#### Uniqueness for space militarization definitely overwhelms the link – 1AC Mason proves space coop is impossible– international talks have accomplished zero and the aff does nothing to demilitarize space – make them explain why the aff is different–

#### 8. Answering Private Stations Bad – 1] We flip U/Q for “Unproven” since we obviously haven’t built one BUT the ISS is falling so there isn’t an alternative and 2] “Decades away” is power-tagged – it says “years” which matters because we have 6 years until the ISS is ending meaning this isn’t offense.

#### ISS fails to spur Global Cooperation – it excluded China, link turns multilat & mason— its about why china is needed.

Young 19 (Makena Young, research associate with the Aerospace Security Project at the Center for Strategic and International Studies (CSIS). Prior to joining CSIS, Ms. Young worked for the Federal Aviation Administration as an aerospace engineer, focusing on automatic dependent surveillance-broadcast certification and integration in small aircraft.)(“Bad Idea: The Wolf Amendment (Limiting Collaboration with China in Space)”, December 4, 2019, https://defense360.csis.org/bad-idea-the-wolf-amendment-limiting-collaboration-with-china-in-space/)//ASMITH

In 2011, Representative Frank Wolf (R-VA) introduced what is now commonly referred to as the Wolf Amendment into the annual commerce, justice, and science (CJS) appropriations bill. This amendment limits U.S. government agencies, such as the National Aeronautics and Space Administration (NASA), from working with Chinese commercial or government agencies. Although Rep Wolf retired in 2014, the amendment has perpetuated and continues to be [included](https://appropriations.house.gov/sites/democrats.appropriations.house.gov/files/FY2020%20CJS%20Sub%20Markup%20Draft.pdf) in the annual CJS appropriations bill. Though the amendment does not prohibit all collaboration between the two countries, the result has proven to be a significant hindrance to bilateral civil space projects. Keeping the Wolf Amendment language is in every sense a bad idea: it does nothing to promote human rights and it hands China an opportunity to challenge NASA’s leadership in civil space exploration.

The [language](https://www.govinfo.gov/content/pkg/PLAW-112publ55/html/PLAW-112publ55.htm) of the Wolf Amendment says that no government funding for NASA, the White House’s Office of Science and Technology Policy (OSTP), or the National Space Council can be used to collaborate with, host, or coordinate bilaterally with China or Chinese-owned companies without certification from the Federal Bureau of Investigations (FBI). The FBI must certify that there is no risk of information sharing and that none of the Chinese officials involved have been determined by the United States to have direct involvement with violations of human rights. In a [2013 letter](https://www.theepochtimes.com/frank-wolfs-letter-on-nasa-controversy_312410.html) to former NASA Administrator Charles Bolden, Representative Wolf stated his “efforts to limit new collaboration with China until we see improvements in its human rights records.”

However, in the eight years since the first iteration of this amendment, the U.S. has not seen the desired changes in Chinese human rights policies that the Wolf Amendment was intended to spur. And during that time, China’s economy, global influence, and space capabilities have continued to grow. Being left out of U.S.-led international missions has not deterred China in space, but instead has pushed China to develop parallel capabilities on its own. Without a way to contribute to the International Space Station (ISS), China began development and testing its own modular space station. China launched the Tiangong-1 and Tiangong-2 [space laboratories](https://chinapower.csis.org/chinese-space-station/) in 2011 and 2016, respectively, as testbeds for a permanent space station. The China National Space Administration (CNSA) has announced that the permanent Chinese Space Station (CSS) should be fully operational by the year 2022.

With the ISS slated for retirement in 2024, other countries that want a long-term human presence in low Earth orbit may be lured into partnering with China on the CSS. Combined with a growing commercial space sector in China that promises to offer [frequent launches](https://www.technologyreview.com/s/612595/china-launched-more-rockets-into-orbit-in-2018-than-any-other-country/) at lucrative prices to foreign entities, China is positioning itself to be the partner nation of choice for future space exploration missions. As NASA enters into a new era of exploration with its Moon-to-Mars projects, it is [touting](https://twitter.com/JimBridenstine/status/1049063320668573696) international collaboration as an integral part of its plans. The [Artemis](https://www.nasa.gov/feature/nasa-gains-broad-international-support-for-artemis-program-at-iac) and [Lunar Gateway](https://www.geekwire.com/2019/worlds-space-agencies-focus-roles-gateway-moon-missions/) programs are working to establish partnerships with Canada, Australia, the European Space Agency, Japan, and possibly Russia. Closing China off from cooperating in these projects could be a strategic mistake.

Both NASA and CNSA share a common goal of exploring the moon for scientific purposes—as is evident by China’s Chang’e 4 rover that landed on the far side of the moon this year. NASA cooperated with CNSA to monitor the landing of the Chinese rover—the first major act of cooperation between the two space agencies in eight years. CNSA provided the planned location and time of the landing, and NASA observed the lander and shared the images that were produced. NASA was able to cooperate on this mission because it certified to Congress that this activity “[did not](https://www.scientificamerican.com/article/farside-politics-the-west-eyes-moon-cooperation-with-china/) pose a risk of resulting in the transfer of technology, data or other information…with China; and [did] not involve knowing interactions with officials who have been determined by the U.S. to have direct involvement with violations of human rights”. To ensure no private data sharing between the two nations, they agreed that any significant findings would be shared globally. This cooperation was a benefit for both space agencies, and although conducted as a one-time informal agreement, it could set precedent for continued cooperation between these two major space powers. Information sharing, even in small instances, can start to build confidence and trust and ultimately could be a tool used to prevent or de-escalate future conflicts in space.

Collaborating with non-allied countries in space is not a foreign concept for NASA. In the height of the Cold War, the U.S. and Soviet space agencies agreed to work together. President Eisenhower pursued these cooperative initiatives in early [letters](https://www.nasa.gov/50th/50th_magazine/coldWarCoOp.html) to Soviet leadership to showcase the peaceful uses of space. Collaborating on missions like the [Apollo-Soyuz](https://www.nasa.gov/apollo-soyuz/overview) test project and later the [Shuttle-Mir](https://www.nasa.gov/mission_pages/shuttle-mir/) program helped propel human space exploration and established a mutually beneficial area of cooperation and communication between the two rivals. This collaboration proved invaluable for both countries in understanding the capabilities and organization of each other’s civil space agencies, and it continues today on the ISS.

As China grows as a space power, U.S. cooperation in selected civil space projects could be one of the best ways to understand the goals and capabilities of the Chinese space agency. Moreover, it would establish avenues of communication and trust between the two nations that could be mutually beneficial in the future. The Wolf Amendment’s statutory exclusion of U.S. – Chinese bilateral cooperation in space has only incentivized China to accelerate its space development programs, creating a serious challenger to U.S. leadership in this vital domain of exploration. History has shown that when the U.S. cooperates with foreign competitors in civil space projects, it enhances NASA’s leadership role. The Wolf Amendment has neither discouraged Chinese space ambitions or altered China’s behavior on human rights—it has only muddled our relationship with China and created an opening for a challenger to NASA’s leadership role in space exploration. The provisions of the Wolf Amendment are not needed to protect technology transfer and only serve to stifle mutually beneficial cooperation for science and exploration. It is time to stop howling at the thought of cooperating with China for exploration missions to the Moon and revise the Wolf Amendment.

#### Space wars don’t cause escalation

James Pavur 19, Professor of Computer Science Department of Computer Science at Oxford University and Ivan Martinovic, DPhil Researcher Cybersecurity Centre for Doctoral Training at Oxford University, “The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space”, 2019 11th International Conference on Cyber Conflict: Silent Battle T. Minárik, S. Alatalu, S. Biondi, M. Signoretti, I. Tolga, G. Visky (Eds.), <https://ccdcoe.org/uploads/2019/06/Art_12_The-Cyber-ASAT.pdf>

A. Limited Accessibility Space is difficult. Over 60 years have passed since the first Sputnik launch and only nine countries (ten including the EU) have orbital launch capabilities. Moreover, a launch programme alone does not guarantee the resources and precision required to operate a meaningful ASAT capability. Given this, one possible reason why space wars have not broken out is simply because only the US has ever had the ability to fight one [21, p. 402], [22, pp. 419–420]. Although launch technology may become cheaper and easier, it is unclear to what extent these advances will be distributed among presently non-spacefaring nations. Limited access to orbit necessarily reduces the scenarios which could plausibly escalate to ASAT usage. Only major conflicts between the handful of states with ‘space club’ membership could be considered possible flashpoints. Even then, the fragility of an attacker’s own space assets creates de-escalatory pressures due to the deterrent effect of retaliation. Since the earliest days of the space race, dominant powers have recognized this dynamic and demonstrated an inclination towards de-escalatory space strategies [23]. B. Attributable Norms There also exists a long-standing normative framework favouring the peaceful use of space. The effectiveness of this regime, centred around the Outer Space Treaty (OST), is highly contentious and many have pointed out its serious legal and political shortcomings [24]–[26]. Nevertheless, this status quo framework has somehow supported over six decades of relative peace in orbit. Over these six decades, norms have become deeply ingrained into the way states describe and perceive space weaponization. This de facto codification was dramatically demonstrated in 2005 when the US found itself on the short end of a 160-1 UN vote after opposing a non-binding resolution on space weaponization. Although states have occasionally pushed the boundaries of these norms, this has typically occurred through incremental legal re-interpretation rather than outright opposition [27]. Even the most notable incidents, such as the 2007-2008 US and Chinese ASAT demonstrations, were couched in rhetoric from both the norm violators and defenders, depicting space as a peaceful global commons [27, p. 56]. Altogether, this suggests that states perceive real costs to breaking this normative tradition and may even moderate their behaviours accordingly. One further factor supporting this norms regime is the high degree of attributability surrounding ASAT weapons. For kinetic ASAT technology, plausible deniability and stealth are essentially impossible. The literally explosive act of launching a rocket cannot evade detection and, if used offensively, retaliation. This imposes high diplomatic costs on ASAT usage and testing, particularly during peacetime. C. Environmental Interdependence A third stabilizing force relates to the orbital debris consequences of ASATs. China’s 2007 ASAT demonstration was the largest debris-generating event in history, as the targeted satellite dissipated into thousands of dangerous debris particles [28, p. 4]. Since debris particles are indiscriminate and unpredictable, they often threaten the attacker’s own space assets [22, p. 420]. This is compounded by Kessler syndrome, a phenomenon whereby orbital debris ‘breeds’ as large pieces of debris collide and disintegrate. As space debris remains in orbit for hundreds of years, the cascade effect of an ASAT attack can constrain the attacker’s long-term use of space [29, pp. 295– 296]. Any state with kinetic ASAT capabilities will likely also operate satellites of its own, and they are necessarily exposed to this collateral damage threat. Space debris thus acts as a strong strategic deterrent to ASAT usage.