# 1NC

## Off

### 1NC – T

#### Interpretation: The aff may only garner offense off a policy stating that the appropriation of outer space by private entities is unjust. To clarify, the aff may not defend the resolution as a consequence of another action or policy.

#### Violation: they defend restricting appropriation of outer space as a consequence of expanding the public trust doctrine.

#### Limits – the only thing the aff has to defend is an external policy that has no predictability since they can just say the plan is a public consequence of the thing they are doing – means the locus of the debate is about an external topic like the PTD as opposed to space appropriation. This is especially problematic because they can use that unpredictable policy to gain extra topical offense that can be used to solve links to disads that would otherwise be the center of the topic, which takes out generics check CP.

#### Especially true with this aff – they use expansion of a legal principle to solve multilat and heg – also ruins counterplan competition.

#### Topicality is a voting issue that should be evaluated through competing interpretations – it tells the negative what they do and do not have to prepare for—there’s no way for the negative to know what constitutes a “reasonable interpretation” when we do prep – reasonability is arbitrary and causes a race to the bottom, proliferating abuse

#### No RVIs—it’s your burden to be topical.

### 1NC – DA

#### NASA is preserving resources by leveraging private partnerships

Miriam Kramer 21, author of Space, “NASA's plans for the future hinge on the success of private companies,” Axios, 12-7-2021, https://www.axios.com/nasa-private-spaceflight-plans-5a5710e6-5223-4da3-8c5d-5a712e1d862e.html

The private space players who will drive NASA's plans for the coming decade are declaring themselves and defining the stakes. Why it matters: NASA plans to focus on getting people to Mars and the Moon, and its deep space exploration ambitions hinge on the agency being able to successfully hand over major operations in low-Earth orbit to private companies. The space agency hopes companies will build private space stations that its astronauts can use and to continue to buy space on private rockets for launching its satellites and other payloads to orbit and beyond. NASA's "big experiment" right now is to test where these commercial partnerships work, the Planetary Society's Casey Dreier told Axios. What's happening: Last week, NASA announced it would award multimillion-dollar contracts to three teams of commercial space companies to start designing and building privately operated space stations.

#### Plan forces spending trade-offs that crush effective Earth sciences --- risks catastrophic climate change

Haymet 7 (Tony, Director of the Scripps Institution of Oceanography – University of California, San Diego, Mark Abbott, Dean of the College of Oceanic and Atmospheric Science – Oregon State University, and Jim Luyten, Acting Director – Woods Hole Oceanographic Institution, “The Planet NASA Needs to Explore”, Washington Post, 5-10, [http://www.washingtonpost.com/wp-dyn/content/article/2007/05/09/AR2007050902451.html](http://www.lexis.com/research/retrieve))

Decades ago, a shift in NASA priorities sidelined progress in human space exploration. As momentum gathers to reinvigorate human space missions to the moon and Mars, we risk hurting ourselves, and Earth, in the long run. Our planet -- not the moon or Mars -- is under significant threat from the consequences of rapid climate change. Yet the changing NASA priorities will threaten exploration here at home.

NASA not only launches shuttles and builds space stations, it also builds and operates our nation's satellites that observe and monitor the Earth. These satellites collect crucial global data on winds, ice and oceans. They help us forecast hurricanes, track the loss of Arctic sea ice and the rise of sea levels, and understand and prepare for climate changes.

NASA's budget for science missions has declined 30 percent in the past six years, and that trend is expected to continue. As more dollars are reallocated to prepare for missions back to the moon and Mars, sophisticated new satellites to observe the Earth will be delayed, harming Earth sciences.

The National Academy of Sciences has noted that the Landsat satellite system, which takes important measurements of global vegetation, is in its fourth decade of operation and could fail without a clear plan for continuation. The same is true for the QuikSCAT satellite, which provides critical wind data used in forecasting hurricanes and El Niño effects.

In January, a partnership of university and NASA scientists demonstrated that climate change and higher ocean temperatures were reducing the growth of microscopic plants and animals at the heart of the marine food web.

Their analysis was based on nearly a decade of NASA satellite measurements of ocean color, which unfortunately are at risk of being interrupted for several years.

Sea levels are rising, and the Arctic Ocean may be ice-free in summer. The buildup of carbon dioxide in the oceans threatens to make them more acidic, which may in turn hinder the ability of some types of marine life, including corals, to build their shells and skeletons. We must learn as much as we can to assess these threats and develop solutions.

Satellites provide coverage of vast, remote regions of our planet that would otherwise remain unseen, especially the oceans, which play an important role in climate change. Without accurate data on such fundamentals as sea surface height, temperatures and biomass, as well as glacier heights and snowpack thickness, we will not be able to understand the likelihood of dangers such as more severe hurricanes along the Gulf Coast or more frequent forest fires in the Pacific Northwest.

Climate change is the most critical problem the Earth has ever faced.

Government agencies and the private sector, as well as individual citizens, need to better grasp the risks and potential paths of global climate change. Mitigating these risks and preparing for the effects of warming will require scientific understanding of how our complex planet operates, how it is changing, and how that change will affect the environment and human society.

John F. Kennedy's brilliant call to put a man on the moon by the end of the 1960s set an arbitrary deadline, but the deadline we face today is set by nature. NASA must continue to play a vital role in helping find ways to protect our planet for (and perhaps from) its intelligent life. Exploration of space is a noble quest. But we can't afford to be so starry-eyed that we overlook our own planet.

#### Warming is inevitable but adjusting government policy can address the worst effects – specifically, for sea level rise. US responses are modeled globally.

**Economist 17**, "How government policy exacerbates hurricanes like Harvey," Economist, https://www.economist.com/news/leaders/21727898-if-global-warming-were-not-enough-threat-poor-planning-and-unwise-subsidies-make-floods

THE extent of the devastation will become clear only when the floodwater recedes, leaving ruined cars, filthy mud-choked houses and the bloated corpses of the drowned. But as we went to press, with the rain pounding South Texas for the sixth day, Hurricane Harvey had already set records as America’s most severe deluge (see Briefing). In Houston it drenched Harris County in over 4.5trn litres of water in just 100 hours—enough rainfall to cover an eight-year-old child. The fate of America’s fourth-largest city holds the world’s attention, but it is hardly alone. In India, Bangladesh and Nepal, at least 1,200 people have died and millions have been left homeless by this year’s monsoon floods. Last month torrential rains caused a mudslide in Sierra Leone that killed over 1,000—though the exact toll will never be known. Around the world, governments are grappling with the threat from floods. This will ultimately be about dealing with climate change. Just as important, is correcting short-sighted government policy and the perverse incentives that make flooding worse. Judgment day The overwhelming good news is that storms and flooding have caused far fewer deaths in recent decades, thanks to better warning systems and the construction of levees, ditches and shelters. The cyclone that struck Bangladesh in 1970 killed 300,000-500,000 people; the most recent severe one, in 2007, killed 4,234. The bad news is that storms and floods still account for almost three-quarters of weather-related disasters, and they are becoming more common. According to the Munich Re, a reinsurer, their number around the world has increased from about 200 in 1980 to over 600 last year. Harvey was the third “500-year” storm to strike Houston since 1979. At the same time, floods and storms are also becoming more costly. By one estimate, three times as many people were living in houses threatened by hurricanes in 2010 as in 1970, and the number is expected to grow as still more people move to coastal cities. The UN reckons that, in the 20 years to 2015, storms and floods caused $1.7trn of destruction; the World Health Organisation estimates that, in real terms, the global cost of hurricane damage is rising by 6% a year. Flood losses in Europe are predicted to increase fivefold by 2050. One cause is global warming. The frequency and severity of hurricanes vary naturally—America has seen unusually few in the past decade. Yet the underlying global trend is what you would expect from climate change. Warmer seas evaporate faster and warmer air can hold more water vapour, which releases energy when it condenses inside a weather system, feeding the violence of storms and the intensity of deluges. Rising sea levels, predicted to be especially marked in the Gulf of Mexico, exacerbate storm surges, adding to the flooding. Harvey was unusually devastating because it suddenly gained strength before it made landfall on Friday; it then stayed put, dumping its rain on Houston before returning to the Gulf. Again, that is consistent with models of a warmer world. Poor planning bears even more blame. Houston, which has almost no restrictions on land-use, is an extreme example of what can go wrong. Although a light touch has enabled developers to cater to the city’s rapid growth—1.8m extra inhabitants since 2000—it has also led to concrete being laid over vast areas of coastal prairie that used to absorb the rain. According to the Texas Tribune and ProPublica, a charity that finances investigative journalism, since 2010 Harris County has allowed more than 8,600 buildings to be put up inside 100-year floodplains, where floods have a 1% chance of occurring in any year. Developers are supposed to build ponds to hold run-off water that would have soaked into undeveloped land, but the rules are poorly enforced. Because the maps are not kept up to date, properties supposedly outside the 100-year floodplain are being flooded repeatedly. Government failure adds to the harm. Developing countries are underinsured against natural disasters. Swiss Re, a reinsurer, says that of the $50bn or so of losses to floods, cyclones and other disasters in Asia in 2014, only 8% were covered. The Bank of International Settlements calculates that the worst natural catastrophes typically permanently lower the afflicted country’s GDP by almost 2%. America has the opposite problem—the federal government subsidises the insurance premiums of vulnerable houses. The National Flood Insurance Programme (NFIP) has been forced to borrow because it fails to charge enough to cover its risk of losses. Underpricing encourages the building of new houses and discourages existing owners from renovating or moving out. According to the Federal Emergency Management Agency, houses that repeatedly flood account for 1% of NFIP’s properties but 25-30% of its claims. Five states, Texas among them, have more than 10,000 such households and, nationwide, their number has been going up by around 5,000 each year. Insurance is meant to provide a signal about risk; in this case, it stifles it. Mend the roof while the sun shines What to do? Flooding strengthens the case for minimising climate change, which threatens to make wet places wetter and storms stormier. Even those who doubt the science would do well to see action as an insurance policy that pays out if the case is proven. However, that will not happen fast, even if all countries, including America, sign up to international agreements. More immediately, therefore, politicians can learn from Houston. Cities need to protect flood defences and catchment areas, such as the wetlands around Kolkata and the lakes in and around Pokhara in Nepal, whose value is becoming clear. Flood maps need to be up to date. Civil engineers, often starved of funds and strangled by bureaucracy, should be building and reinforcing levees and reservoirs now, before it is too late. The NFIP should start to charge market premiums and developing countries should sell catastrophe bonds. All this is a test of government, of foresight and the ability to withstand the lobbying of homeowners and developers. But politicians and officials who fail the test need to realise that, sooner or later, they will wake up to a Hurricane Harvey of their own.

#### The impact’s global war

Eric **Holthaus 15**, editor at rollingstone magazine citing James Hansen, former NASA climatologist, "The Point of No Return: Climate Change Nightmares Are Here," Rolling Stone, accessed 10-23-2016, http://www.rollingstone.com/politics/news/the-point-of-no-return-climate-change-nightmares-are-already-here-20150805

On July 20th, James Hansen, the former NASA climatologist who brought climate change to the public's attention in the summer of 1988, issued a bombshell: He and a team of climate scientists had identified a newly important feedback mechanism off the coast of Antarctica that suggests mean sea levels could rise 10 times faster than previously predicted: 10 feet by 2065. The authors included this chilling warning: If emissions aren't cut, "We conclude that multi-meter sea-level rise would become practically unavoidable. Social disruption and economic consequences of such large sea-level rise could be devastating. It is not difficult to imagine that conflicts arising from forced migrations and economic collapse might make the planet ungovernable, threatening the fabric of civilization."

### 1NC – DA

#### Reforms spurred by popular backlash are critical to Russian growth and coming now, but the plan stops them by giving Putin a foreign policy win that secures legitimacy

Andrew Wood 19, Associate Fellow in the Russia and Eurasia Program of Chatham House, Former British Ambassador to Belgrade and Moscow, “Putinist Rule Minus Putin?”, The American Interest, 7/29/2019, https://www.the-american-interest.com/2019/07/29/putinist-rule-minus-putin/

The Russian tradition of top-down rule has a long history, but Vladimir Vladimirovich Putin was not condemned to follow it over the past couple of decades. It was Putin who made the crucial decision to reinforce it further on his return to the Kremlin in 2012 by choosing repression over the cautious economic reforms that had been mooted in the Medvedev presidential interlude. He it was who seized Crimea in 2014 and invaded eastern Ukraine. He has overseen the decline in the Russian economy since 2008 and the continuing rise in corruption that has gone along with it. He is responsible for the servility of the Duma and the courts to the diktat of the executive branch, and for the predatory conduct of Russia’s various enforcement agencies.

The questions for Russia now are how, and whether, present political structures can in due course cope without Putin. “Putinism” is a convenient shorthand for describing the way Russia is ruled, but that is the result of a personalized process intended to enforce the unity of the Russian state and the obligation of its citizens to obey its requirements, not a construct defined in detail from the start. Its principal achievement has been that it has both protected and enhanced the role of the center. Putin’s re-election as President in 2018 confirmed authoritarianism as a process in continuing advance, its overriding purpose being to retain power in the interests of those already wielding it, and bound by loyalty to its central figure, at present Putin.

Putin does not of course literally rule alone. He cannot in the nature of things decide everything in Russia by himself. He could not, even if he wished it, prevent those holding some degree of power at any level from using it to their cumulative advantage without regard to the law, or to what most outsiders would see as common decency, for that matter. He is most immediately dependent on the support of a narrowing set of long-term collaborators, whether political-, security-, or business-related, whose interests are also dependent on the present disorder of things, together with the mutual and complicit trust among those collaborators essential to its preservation. Putin is the linchpin that holds them together. Hang together or hang separately is the English language proverb. There is no doubt a Russian one.

Stability?

Putin’s present term ends in May 2024. He cannot under Russia’s Constitution stand again that year. But the personalized and repressive logic of Putinism implies that a way to allow him to remain in command must nevertheless be found. As Grigory Yavlinsky rightly put it in his updated and newly translated study of what he calls peripheral authoritarianism, in Russia and in other states similarly governed:

signs have become more pronounced that Russia’s autocracy is developing along the lines of long-term usurpation of power by a very close circle of people that see politics in terms of highly personal power play rather than as a mechanism to ensure the long-term survival of Russian statehood.

Yavlinsky concludes that the spectrum of remaining opportunities for change has narrowed, at least for the next decade. If that proves to be so, preserving a lasting claim to continuing legitimacy without addressing Russia’s external or internal problems would in effect, if it succeeded, be to freeze those problems in place.

The shadow of unknown and so far unpredictable change in 2024 has now fed into a shift in public attitudes since Putin’s re-election in 2018. Putin himself has become somewhat tarnished, losing in the process his image of being beyond politics, and of being Russia’s necessary savior. Putin is now held personally responsible for domestic problems that he could once deflect onto his Prime Minister’s shoulders. The argument that the Kremlin is the defender of “traditional values” on behalf of the Russian people has lost some of its force. The perception that Russia’s leaders are concerned for their own interests and those of their privileged dependents, rather than those of Russia’s ordinary citizens, is becoming the norm. Polls show that about 27-30 percent of the population are now ready, or at least say they are ready, to take part in street protests. These are becoming more common, not least outside Moscow, provoked for the most part by local issues and the misdeeds of local or regional office holders. But they all nevertheless reflect to some degree or another on the standing of the Kremlin.

None of this is to suggest that widespread public disturbance is imminent. What triggers that in any society is always unpredictable. There are, moreover, neither widely accepted ideas for better government nor public figures of sufficient standing to articulate them in Russia, for now at least, around whom such disturbances might crystallize on a nation-wide scale. But the existing and potentially developing shift in public attitudes does indicate that, if Putin chooses to stay in effective power after 2024, then continuity in the Kremlin will be dependent on popular resignation rather than enthusiasm. Russia’s economic prospects up to and beyond 2024 are poor, and neither Putin nor his authoritarian minded supporters have serious proposals for improving them. The “National Projects” he has put forward are similar in principle to others that have been tried in vain before. Assertions that innovative investment in the defense sector will pay off in promoting diversity across the economy as a whole have proved false. Per capita income has declined over the past five years and may not easily recover. Putin and his colleagues can no longer rely, as the Kremlin did ten or more years ago, on growing income from natural resources, however ill-managed, to bolster its popular appeal and to pay off its political allies. Around three-quarters of Russia’s GDP is by now state owned, meaning run by Putin sanctioned beneficiaries.

Significant capital flight has continued and is a clear marker of distrust of the authorities. So too is the less widely noted emigration of well educated and enterprising Russians to the Western democracies since 2000, whose rate rose significantly after Putin’s return to the Kremlin in 2012. The total over the past 19 years is estimated to be 1.6–2 million.

The Internal Backstop

Economic difficulties, a sense that Putinism has exhausted its political capital and resentment at the enforcement of top down control may perhaps make a further Putin term after 2024 troublesome to implement without some sort of domestic or foreign event to make it seem necessary. There are however significant numbers of Russians able to benefit from the complexities of the present state of affairs, or unsettled enough at the thought of Putin going without a clear and reasonably trusted successor in prospect to make Putin’s continuance in effective control seem by 2023 both inevitable and acceptable. Continued stagnation from 2024 on and uncertain relations with the outside world would, on the other hand, seem likely to fuel more and more discontent.

There is at present no sign of an aging Putin or his collaborators having anything fresh to offer on his home front, either before or after 2024. But he has a telling reserve of force at his disposal for the purpose of ensuring the survival of the regime in case of domestic violence. The National Guard is comparable in numbers to the Russian Armed Forces. Its declared purpose is to ensure public order, meaning in practice keeping Russian citizens in order by force, however violent. There are other internal agencies with similar powers. The extent of the network expresses ruthlessness but is also a mark of fear within the regime as to the committed loyalty of the Russian people in general. The same is true of the persistent effort made by Kremlin supporters to confine public discussion to their approved agenda of how Russia should develop, politically, economically or with regard to the rest of the world.

The effect is that Russia at present exists in a state of limbo, with its governing authorities incapable of addressing the issues of most importance to its citizens, its domestic concerns. The large share of the Russian budget devoted to domestic and international security gets in the way, along with the interest of privileged state contractors in using every opportunity to pursue and price projects designed to fill their pockets rather than benefit the public as a whole.

Great Power?

Stephen Kotkin records in his magisterial history of the Stalin years that, by 1937, “Perceived security imperatives and a need for absolute unity once again turned the quest in Russia to build a strong state into personal rule.” Stalin has of course been restored to eminent repute in Russia under Putin, and Putin has been influenced by Stalin’s train of thought, as well as borrowing his language from time to time. But I do not quote Kotkin to show that Putin is a Stalin clone, merely to point to the fact that Putin’s aim from the beginning has been, like Stalin’s and others’ before him, to build a strong state in Russia by means of a “vertical of power,” and that the end result is, once again, personal rule. Security imperatives, as Putin would see them, have been a driving force, with the need for absolute unity in meeting them as the inescapable corollary. Like Stalin before him, Putin does not draw a distinction between what he sees as threatening at home or abroad. The two shade into one another.

The tragedy of Beslan in September 2004, for instance, was by any normal criteria an internal affair, with the school seized by Chechen terrorists and the threat resolved with brutal slaughter by Russian forces. For Putin, it was also an attempt by unspecified foreign forces to seize a “juicy piece” of Russian territory, and a reason to abolish the autonomous standing of Russia’s Governors. He and his colleagues saw the 2004-05 Orange Revolution in Ukraine not as an internal crisis in that state, but as the result of foreign interference directed at Russia. He responded at home with increasingly stringent measures against non-governmental organizations in Russia, starting with any that had any form of external financial aid and the introduction and extension of measures directed against “extremism.” He argued that the street protests of 2011-12 were provoked and planned by Hillary Clinton. And so on, to the need to protect Fortress Russia today from internal Fifth Columnists and from hostile foreign powers determined to destroy it.

There are of course complexities in this process of hardening attitudes in official Russia as to its relationship with its own people, with its ex-Soviet neighbors, with former members of the Warsaw Pact, and with the West in general over the Putin years, but one strain is constant: Nothing is ever Russia’s fault. Moscow is always sinned against. Putin’s historic mission is to restore his country’s status as a great power, with the right to establish and protect its hegemony over its neighbors. Those neighbors have no right to object, let alone to look to outside powers to support their independence. Putin and his colleagues have public support in Russia for such a stance, as did their tsarist predecessors in analogous circumstances. But the Russian public would at the same time by now prefer there to be a less fraught relationship with the rest of Europe, and the United States too. The euphoria provoked by the Kremlin’s bloodless seizure of Crimea in 2014 has faded. The idea that their country has a special mission to defend itself, and that this has to be done by cowing its neighbors into effective submission, is still there as a general assumption, but not as an immediate aspiration.

#### The plan masks the need for economic modernization

Nicole J. Jackson 19, Associate Professor in International Studies, Specializing in Russian and Eurasian Politics and Security Studies at the School for International Studies, Simon Fraser University, Vancouver, Canada, PhD from the London School of Economics, Outer Space in Russia’s Security Strategy, Chapter19, Routledge Handbook of Russian Security, Reviewed & Edited by Roger E. Kanet, Professor of Political Science at the University of Miami, Taylor and Francis

Today, the Russian Federation is a major actor in space and outer space governance. Its presence in space is second only to that of the US. Meanwhile, the challenges of keeping outer space ‘secure’ is growing in importance and complexity in the current context of globalisation, rapid technological change, and the increasing access to space for state and non-state actors. Russia considers outer space as a strategic region to enhance its military capabilities on earth, provide intelligence and communication functions, and achieve international status and prestige as a space power. It is sensitive to US strategy and actions and has developed counter-space technologies (e.g. electronic weapons that can jam satellites) to provide Russia with an asymmetrical edge to offset US military advantages. However, Russia’s outer space rhetoric and policy are also driven by domestic and identity issues. Outer space strategy is an instrument through which Russia pursues its goal to be a ‘great power’ and to shape the international system more closely to the new multipolar world as it sees it. It may also bring Russia economic benefits and mask internal challenges.

President Vladimir Putin has taken both symmetric and asymmetric actions in outer space and increased Russia’s investment in new technologies (satellites, electronic warfare,1 strategic offensive weapon, etc.) and simultaneously pursued diplomatic initiatives to control weapons in space. During the Cold War, despite military tensions and serious concern about a possible arms race in outer space, Russia and the US negotiated internationally binding agreements related to the governance of space activities. Today, both powers are again warning of a new arms race in outer space while continuing to strengthen the roles of their militaries in the field.

Since 2000, Russia has actively pursued both binding laws and non-binding norms to ban and control weapons in outer space and has advocated for non-binding, voluntary transparency and confidence-building measures (TCBMs). Sometimes it has done this in cooperation with other states, sometimes in opposition to them. This diplomatic endeavour may seem somewhat at odds with Russia’s growing militarisation; however, the dual role on outer space fits well within Russia’s overall foreign and security strategy which is both reactive to US policy and simultaneously pro the United Nations (UN) and consensus-based multilateral negotiations. Russia is strengthening its comprehensive power, including military, diplomatic and normative global influence, in order to make its voice heard on the international stage. Russia’s diplomatic activism is that of an aspirational great power, but it also reflects the limits of its current economic and military weaknesses. International negotiations enable Russia to be recognised as a key player in global affairs, while also benefiting from an opportunity to highlight the US/West’s declining influence and the rise of a multipolar world.

This chapter examines why outer space is so important for Russia. Then, it shows how and why the Russian government’s outer space strategy and capabilities have evolved since the 1990s. The paper concludes with an appraisal of Russia’s recent diplomatic initiatives on outer space governance.2 No longer economically competitive in the race for control of outer space, Russia has attempted several strategies to enable it at least to keep in the running. It has placed its space strategy in the context of defence requirements and state military control. It is using diplomacy – working with international organisations affiliated with the UN – to discuss, cooperate on and influence the race for the militarisation of space. It works with disarmament organisations to influence and promote a collective approach to the problem, rather than one dominated by the richer and more powerful states. Russia’s securitisation of outer space: threats and opportunities The Russian state defines threats largely in traditional terms of territorial protection from military challenges and views space assets as vital for military communication and defence. Russia’s geography highlights the need to protect its extensive borders and military and economic assets and infrastructure scattered over its vast territory (Barvinenko, 2007). The state has traditionally assessed that it is surrounded by hostile powers and thus needs ‘buffers’ or a ‘sphere of influence’ to protect itself. Today, Russia has expanded this rhetoric of vulnerability to include attacks from outer space. Russians use the term ‘aerospace’ rather than outer space because of the interrelatedness of airspace and outer space in the context of contemporary threats and conflicts, and because there is no distinct boundary between the two concepts (Kupriyanov, 2005). Russia’s rhetoric on outer space broadly mirrors that of the US, stressing urgency to prepare for a possible future war there. In 2017, US Navy Vice Admiral Charles Richards, deputy commander of US Strategic Command, argued that ‘With rapidly growing threat of a degraded space environment, we must prepare for a conflict that extends into space’ (quoted in Daniels, 2017).

Rapid technological advancements in the space industry have influenced perceptions that there are economic benefits from being a space power. At the same time, they have given rise to concerns about threats stemming from the militarisation of space. For example, the development of cheap miniature satellites promises speedy replacement of disabled satellites in the event of attack. Theoretically, this could allow the US military (or other actors) to use such space constellations to support operations during a conflict.3 Through technology outer space has become integrated with other domains – land, sea, air and cyber. Most recently, the first generation of hypersonic weapons has ‘set the conditions for the merger of air and missiles defence and the air and outer space domains’ (Charron and Fergusson, 2018). Of course, a healthy space industry also provides strategic resources for a state’s military and economy. In Russia’s case, the announcement of new technological developments also masks unaddressed structural and systemic weaknesses and confers domestic and international legitimacy on Russia’s aspiration to be a ‘great power’.

#### Extinction

Bruce Blair 19, Co-founder of Global Zero, nuclear security expert and a research scholar at the Program on Science and Global Security at Princeton University's Woodrow Wilson School of Public and International Affairs, with; Clifford Gaddy; 2019, “Russia’s Aging War Machine,” https://www.globalzero.org/wp-content/uploads/2019/03/BB\_Russias-Aging-War-Machine\_1999.pdf

The Stakes for the United States Should Americans and their government care about Russia’s nuclear posture and its dissolution? The answer is an emphatic yes. American security is bound up in Russia’s destiny, and our immediate security depends crucially on ironclad Russian control over its nuclear arsenal.

If we are very lucky, the Russian nuclear arsenal and control system will atrophy without incident, coming to a safe instead of deadly end. In such a happy scenario, this atrophy will also encourage Russia to ratify the START II arms reduction treaty and negotiate even deeper bilateral reductions, lowering the ceiling on strategic deployments from 3,500 (START II) to 2,500 (START III) or fewer.Within a decade or so Russia’s aging force could easily shrink to 500 or fewer, creating enormous latitude to negotiate vast reductions in deployments.

But this scenario is wishful thinking loaded with untenable assumptions. The START process has stalled and may not be revived any time soon, leaving in place increasingly decrepit and hazardous forces that Russia might not retire after all. The decay of the Russian arsenal is certain to run growing risks of proliferation and to erode safety along with basic offensive capability. For example, a degraded early warning network is less able to detect an actual attack—but also less able to screen out false indications of attack. Similarly, failure in the nuclear command link between the General Staff in Moscow and the launch crews in the field would disrupt not only the ability of the General Staff to quickly transmit the go code, but also the feedback loop from the missiles to the General Staff that detects and prevents an unauthorized launch attempt at any subordinate level of command. Finally, the departure of security guards from their posts at weapons depots to forage for food or escape inclement weather may not only impede the authorized dispersal of those weapons during a crisis but also increase the vulnerability of the weapons to theft. And the danger is not merely theoretical. A 1996 CIA report noted that broken locking devices on some Russian nuclear weapons had not been repaired for lack of spare parts. In short, progressive nuclear deterioration in Russia increases the risks of mistaken, illicit, or accidental launch, and the loss of strict central control over Russia’s vast nuclear complex bodes ill for nonproliferation. If Russia’s nuclear designers, producers, and custodians surrender to economic pressure, they could open the floodgates to the illicit transfer of nuclear materials, weapons, and delivery technologies to America’s adversaries.

A meltdown of Russian nuclear control could be catastrophic for Americans. Securing Russia’s nuclear weapons and materials and strengthening safety and control over operational deployments deserve top billing among the security priorities of the U.S. government.

To alleviate the immediate danger, Russian and U.S. strategic missiles should be taken off hair-trigger alert so that none could be fired on a moment’s notice. “De-alerting” our arsenals, ideally by detaching the warheads from missiles, would reduce their susceptibility to illicit or mistaken launch.Today it takes only minutes to prepare those forces for launch. Reducing the interval to days or longer would provide a far larger margin of safety against many scenarios, ranging from the temporary loss of legitimate civilian control over Russian weapons to false warning in Russia’s early warning system—both more plausible dangers than a deliberate, cold-blooded attack by Russia or the United States against each other. The challenge of deterrence today pales beside the challenge of operational safety.

But even a comprehensive nuclear stand-down falls short over the long run. As long as Russia remains mired in economic, political, and military despair, the nuclear threat will continue. Russia will not be able to reduce its reliance on nuclear weapons until it can afford an adequate conventional military force. It will not be able to ensure control over its nuclear weapons and materials until it has a strong state, one based on a healthy economy and a civil society. The West’s vital stakes in this process of nation-building have not diminished, despite all the failures and frustrations of the past decade. If anything, those stakes have grown—as have the cost and effort needed to stabilize and transform Russia.

## Case

### 1NC – PTD

#### Public trust won’t set a binding precedent

Albert **LIN** Law @ UC Davis **’12** “Public Trust and Public Nuisance: Common Law Peas in a Pod?” Public Trust and Public Nuisance: Common Law Peas in a Pod." UCDL Rev. 45 p. 1089

The courts’ reluctance to expand the public trust doctrine far beyond waterways and tidal lands has not deterred commentators from calling for its broader application. Four decades ago, Joseph Sax suggested that application of the procedural and substantive protections developed in public trust cases may be “equally appropriate in controversies involving air pollution, the dissemination of pesticides, the location of rights of way for utilities, and strip mining or wetland filling on private lands.”78 Others have advocated an understanding of public trust resources that would embrace all natural resources, including the global atmosphere, soils, and forests.79 One difficulty with adopting a broader understanding of the public trust doctrine is the lack of a readily defensible stopping point.80 The public trust doctrine has the potential to reach — and to lead to restrictions on the behavior of — all parties that contribute collectively to an ecological problem, even if the causal link of any individual party to the problem is attenuated. This concern apparently has not been lost on the courts, which have generally rejected expansive interpretations of the doctrine.81

#### Public trust isn’t transformative

John **NAGLE** John N. Matthews Prf. @ Notre Dame Law **’15** “THE ENVIRONMENTALIST ATTACK ON ENVIRONMENTAL LAW” 50 TULSA L. REV. 593 p. 595

There is much in both books to applaud. The authors are especially effective in identifying the shortcomings in how environmental law actually operates today. But their proposed solutions are likely to fall short absent a more fundamental transformation of how we imagine the natural environment and humanity’s relationship to it. The public trust doctrine and the commons have been part of the fabric of the law for centuries, yet they have failed to accomplish the environmental goals that Wood, Weston, and Bollier hope to achieve now. And if we do experience a fundamental transformation in environmental thinking, then the existing environmental laws may finally fulfill their original purposes.

#### Space debris isn’t a threat --- current monitoring systems and rules solve.

Dave Mosher 18. Journalist for Business Insider, citing Jesse Gossner, an orbital-mechanics engineer who teaches at the US Air Force's Advanced Space Operations School/ 8-30-2018, "A space junk disaster could cut off human access to space. Here's how." https://www.businessinsider.com/space-junk-kessler-syndrome-chain-reaction-prevention-2018-3

The Kessler syndrome plays center-stage in the movie "Gravity," in which an accidental space collision endangers a crew aboard a large space station. But Gossner said that type of a runaway space-junk catastrophe is unlikely. "Right now I don't think we're close to that," he said. "I'm not saying we couldn't get there, and I'm not saying we don't need to be smart and manage the problem. But I don't see it ever becoming, anytime soon, an unmanageable problem." There is no current system to remove old satellites or sweep up bits of debris in order to prevent a Kessler event. Instead, space debris is monitored from Earth, and new rules require satellites in low-Earth orbit be deorbited after 25 years so they don't wind up adding more space junk. "Our current plan is to manage the problem and not let it get that far," Gossner said. "I don't think that we're even close to needing to actively remove stuff. There's lots of research being done on that, and maybe some day that will happen, but I think that — at this point, and in my humble opinion — an unnecessary expense."

#### Collisions are unlikely because all debris is moving in the same direction, at the same speed

Michael McClennen 18, Research Informaticist in the Department of Geoscience at the University of Wisconsin-Madison, “With So Many Satellites and Space Junk Floating Around the Earth, How Is It That There Are Not Very Many of Them Colliding With One Another or Crashing Into The Space Station or Even New Ships Sent Into Space?”, Quora, 10/10/2018, https://www.quora.com/With-so-many-satellites-and-space-junk-floating-around-the-earth-how-is-it-that-there-are-not-very-many-of-them-colliding-with-one-another-or-crashing-into-the-space-station-or-even-new-ships-sent-into-space

In addition to the other answers, there is another very important factor. A large majority of the orbiting objects (both satellites and debris) are all going in roughly the same direction around Earth, in the same direction as Earth’s rotation with an orbital inclination of between 0º and 22º with respect to the equator. This is due primarily to the fact that launching due East is more efficient than launching in any other direction, and allows you to use the least amount of fuel in getting your payload to orbit. In addition, the laws of physics mandate that all of the objects at a given orbital altitude are moving at roughly the same speed. These basic facts substantially lower the chances of collision. As these objects all move around the globe, they are roughly keeping station with respect to most of the other objects at the same altitude. There is, of course, another group of satellites and debris that are moving in polar orbits, which are roughly perpendicular to the the mostly-equatorial orbits I discussed in the previous paragraph. These satellites and most of their associated debris were deliberately placed into orbit at a different range of altitudes from the equatorially-orbiting satellites, specifically so that the two populations of objects would not crash into each other. So it is not the case that the tracks of orbiting objects randomly cross in all directions. Rather the ones at any given altitude are (mostly) moving in the same direction and at roughly the same speed. This has helped quite a bit to keep the orbital-debris situation tolerable so far.

#### No impact to space weather – the satellites that matter are resilient

Hunter 19 (Cameron, The Schumacher Institute, University of Bristol, “Environmental Security Above the Atmosphere: A Primer”, The Schumacher Institute, 11/10, <https://www.schumacherinstitute.org.uk/wpfb-file/201708-environmental-security-above-the-atmosphere-a-primer-cameron-hunter-pdf/>) DB

An unlikely event would be a solar flare which disables unprotected satellites over one hemisphere of the Earth – a “Carrington event” outlined above. Key military satellites are likely well-protected against this kind of radiation (due to its similarities to the effects of nuclear weapons) so essential systems like GPS would hopefully be unaffected. The damage would be concentrated on civilian communications, environmental and agricultural satellites. To replace them would take years and billions of dollars. In this scenario, however, the largest amount of damage would be to power grids on the surface, causing much more disruption than the effects to space systems. Perhaps the most dangerous effect of all would be the likely panic that affected populations would experience under such unusual circumstances. A highly unlikely and but highly consequential scenario would be a full-scale war in space with far-reaching effects both in orbit and on the surface. The most commonly discussed scenario would be some kind of US-China conflict in the South and/or East China Seas. According to some American observers, China would likely launch anti-satellite attacks early on in such a conflict in order to damage the technological advantage the American military has over the Chinese military. For this to have any meaningful strategic effect, China would have to launch a large number of ASAT missiles (Sankaran 2014). If these were of the “kinetic” type used in 2007, a Kessler event would be much more likely, or if the attacks were particularly intense, a cascade could be triggered at that point. An additional risk comes from the intersection of an international conflict and the potential loss of nuclear early-warning and command systems. In the very worst-case scenario, the US would be left with no way to detect a pre-emptive nuclear strike by China, and with poor prospects of communicating with its nuclear forces as the crisis unfolded. The result could well be an accidental nuclear war with global ramifications – consequences far in excess (and more concerning) than the effects on the space environment (for a fruitful discussion on this topic see BotAS 2015). Mitigation and resilience The questions of how resilient we are, or how we might mitigate the risks outlined so far, depend heavily on what risks we are talking about. As we have seen from the three brief imaginary scenarios, attempts to prevent or respond to the consequences of degradation of the space environment would need to vary to fit the specific consequences in question. There is a huge range of possible levels of risks and consequences, so this report cannot be exhaustive. Instead, it aims to raise some of the key issues on matters of mitigation and resilience. Despite the grim outlook in the long-run, it should be noted that there is a reasonable degree of resilience to the risks outlined in this report. Space weather may be unpredictable, but current models do not predict totally catastrophic results from solar activity. In a sense, this risk may not be worth mitigating against since it is quite unlikely (and key systems are already resilient to these effects). Similarly, even the economies most heavily dependent on space services are probably capable of absorbing the loss of some space services. The loss of a single satellite to a debris strike might damage some communication links, or limit our ability to collect data on climate change. Yet this outcome would be unlikely to cause widespread panic and, assuming no Kessler event was triggered, could be replaced with new satellites. The key space system for many advanced economies, GPS, is already very resilient, both to debris and to solar radiation. It has on-orbit back-up satellites and orbits in a relatively uncrowded area of space. Unless there was a major war in space in which many kinetic ASAT weapons were used, GPS would likely remain functioning. If this nightmare scenario were to occur, then as one attendee of the Schumacher Institute’s workshop observed, we would have much bigger problems to worry about. One concern is that the US might shutdown the GPS signal during a crisis, but eventually more global navigation systems will be functioning, such as the European Galileo system and Russia’s GLONASS.

#### No impact to grid or internet collapse

**Lovett 12**—quoting Tom Bogdan, Ph.D. in Physics from UChicago, Director of the National Oceanic and Atmospheric Administration’s Space Environment Center – AND – Rodney Viereck, Leader of the Data and Instrumentation Group Research Division NOAA Space Environment Center (Richard, National Geographic News, March 8, 2012, <http://news.nationalgeographic.com/news/2012/03/120308-solar-flare-storm-sun-space-weather-science-aurora/>, ZBurdette)

Even now, the center's Bogdan said, the most damaging emissions from big storms travel slowly enough to be detected by sun-watching satellites **well before** the particles strike Earth. "That gives us [about] 20 hours to determine what actions we need to take," Viereck said. (Related pictures: "Multicolored Auroras Sparked by Double Sun Blast" [August 2011].) In a pinch, power companies could protect valuable transformers by taking them offline before the storm strikes. That would produce local blackouts, but they wouldn't last for long. "The good news is that these storms tend to pass after a couple of hours," Bogdan added. Meanwhile, scientists are scrambling to learn everything they can about the sun in an effort to produce even longer-range forecasts.

#### Satellite loss shuts down global fracking

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Energy, environment, farming, mining, land use. All of these areas and more are now inextricably linked to satellite data and would be devastated should that flow of data stop.

Environmental Monitoring

Oh how complacent we've become. We take for granted that we will have instant images from space showing a volcanic eruption somewhere in the South Pacific within hours of learning that it happened. When the BP oll spill happened in the Gulf of Mexico in 2010, satellite images were used in conjunction with aircraft and ships to monitor the extent and evolving nature of the spill (Figures 10.1 and 10.2).

The data were also used to direct the ships that were attempting to clean up the spill, to warn fishermen of areas in which it would be dangerous to fish, and to generally monitor the extent of the disaster. This is the type of data we get from space in a field known as remote sensing.

Remote sensing is, well, exactly what its name implies. With it, you gather data, or sense, usually in the form of electromagnetic radiation (light), remotely - that is, you are not physically touching what you are looking at. Satellite remote sensing began shortly after we began launching satellites and many industries are now totally dependent upon having the capability.

We use satellites, like the venerable Landsat series, to study the Earth m unprecedented detail. Since 1972, Landsat satellites have taken millions of high resolution images of the Earth's surface, allowing comprehensive studies of how the land has changed due to human intervention (deforestation, agriculture, settlement, etc.) and natural processes (desertification, floods, etc.).

The best way to understand how useful Landsat and similar data can be to governments at all levels is best illustrated by looking at 14then and now" photographs. For example, Africa's Lake Chad has been shrinking for 40 years, as the desert has encroached on this once plentiful inland freshwater lake. Forty years ago, there were about 15,000 square miles of water within the lake. Now, it is less than 500 square miles (Figure 10.3) [1].

And what is the practical side of this particular bit of information?

Governments use this type of satellite imagery to avoid human tragedy. Hundreds of thousands of people, if not millions, depend upon the waters of Lake Chad for agriculture, industry, and personal hygiene. With the lake going dry, how has this impacted on their livelihoods, their families, and their very lives?

The European Space Agency (ESA) is freely providing satellite data to developing countries as they search for new sources of drinking water. For example, ESA assessed data obtained from space over Nigeria to find over 90 new freshwater sources within that country. After ground teams visited the new sites, all were confirmed to contain fresh water. This was no accident. These were satellites with sensors developed for just such purposes in mind [2].

Desertification is but one example of changing climates affecting people's everyday lives. What about more direct observations of our impact on the planet? Figures 10.4 and 10.5 show the scarring of the Earth's surface as a result of surface mining in West Virginia. This is not a polemic against mining; rather, it is an observation that we can use satellite imagery to monitor such mining and be mindful of its impact on the environment.

Other than taking pictures of surface features, like lakes and open pit mines, how are satellites monitoring the Earth's changing climate? In just about every way, by: monitoring global land, sea, and atmospheric temperatures; measuring yearly average rainfall amounts just about everywhere on the globe; measuring glaciation rates; measuring sea surface heights; and more. Remote sensing is more than taking pictures of the Earth in the visible part of the spectrum. We can learn a great deal from looking at part of the spectrum that our eyes cannot see - but our instruments can.

Shown in Figure 10.6 is a composite image of the Earth's surface showing the average land-surface temperature at night. The data came from two NASA satellites, Terra and Aqua, as they orbit the Earth in a polar orbit. (This means that they circle the Earth from top to bottom, passing over both the North and South Poles with each complete orbit.) Terra's orbit is such that it passes from the north to the south across the equator in the morning; Aqua passes south to north over the equator in the afternoon. Taken together, they observe the Earth's surface in its entirety every two days. Data sets such as this exist for just about any day of the year and can show either night-time lows or daytime highs.

By looking in different parts of the spectrum, like the infrared light discussed above, we can make observations as described in Table 10.1.

Pollution Monitoring

As emerging countries industrialize, they also become polluters. Many of these countries are not exactly forthright about releasing air-pollution details to the media, so much of our awareness of the rising pollution there is anecdotal - typically m the form of stories told by people who have visited these countries and seen the extreme pollution at first hand. This, by the way, is not exactly scientific.

Using satellites, and not relying on either the governments in question or second-hand stories, we can accurately assess the pollution levels there and elsewhere. Using satellite images to measure the amount of light absorbed or blocked by fine particulates in the atmosphere, otherwise known as air pollution, you can determine not only what the airborne pollutant might be, but also its size. And, by looking at the overall light blockage, an accurate estimate of the amount of pollution in the air can also be made. Recent studies show that many of these countries are covered in a pollution cloud that countries in the developed world would deem extremely harmful. And how do we know this with scientific certainty? From satellite measurements.

Energy Production

The recent boom in the production of shale oil in the United States and elsewhere is due in large part to the identification and geolocation of promising geologic formations for test drilling and fracking. "Fracking" is a somewhat new term that comes from the phrase "hydraulic fracturing". In fracking, massive amounts of previously unusable reservoirs of oil and natural gas are released for capture, sale, and transport from deposits deep within the Earth - many located at least a mile below the surface. In the United States alone, there may be as much as 750 trillion cubic feet of natural gas within shale deposits releasable by fracking [3]. How do energy companies know where to look for these deposits? In large part, by analyzing satellite imagery.

According to Science Daily (26 February 2009), a new map of the Earth's gravitational field based on satellite measurements makes it much less resource intensive to find new oil deposits. The map will be particularly useful as the ice melts in the oil-rich Arctic regions. The easy-to-find oilfields have already been found. To fuel the growing world economy, those harder-to-find deposits must be located and tapped - which is why satellite imagery is so important. Take away this and other satellite-dependent techniques of oil and gas exploration and the world economy will feel the impact through higher oil and natural gas prices.

#### Fracking makes extinction inevitable---try-or die to shut it off

Rev. Mac Legerton 18, Co-Founder and Executive Director of the Center for Community Action, Member of the Board of Directors of the NC Climate Solutions Coalition, Member of the Board of Directors of the Windcall Institute, “Will The U.S. Blaze A Trail To Mass Extinction?”, APPPL News, 1/15/2018, https://www.apppl.org/news/will-the-u-s-blaze-a-trail-to-mass-extinction/

As an elder, I now realize that there is even a greater threat to humanity and life on Earth than nuclear war—though, unlike a nuclear exchange, this threat is a slow-motion catastrophe. Can you guess what it is? Here’s a clue: it is something with which most people don’t have a personal relationship. Tragically, some persons remain in total denial of its validity, much less its present danger. And that’s the problem – that’s why this threat needs to be more seriously addressed on the local, state, national, and international level.

What is it? It’s the slow-motion but rapidly growing catastrophe of climate change. There’s now good news amidst this seemingly overwhelming challenge. But the answer may surprise you. Today we know what is the #1 preventable cause of climate change. It’s not coal, it’s not nuclear, and it’s not oil and gasoline. It’s actually the use of the very fuel that is touted as being cleaner, greener, and cheaper than all the rest. This fuel is called “Natural Gas”.

Let’s start with its name – “Natural Gas”. What is “natural gas”? There’s actually nothing “natural” about it when it is forcibly extracted from the ground through hydraulic fracturing, commonly known as “fracking”. When something is forcibly ruptured from deep within the earth with the use of toxic chemicals, the last name you would use for it is “natural”.

Fracking disrupts the geologic fault lines causing earthquakes, uses millions of gallons of fresh water that becomes permanently poisoned by unknown, cancer-producing chemicals added to it, creates air pollution during the drilling process, increases the risk of injury and explosions, raises major health risks to both people and place in close proximity to it, and changes the nature of both neighborhoods and landscapes. Fracking also leaves a massive carbon footprint of drilling wells as deep as 8,000 feet and then drilling horizontally over 10,000 feet; On top of all this, it leaks major amounts of gas into the environment.

So, what is this gas? It is 90-95% methane gas which is a hydrocarbon compound made up of one carbon atom and four hydrogen atoms (CH4). It releases carbon into the atmosphere and produces carbon dioxide (C02) just like coal does when it is burned. Methane is not its trace element–it is its undisputed compound of this fossil fuel product. If a compound is 90-95% of a product, it makes sense to call it by that name. Doesn’t it? Well, actually not if you want people to believe and think that it is something that it is not. It is un-natural methane gas produced under massive and highly toxic pressure and hazardous conditions.

Now that we know what this gas is, what does it do to the atmosphere and climate that is so dangerous? This hydrocarbon has properties that block the radiation of heat from Earth’s surface 100 times more effectively than CO2 (released from burning coal) during its first 10 years of release and 86 times more effectively in its first 20 years. Because of the climate emergency underway, the first 10 or 20 years matter most.

When utility companies and the larger fossil fuel companies state that they are committed to lowering carbon emissions, this just isn’t true. They are radically escalating the most dangerous and worst of all fossil fuels in relation to its impact on the climate. Now the industry wants to expand production of methane gas all over the world by calling it “the most environmentally friendly fossil fuel”and a “bridge fuel” that we can safely use until we transition to 100% renewable energy sources.

Why would a major business industry want to call its product by another name? Perhaps for the same reason that the tobacco industry did not like the term “coffin nails” or “cancer sticks” for cigarettes. Honestly, there’s a striking similarity between what are called cigarettes and natural gas. When both were produced and named, their harm was not fully known. Once the industries promoting them learned of their significant harm, they did everything they could to hide this knowledge from the public. They even hired scientists to deny their dangers. The tobacco industry was eventually sued, the truth was acknowledged, and billions of dollars were paid out in the tobacco settlement.

This same scenario that occurred with the tobacco industry needs to occur with methane gas and the fossil fuel industry. The major difference in these two scenarios is that that this fossil fuel product doesn’t just threaten the lives of individuals who voluntarily breathe it in – it threatens the lives of not only every human being, but also all life on the planet. The outcome of this scenario needs to be a moratorium and eventual end to all use of methane gas as an energy source. For the sake of all of us, our communities, and world, the sooner the better. This abomination is different. There is no time to waste.

#### No miscalc or escalation from space wars

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.

#### Debris and collisions won’t be interpreted as ASAT attacks---attribution works.

Eric J. Zarybnisky 2018, PhD in Operations Research @ MIT, Material Leader @ USAF, 28 March 2018, “Celestial Deterrence: Deterring Aggression in the Global Commons of Space,” https://apps.dtic.mil/dtic/tr/fulltext/u2/1062004.pdf

Unlike nuclear deterrence during the Cold War, deterring aggression in space does not have a fundamental philosophy such as Mutually Assured Destruction, which dictated a specific response to a nuclear attack. Reliance on satellites is neither equal among countries nor static over time. As more countries rely on space assets, policymakers need to understand the impact on deterrence, from both kinetic and non-kinetic engagements, to maintain the utility of the space environment. This paper argues that traditional deterrence theory is effective for kinetic space attacks but not for other types of attacks, namely non-kinetic physical, electromagnetic, and cyber. Underlying this argument is the fact that kinetic attacks can be readily attributed and a small number of countries have kinetic attack capability allowing for credible deterrence, which includes communication of the deterrent threat, without significant risk for miscalculation between countries. Traditional deterrence theory is not effective for other types of attacks including non-kinetic physical attacks (e.g., lasers or high-power microwaves), electromagnetic attacks (e.g., jamming) and cyber attacks, due to the challenges of attribution. Deterring kinetic aggression in space requires policymakers to develop a credible deterrent through exercises, budgetary authority, new international norms, and mechanisms to prevent inadvertent escalation.

#### Space miscalc doesn’t go nuclear---response will be proportional

Zack Cooper 18, senior fellow for Asian security at the Center for Strategic and International Studies (CSIS). Thomas G. Roberts is a research assistant and program coordinator for the Aerospace Security Project at CSIS, 1/2/18, "Deterrence in the Last Sanctuary," War on the Rocks, <https://warontherocks.com/2018/01/deterrence-last-sanctuary/>

Until recently, resilience in space was largely an afterthought. It was assumed that a conflict in space would likely lead to or precede a major nuclear exchange. Therefore, the focus was on cost-effective architectures that maximized satellite capabilities, often at the cost of resilience. Recently, however, some have hoped that new architectures could enhance resilience and prevent critical military operations from being significantly impeded in an attack. Although resilience can be expensive, American investments in smaller satellites and more distributed space architectures could minimize adversary incentives to carry out first strikes in space.

In the late 20th century, minor escalations against space systems were treated as major events, since they typically threatened the superpowers’ nuclear architectures. Today, the proliferation of counter-space capabilities and the wide array of possible types of attacks means that most attacks against U.S. space systems are unlikely to warrant a nuclear response. It is critical that policymakers understand the likely break points in any conflict involving space systems. Strategists should explore whether the characteristics of different types of attacks against space systems create different thresholds, paying particular attention to attribution, reversibility, the defender’s awareness of an attack, the attacker’s ability to assess an attack’s effectiveness, and the risks of collateral damage (e.g., orbital debris). Competitors may attempt to use non-kinetic weapons and reversible actions to stay below the threshold that would trigger a strong U.S. response. The 2017 National Security Strategy warns:

#### Precision farming via satellites *locks in* unsustainable agriculture practices by securing agri-business’ hold over small farmers globally

Ruiz-Marrero 02 (Carmelo Ruiz-Marrero, Fellow at the Society of Environmental Journalists and a Research Associate at the Institute for Social Ecology, “Precision Farming: Agribusiness Meets Spy Technology”, 10/2/02, http://www.councilforresponsiblegenetics.org/ViewPage.aspx?pageId=131)

Which corporations are involved? Joining forces to promote precision farming are farm equipment manufacturers like John Deere, agrochemical companies like Monsanto and DowElanco, pharmaceutical/biotech companies like Rhone-Poulenc, Novartis and AstraZeneca, as well as information brokering and data management firms. Not surprisingly, corporations with a long history of service to the military-industrial complex and intelligence agencies, like Rockwell and Lockheed Martin, are also jumping onto the precision farming bandwagon. For example, in a 1,000-acre potato farm, aerospace behemoth Lockheed Martin can place meteorological stations that measure 13 different weather parameters every 15 minutes and telemeter the data to a computer base station. "More than 430 gauges measure irrigation. Yield measurements are taken every three seconds during harvest. Crop quality samples are analyzed," boasts Lockheed's promotional material. What's more, "Soil is tested for 18 nutrient parameters. Microbialcommunities in the topsoil are studied." The Downside An interesting historical parallel comes to mind. Just as World War Two military contractors developed the chemicals and machinery that fueled the Green Revolution of the 1970's, precision farming is, to a large extent, an outgrowth of the space-age surveillance technologies used in the Cold War. The tight relationship between the military industries and industrial agriculture continues well into the twenty-first century. Some observers fear that these new technologies bode ill for sustainable agriculture and democratic governance, and could impose new forms of dependence on farmers. "Precision farming has less to do with mitigating agricultural pollution than with advancing industrial modes of production", according to social scientists Steven Wolf of the University of California, Berkeley and Fred Buttel of the University of Wisconsin. Action Group on Erosion, Technology and Concentration (ETC Group) Research Director Hope Shand agrees. "Precision farming is about commodification and control of information and it is among the high-tech tools that are driving the industrialization of agriculture, the loss of local farm knowledge and the erosion of farmers rights", she told CorpWatch. "With precision farming, farmers increasingly depend on off-farm decision making to determine precise levels of inputs. For example, dictating what seed, fertilizer, chemicals, row spacing, irrigation and harvesting techniques are used, and other management requirements," Shand explained. Precision farming seeks to legitimate and reinforce the uniformity and chemical-intensive requirements of industrial agriculture under the guise of protecting the environment and improving efficiency, according to Shand. How it Works: Remote Sensing Remote sensing is an important component of precision agriculture. For example, NASA is a partner in Ag 20/20, a long-range research project that involves remote sensing. A satellite-mounted sensor looks down on farm fields, distinguishing as many as 256 light wavelengths. Similar systems that work with land-based and plane-mounted sensors are also in the works. With the right hardware, software and know-how, the precision farmer can use this spectral information to find out a crop's health status. Does it need irrigation? Is it under attack by pests? Are weeds gaining ground? Are soil nitrogen levels OK? A great number of quantifiable variables can be measured. The use of satellites in agriculture is already a reality. The government of the southern Pacific island of Tasmania is using GPS technology on some 600 farms as part of an identity protection pilot program, which it plans to extend to all of Tasmania's farms by 2005. In Argentina, satellite surveillance is being used to catch farmers who cheat on their taxes by underreporting the size of their fields, and to prevent them from saving seed, which is illegal there. Who Will Benefit? Will farmers want, or be able, to understand the advanced gadgetry of precision farming? In Puerto Rico, for example, only 14% of farmers have college degrees, and a higher percentage might be illiterate altogether. The average Puerto Rican farmer is 55 years old, according to the US Farm Census. Many are probably too traditional to embrace advanced software, satellite imaging and other new technologies. To get around this obstacle, precision farming contractors plan to offer farmers a plethora of consulting services. Critics fear that these services will exacerbate farmers' dependence on the purveyors of agribusiness even further. Of course, the more fundamental question is what farmer will be able to afford precision farming technology, whose basic packages start at $15,000 to $20,000? How can family farms in the United States, facing extinction by economic strangulation, afford these dazzling technological advances? What will happen to rural U.S. and worldwide farming communities if food processors, retailers and other major purchasers of agricultural produce start requiring suppliers to use precision farming and identity protection technology? Large U.S. industrial farms, heavily capitalized and subsidized by the government with tens of billions of dollars every year, will easily afford the technology. But struggling family farms could be put out of business. Suing the Victim These remote sensing technologies can also be used to distinguish GM from non-GM crops and trace genetic pollution. Runaway pollen and seeds from GM crops like soy, corn and canola have been a great concern since the commercial cultivation of GM plants began in 1996. Last year, GM corn was found to be aggressively proliferating in Mexico, causing farmers, scientists and environmentalists to worry about potential consequences for the environment, biodiversity and world agriculture. Agribusiness corporations can use satellite imaging to find out what farmers have had their crops contaminated with GM pollen and sue them. This actually happened to Canadian farmer Percy Schmeiser of Bruno, Saskatchewan. When he complained that his organic canola crop had been genetically contaminated by a GM canola field somewhere upwind, Monsanto's lawyers sued him for illegally planting the corporation's patented seed. Kafka could have hardly thought of a more bizarre scenario. Monsanto didn't accept Schmeiser's argument that the corporation's GM canola had blown downwind to his farm, and neither did the judge, who ruled that how the GM seed got there is irrelevant. In September 2002 Schmeiser lost his appeal and now intends to take his case to Canada's Supreme Court. [For more information about Schmeiser’s plight, visit www.percyschmeiser.com]. Unfortunately, Schmeiser's ordeal is not an isolated case. Monsanto is suing farmers all over Canada and the United States for allegedly planting its patented GM seeds without authorization. Many of them claim they never knowingly planted Monsanto's seeds, and that their fields were contaminated by upwind GM plantations. Once again, the tortilla gets flipped. The same corporations that vehemently denied that GM pollution by pollination would ever take place, may soon be eager — too eager — to believe every report of such contamination, especially if the information can be used to sue the victims. Precision Agriculture and Global Trade This type of persecution could reach global proportions through the Trade-Related Intellectual Property Rights agreement (TRIPS) enforced by the World Trade Organization (WTO). Under TRIPS, the WTO can impose economic sanctions against countries deemed guilty of illegally using patented products, like seeds. The intellectual property rights provisions of NAFTA are even more draconian, since the agreement allows private entities to sue governments. Given this possibility, one can visualize a scenario in which Monsanto sues Mexico under NAFTA for illegally planting its GM corn. The corporation could conceivably demand a compensation ranging in the hundreds of millions of dollars. What are advocates of socially responsible and environmentally sustainable agriculture doing about precision farming? Many in the movement against corporate globalization hold that this and other new agro-technologies must be addressed within the context of a broader critique of industrial agriculture. "The reality is that farmers do not control precision farming," notes Hope Shand of ETC Group. "Rather, precision agriculture is more likely to dictate decision making, control and management of the farmer." Shand compares precision agriculture to a kind of high tech feudalism: "Precision farming reinforces bioserfdom and the role of the farmer as a ‘renter of germplasm.’"

#### Unsustainable ag production is *independently* responsible for the biodiversity crisis

Lanz 18 (Bruno Lanz, University of Neuchâtel, Department of Economics and Business, ETH Zurich, Chair for Integrative Risk Management and Economics, Massachusetts Institute of Technology, Joint Program on the Science and Policy of Global Change; Simon Dietz, London School of Economics and Political Science, Grantham Research Institute on Climate Change and the Environment, and Department of Geography and Environment; Tim Swanson, Graduate Institute of International and Development Studies, Department of Economics and Centre for International Environmental Studies; “The Expansion of Modern Agriculture and Global Biodiversity Decline: An Integrated Assessment”, Ecological Economics, 144, 260–277, 2018, doi:10.1016/j.ecolecon.2017.07.018)

An increase in agricultural output can be achieved in various ways and the great increases seen in the second half of the twentieth century came mainly from intensification and corresponding increases in yields (FAOSTAT; Klein Goldewijk et al., 2011). Nonetheless the clear consensus from global land-use models is that some of the additional future production will come from expanding the agricultural land area. According to the Agricultural Model Intercomparison and Improvement Project or AgMIP, the area of world cropland in 2050 will be between 10 and 25% larger than today, under a reference scenario in which world food production rises by 43 to 99% (von Lampe et al., 2014; Schmitz et al., 2014).

The expansion of modern agriculture through a combination of intensification and extensification has managed to sustain the world population explosion that began with the industrial revolution and accelerated in the early to mid twentieth century (United Nations, 2015). For example, the prevalence of undernourishment has declined globally (Fogel, 1997; World Bank, 2016), while the real prices of agricultural commodities fell quite significantly between 1950 and 2000 (Alston and Pardey, 2014).2 However, the expansion of modern agriculture has had other, less desirable consequences.

Both agricultural intensification – of the prevailing, nonecological or unsustainable variety (cf. Bommarco et al., 2013; Godfray and Garnett, 2014) – and extensification have been primary causes of a historically unprecedented loss of global biodiversity. According to the Millennium Ecosystem Assessment (2005), the current global rate of species extinction is up to 1000 times higher than the background rate that has been estimated from the fossil record. A broader index of global biodiversity has been in decline since 1970 (the first year for which data are available) and there is no statistical indication that the rate of decline is slowing (Butchart et al., 2010). Local species richness is estimated to have declined by over 10% in the last 200 years, globally on average (Newbold et al., 2015).

#### BioD loss causes extinction and turns everything

Torres 16 (Phil, founder of the X-Risks Institute, an affiliate scholar at the Institute for Ethics and Emerging Technologies, and the author of The End: What Science and Religion Tell Us About the Apocalypse, "Biodiversity loss: An existential risk comparable to climate change," Bulletin of Atomic Scientists, 4/11, http://thebulletin.org/biodiversity-loss-existential-risk-comparable-climate-change9329)

But there is another existential threat that the Bulletin overlooked in its Doomsday Clock announcement: biodiversity loss. This phenomenon is often identified as one of the many consequences of climate change, and this is of course correct. But biodiversity loss is also a contributing factor behind climate change. For example, deforestation in the Amazon rainforest and elsewhere reduces the amount of carbon dioxide removed from the atmosphere by plants, a natural process that mitigates the effects of climate change. So the causal relation between climate change and biodiversity loss is bidirectional. Furthermore, there are myriad phenomena that are driving biodiversity loss in addition to climate change. Other causes include ecosystem fragmentation, invasive species, pollution, oxygen depletion caused by fertilizers running off into ponds and streams, overfishing, human overpopulation, and overconsumption. All of these phenomena have a direct impact on the health of the biosphere, and all would conceivably persist even if the problem of climate change were somehow immediately solved. Such considerations warrant decoupling biodiversity loss from climate change, because the former has been consistently subsumed by the latter as a mere effect. Biodiversity loss is a distinct environmental crisis with its own unique syndrome of causes, consequences, and solutions—such as restoring habitats, creating protected areas (“biodiversity parks”), and practicing sustainable agriculture. The sixth extinction. The repercussions of biodiversity loss are potentially as severe as those anticipated from climate change, or even a nuclear conflict. For example, according to a 2015 study published in Science Advances, the best available evidence reveals “an exceptionally rapid loss of biodiversity over the last few centuries, indicating that a sixth mass extinction is already under way.” This conclusion holds, even on the most optimistic assumptions about the background rate of species losses and the current rate of vertebrate extinctions. The group classified as “vertebrates” includes mammals, birds, reptiles, fish, and all other creatures with a backbone. The article argues that, using its conservative figures, the average loss of vertebrate species was 100 times higher in the past century relative to the background rate of extinction. (Other scientists have suggested that the current extinction rate could be as much as 10,000 times higher than normal.) As the authors write, “The evidence is incontrovertible that recent extinction rates are unprecedented in human history and highly unusual in Earth’s history.” Perhaps the term “Big Six” should enter the popular lexicon—to add the current extinction to the previous “Big Five,” the last of which wiped out the dinosaurs 66 million years ago. But the concept of biodiversity encompasses more than just the total number of species on the planet. It also refers to the size of different populations of species. With respect to this phenomenon, multiple studies have confirmed that wild populations around the world are dwindling and disappearing at an alarming rate. For example, the 2010 Global Biodiversity Outlook report found that the population of wild vertebrates living in the tropics dropped by 59 percent between 1970 and 2006. The report also found that the population of farmland birds in Europe has dropped by 50 percent since 1980; bird populations in the grasslands of North America declined by almost 40 percent between 1968 and 2003; and the population of birds in North American arid lands has fallen by almost 30 percent since the 1960s. Similarly, 42 percent of all amphibian species (a type of vertebrate that is sometimes called an “ecological indicator”) are undergoing population declines, and 23 percent of all plant species “are estimated to be threatened with extinction.” Other studies have found that some 20 percent of all reptile species, 48 percent of the world’s primates, and 50 percent of freshwater turtles are threatened. Underwater, about 10 percent of all coral reefs are now dead, and another 60 percent are in danger of dying. Consistent with these data, the 2014 Living Planet Report shows that the global population of wild vertebrates dropped by 52 percent in only four decades—from 1970 to 2010. While biologists often avoid projecting historical trends into the future because of the complexity of ecological systems, it’s tempting to extrapolate this figure to, say, the year 2050, which is four decades from 2010. As it happens, a 2006 study published in Science does precisely this: It projects past trends of marine biodiversity loss into the 21st century, concluding that, unless significant changes are made to patterns of human activity, there will be virtually no more wild-caught seafood by 2048. Catastrophic consequences for civilization. The consequences of this rapid pruning of the evolutionary tree of life extend beyond the obvious. There could be surprising effects of biodiversity loss that scientists are unable to fully anticipate in advance. For example, prior research has shown that localized ecosystems can undergo abrupt and irreversible shifts when they reach a tipping point. According to a 2012 paper published in Nature, there are reasons for thinking that we may be approaching a tipping point of this sort in the global ecosystem, beyond which the consequences could be catastrophic for civilization. As the authors write, a planetary-scale transition could precipitate “substantial losses of ecosystem services required to sustain the human population.” An ecosystem service is any ecological process that benefits humanity, such as food production and crop pollination. If the global ecosystem were to cross a tipping point and substantial ecosystem services were lost, the results could be “widespread social unrest, economic instability, and loss of human life.” According to Missouri Botanical Garden ecologist Adam Smith, one of the paper’s co-authors, this could occur in a matter of decades—far more quickly than most of the expected consequences of climate change, yet equally destructive. Biodiversity loss is a “threat multiplier” that, by pushing societies to the brink of collapse, will exacerbate existing conflicts and introduce entirely new struggles between state and non-state actors. Indeed, it could even fuel the rise of terrorism. (After all, climate change has been linked to the emergence of ISIS in Syria, and multiple high-ranking US officials, such as former US Defense Secretary Chuck Hagel and CIA director John Brennan, have affirmed that climate change and terrorism are connected.) The reality is that we are entering the sixth mass extinction in the 3.8-billion-year history of life on Earth, and the impact of this event could be felt by civilization “in as little as three human lifetimes,” as the aforementioned 2012 Nature paper notes. Furthermore, the widespread decline of biological populations could plausibly initiate a dramatic transformation of the global ecosystem on an even faster timescale: perhaps a single human lifetime. The unavoidable conclusion is that biodiversity loss constitutes an existential threat in its own right. As such, it ought to be considered alongside climate change and nuclear weapons as one of the most significant contemporary risks to human prosperity and survival.

#### Restraint on space weapons flips the balance of power and causes Chinese invasion of Taiwan

Taylor Dinerman 12, Senior Editor at the Gatestone Institute, Former Editor of SpaceEquity.com, Consultant for the Department of Defense, “America's Suicidal Space Diplomacy”, Gatestone Institute, 1/12/2012, https://www.gatestoneinstitute.org/2751/america-suicidal-space-diplomacy

If the US were to abide fully by a restrictive interpretation of the Code of Conduct, the use of anti-satellite weapons by China against US satellites would give it a major advantage that might last for weeks or months -- enough time comfortably to invade and occupy Taiwan and to change the balance of military power in the Far East. The US would have to decide if it wanted to fight a major war to restore its military superiority and to liberate Taiwan, or to accept defeat. The use of Earth-based lasers to degrade the performance of spacecraft optics, which the US claims the Chinese have done against America's spy satellites on several occasions, would supposedly be a violation of the Code. Yet the US has done nothing in retaliation for this except to complain through diplomatic channels. It is hard to see how the Code would make much of a difference. It is difficult to imagine the EU or Japan imposing meaningful sanctions on China in response to a Chinese laser attack on a US soy satellite.

#### Nuclear war

William Lowther 13, Taipei Times, citing a report by the Center for Strategic and International Studies, 3/16/13, “Taiwan Could Spark Nuclear War: Report,” <http://www.taipeitimes.com/News/taiwan/archives/2013/03/16/2003557211>

Taiwan is the most likely potential crisis that could trigger a nuclear war between China and the US, a new academic report concludes.

“Taiwan remains the single most plausible and dangerous source of tension and conflict between the US and China,” says the 42-page report by the Washington-based Center for Strategic and International Studies (CSIS).

Prepared by the CSIS’ Project on Nuclear Issues and resulting from a year-long study, the report emphasizes that Beijing continues to be set on a policy to prevent Taiwan’s independence, while at the same time the US maintains the capability to come to Taiwan’s defense.

“Although tensions across the Taiwan Strait have subsided since both Taipei and Beijing embraced a policy of engagement in 2008, the situation remains combustible, complicated by rapidly diverging cross-strait military capabilities and persistent political disagreements,” the report says.

In a footnote, it quotes senior fellow at the US Council on Foreign Relations Richard Betts describing Taiwan as “the main potential flashpoint for the US in East Asia.”

The report also quotes Betts as saying that neither Beijing nor Washington can fully control developments that might ignite a Taiwan crisis.

“This is a classic recipe for surprise, miscalculation and uncontrolled escalation,” Betts wrote in a separate study of his own.

The CSIS study says: “For the foreseeable future Taiwan is the contingency in which nuclear weapons would most likely become a major factor, because the fate of the island is intertwined both with the legitimacy of the Chinese Communist Party and the reliability of US defense commitments in the Asia-Pacific region.”

Titled Nuclear Weapons and US-China Relations, the study says disputes in the East and South China seas appear unlikely to lead to major conflict between China and the US, but they do “provide kindling” for potential conflict between the two nations because the disputes implicate a number of important regional interests, including the interests of treaty allies of the US.

The danger posed by flashpoints such as Taiwan, the Korean Peninsula and maritime demarcation disputes is magnified by the potential for mistakes, the study says.¶ “Although Beijing and Washington have agreed to a range of crisis management mechanisms, such as the Military Maritime Consultative Agreement and the establishment of a direct hotline between the Pentagon and the Ministry of Defense, the bases for miscommunication and misunderstanding remain and draw on deep historical reservoirs of suspicion,” the report says.

For example, it says, it is unclear whether either side understands what kinds of actions would result in a military or even nuclear response by the other party.

To make things worse, “neither side seems to believe the other’s declared policies and intentions, suggesting that escalation management, already a very uncertain endeavor, could be especially difficult in any conflict,” it says.

Although conflict “mercifully” seems unlikely at this point, the report concludes that “it cannot be ruled out and may become increasingly likely if we are unwise or unlucky.”

The report says: “With both sides possessing and looking set to retain formidable nuclear weapons arsenals, such a conflict would be tremendously dangerous and quite possibly devastating.”

#### Missile defense is inevitable, but space weapons make it multi-layered and effective---that stops WMD missiles and EMP attacks---extinction

Dr. Steven Lambakis 7, Senior Defense Analyst at the National Institute for Public Policy, Ph.D. at Catholic University, and Managing Editor of Comparative Strategy, “Missile Defense From Space”, Hoover Institution Policy Review, February/March 2007, https://www.hoover.org/research/missile-defense-space

The ballistic missile threat to the United States, its deployed forces, and allies and friends has been well defined.

This is a threat we downplay at our peril. Nations such as North Korea and Iran — which also have significant programs to develop nuclear, biological, and chemical weapons — as well as nonstate groups can pose significant, even catastrophic, dangers to the U.S. homeland, our troops, and our allies. Russia and China, two militarily powerful nations in transition, have advanced ballistic missile modernization and countermeasure programs. Indeed, despite the reality that trade relations with China continue to expand, its rapid military modernization represents a potentially serious threat. Whether these nations become deadly adversaries hinges on nothing more than a political change of heart in their respective capitals.

The intelligence community’s ability to provide timely and accurate estimates of ballistic missile threats is, by many measures, poor. Our leaders have been consistently surprised by foreign ballistic missile developments. Shortened development timelines and the ability to move or import operational missiles, buy components, and hire missile experts from abroad mean the United States may have little or no warning before it is threatened or attacked. There is no escaping the uncertainty we face.

And the stakes couldn’t be higher. A ballistic missile delivering a nuclear payload to an American city would be truly devastating. For comparison, the Insurance Information Institute estimates total economic loss so far from Hurricane Katrina at more than $100 billion. By some calculations, it is going to take New Orleans 25 years to recover fully, and the cost of rebuilding the city is predicted to be as high as $200 billion. The direct cost to the New York City economy following the September 11, 2001, terrorist attacks was between $80 billion and $100 billion. These figures do not include indirect costs or the incalculable human losses. Now just imagine the costs imposed by a ballistic missile nuclear strike against a U.S. city. The economic toll from a single nuclear attack against a major city, which would involve extensive decontamination activities and impact the national economy, could rise above $4 trillion.

The economy could also be devastated by the electromagnetic pulse generated by a high-altitude nuclear explosion. The resulting electromagnetic shock would fry transformers within regional electrical power grids.

The interdependent telecommunications (including computers), transportation, and banking and financial infrastructures that people and businesses rely on would be significantly damaged. Such an event would leave us, in some cases, with nineteenth-century technologies. This situation could jeopardize the very viability of society and the survival of the nation. Moreover, the paralysis leaders would experience would leave the country and its allies exposed to highly lethal twenty-first century threats. The blackmail possibilities of these weapons are as mind-numbing as they are terrifying.

After more than 60 years of advances in ballistic missile technologies, we have only just begun to address our vulnerability to them. Missile defense is a policy and budgetary reality today, and it enjoys strong bipartisan support. Current U.S. efforts to dissuade other countries from investing in ballistic missiles, to assure U.S. allies, and to deter aggression put missile defense in a place of prominence. Bush Administration policy is to evolve the fielded system incrementally to defend against these threats. The system is intended to adapt to new threats as they emerge and integrate advanced missile defense technologies as they are introduced.

The fielded system today consists of space-based detection sensors, ground-based and seaborne early warning and tracking sensors, ground-based interceptors in Alaska and California for long-range defense, transportable ground-based Patriot Advanced Capability–3 units, and sea-based interceptors to engage short- and medium-range ballistic missiles. There are also several development programs to field new ground- and sea-based and airborne weapons to give the layered defense system new capabilities for engaging all ranges of ballistic missiles.

Multiple defensive layers, with system elements working together synergistically to enhance the capability of the whole, are central to the approach adopted by U.S. defense leaders. No one layer or interceptor design can fulfill this global mission on its own. Several capabilities for intercepting a ballistic missile or its payload just after launch, or as it flies through its midcourse phase in space, or as it reenters Earth’s atmosphere on a terminal trajectory will enhance overall system effectiveness by providing a defense in depth. Such a defense not only can enable several shot opportunities against an in-flight missile, but also can address the problem of missile defense countermeasures, which generally work in only one phase of flight. The current U.S. approach, in other words, is the right one.

Limits of the current system

Over the long term, will the currently configured and planned terrestrial-based missile defense system be sufficient to deal with increasingly sophisticated countermeasures and shifting threats? The answer, I believe, is no.

The system being deployed today is fixed firmly to Earth. Whether they are sea-based or land-based weapons, or even the boost-engagement Airborne Laser, we are essentially talking about terrestrial platforms for basing weapons. As we move into the future, there are plans to make those platforms, the sensors and interceptors, more mobile. Why? Because greater mobility can provide greater flexibility for dealing with unpredicted threats. Mobility also allows a commander to concentrate his forces or disperse them as the requirements of the battlefield demand.

It matters where we locate sensors and interceptors. It is important to put sensors close to the threat, because they will be in position to provide critical cueing and tracking data early in a ballistic missile’s flight. These data can help enlarge the engagement battle space. To perform boost-phase intercept from the ground or sea, the weapons platforms must be very near the target launch site. These terrestrial boost-phase weapons can defend many targets around the globe by covering a single launch site. The disadvantage of such basing, a disadvantage that is mitigated somewhat with a mobile platform like the Airborne Laser, is that the threat launch site or region must be predicted.

Terrestrial-based weapons that engage in space, in the middle or midcourse of a missile’s or warhead’s flight, offer perhaps the greatest flexibility in terms of addressing possible flight azimuths, trajectories, and launch points. While ground-based midcourse interceptors may have to be oriented to large threat regions, they can defend against multiple launch points.

Conversely, ground interceptors that are near the target can defend only a small area, but they can potentially protect that point from launches anywhere in the world. Yet it is simply unaffordable to do a point defense for every place you want to defend in the United States, every place that U.S. forces go, or everywhere that our allies are. The ability to do area defense — to defend against multiple launch points as opposed to doing point defense of a very limited area — is fundamental to successful missile defense.

Political, strategic, and technological uncertainties could change the missile defense scenario by causing a shift in the threat from one region to another. Given that it takes years to field, test, and make operational new fixed interceptor and sensor sites, a shift in the threat could leave the nation vulnerable. Because many of the interceptors and sensors in the current system are fixed to geographic points, we are limited in our ability to defend the homeland, for example, against missiles launched from surprise locations such as a ship off our shoreline. We also might face an adversary tomorrow that deploys tens or even hundreds of ballistic missiles or one that has more sophisticated countermeasure and reentry technologies. Those, too, would be expected to stress the current system, which is designed at the moment to deal with more limited threats.

Planned transportable land-based and mobile sea-based and airborne systems also suffer limitations. The need to base sensors and interceptors forward, closer to threat launch sites, in order to enlarge the engagement battle space makes our security dependent on political decisions by foreign governments. Projected boost defense systems, which may be deployed to the periphery or littoral of an adversary, would have very limited or no utility against a ballistic missile launched from several hundred miles inside a threat country’s border. The inability to engage a missile in boost means we would be left with only midcourse or terminal intercept possibilities, if those are available, and this removes a layer from the effectiveness calculations.

It’s all about position

Today we base missile-defense weapons on Earth, yet most engagements actually take place high above the Earth’s surface, in space — unless, of course, those engagements occur very early in boost or late in terminal. Putting interceptors in space to engage ballistic missiles could offer efficiencies that go a long way towards improving national defense, protecting more areas around the world, and reacting more effectively to threat surprises.