# 1nc

## 1

#### a] interp: the aff must only garner offense on a negative action on outer space that limit the amount of appropriation absent creating new concepts for treating space

#### Unjust refers to a negative action – it means contrary.

Black Laws No Date "What is Unjust?" <https://thelawdictionary.org/unjust/> //Elmer

Contrary to right and justice, or to the enjoyment of his rights by another, or to the standards of conduct furnished by the laws.

#### b] Violation: The Aff is a positive action – it creates a new concept for Space: treating it like commons

#### c] vote neg:

#### 1] limits – making the topic bi-directional explodes predictability – it means that Aff’s can both increase non-exist property regimes in space AND decrease appropriation by private actors – makes the topic untenable.

#### a] independently they’re also extra t bc they enact a plan that establishes a new property rights regime AND effects t bc creation of new property rights regimes isn’t intrinsically a reduction on private property in space bc it involves creating a governance system and redistribution/coop

#### 2] ground – wrecks neg generics – we can’t say appropriation good since the 1AC can create new views on Outer Space Property Rights that circumvent our links since they can say “commons” solves. It also makes private sector good impossible since they could always say “we maintain the private sector”

#### 3] predictability – the res is the most predictable stasis point for debates, their counter interp justifies them picking literally any ground which decks neg ground and makes prep impossible

#### tva: wholerez aff w/o the plan bc the res doesn’t ask for one

#### d] paradigm issues:

#### 1] fairness is a voter ­– debate’s a competitive activity that requires equal opportunities for both sides

#### 2] education is a voter ­– its why schools fund debate

#### 3] dtd for norm setting especially this early on in the topic – dta makes no sense bc we indict their advocacy, use competing interps ­– topicality is a yes/no question and reasonability invites arbitrary judge intervention, no rvis ­– you don’t win for being fair

## 2

#### US space commercialization is key to nuclear deterrence

Gleason and Hays 21, Michael P. Gleason and Peter L. Hays,, 2021, " GETTING THE MOST DETERRENT VALUE FROM U.S. SPACE FORCES" CENTER FOR SPACE POLICY AND STRATEGY, [https://csps.aerospace.org/sites/default/files/2021-08/Gleason-Hays\_SpaceDeterrence\_20201027\_0.pdf //](https://csps.aerospace.org/sites/default/files/2021-08/Gleason-Hays_SpaceDeterrence_20201027_0.pdf%20//)wr tanya

As the strategic environment changes, we must explore ways to strengthen the contribution of U.S. military space capabilities to deterrence while also enhance any advantages should deterrence fail. Focusing on the credibility of U.S. space capabilities in some narrow areas reveals steps that could be made to strengthen their deterrent value. The vulnerability of U.S. military, intelligence, and partner satellites to these threats weakens the United States’ conventional deterrence abilities and potentially undermines the U.S. nuclear deterrent. Conventionally, Russia and China see their space attack capabilities as a means to level the battlefield with the U.S. military. U.S. military and intelligence satellites, as well as the commercial satellites the U.S. military uses, are critical to the modern American way of war. But if those satellites can be destroyed or at least disrupted, Russian and Chinese terrestrial forces may perceive a narrower disadvantage and those nations may be more willing to start a war. U.S. space capabilities enable U.S. nuclear deterrence strategy by gathering and delivering intelligence on adversaries’ nuclear weapons dispositions, verifying Russian compliance with nuclear arms control agreements, providing the United States with warning of a nuclear attack, and providing U.S. decision-makers with tight command and control of U.S. nuclear forces. If attacking those satellite capabilities is perceived as a way to prevent the United States from responding to a nuclear attack, nuclear deterrence may be undermined. Moreover, even if the adversary attacks U.S. satellites only in pursuit of limited, regional objectives, the United States may perceive itself to be under strategic attack. The United States considers unfettered access to and freedom to operate in space to be a vital interest. Any harmful interference with or an attack upon critical components of our space architecture that directly affects this vital U.S. interest will be met with a deliberate response at a time, place, manner, and domain of our choosing. Under this threat, actors may be deterred from undesired behavior if they conclude that the costs of the behavior outweigh the benefits. Denial, by contrast, attempts to deter undesired behavior by leading actors to conclude that they will be unable to achieve the objectives they seek from their behavior. Denial requires effectively responding in the same time and place as the attack. To prevent a breakdown in deterrence, both punishment and denial require that the actor attempting to deter undesired behavior is perceived as possessing needed capabilities, is credible in exercising those capabilities under threat of counterretaliation and potential escalation, and has successfully communicated its capabilities and credibility to the actors it intends to deter. A deterrence by punishment strategy has more stringent attribution requirements. To justify a punitive response elsewhere, an actor must have defensible evidence of what happened that it is willing to share with allies and the public. If an adversary is confident that its responsibility for an attack may be obscured or unattributable—quite possible in space with all the attribution difficulties noted above— the adversary may calculate that it can avoid retaliation for the attack and get away with a fait accompli. Therefore, for deterrence by punishment to be most credible, the adversary must perceive that it will not be able to escape responsibility for an attack in space due to the United States’ inadequate ability to confidently attribute the attack. In contrast, deterrence by denial emphasizes the ability to absorb an attack at the time and place it occurs, so rapid, precise attribution of an attack in space may appear relatively less important. However, the line between deterrence by denial and punishment is blurry at best. Strategists might assume that if the threat of denial fails, they still have the threat of punishment to wield. In essence, the threat of punishment usually backstops a denial deterrence strategy. If that is the case, it leads to the notion that both denial and punishment strategies require the same attribution strategy. The United States must also ensure that adversaries know U.S. space capabilities can withstand attacks. Weak links make for tempting, first-strike targets and can lead to a breakdown in deterrence no matter where the capabilities physically reside. Increasing satellite and space architectural resilience and defenses can make space a strong link that discourages rather than tempts attack.

#### The plan is a space shock that causes Japanese prolif

Cheng 9, Dean Cheng 9, Senior Research Fellow in the Asia Studies Center at the Heritage Foundation, Former Senior Analyst at the China Studies Division of the Center for Naval Analyses, Former Senior Analyst with Science Applications International Corporation, “Reflections On Sino-US Space Cooperation”, Space and Defense, Volume 2, Number 3, Winter 2009, <https://www.usafa.edu/app/uploads/Space_and_Defense_2_3.pdf> //recut tanya

Broader International Implications

Beyond the bilateral difficulties of cooperating with the PRC, it is also important to consider potential ramifications of Sino-US cooperation in space on the Asian political landscape. In particular, cooperation between Washington and Beijing on space issues may well arouse concerns in Tokyo and Delhi. Both of these nations have their own space programs, and while they are arguably not engaged in a “space race” with China (or each other), they are certainly keeping a close eye on developments regarding China. Of particular importance is Japan. The United States relationship with Japan is arguably its most important in East Asia. US interest in Japan should be self evident. Japan hosts 47,000 US troops and is the linchpin for forward US presence in that hemisphere. Japan is the second largest contributor to all major international organizations that buttress US foreign policy…. Japan is the bulwark for US deterrence and engagement of China and North Korea—the reason why those countries cannot assume that the United States will eventually withdraw from the region.35 For Japan, whose “peace constitution” forbids it from using war as an instrument of state policy, the United States is an essential guarantor of its security. Any move by the US that might undermine this view raises not only the prospect of weakening US-Japanese ties, but also potentially affecting Japan’s security policies. In this regard, then, it is essential not to engage in activities that would undercut perceptions of American reliability. Such moves, it should be noted, are not limited to those in the security realm. For example, the Nixon administration undertook several initiatives in the late 1960s and early 1970s that rocked Tokyo-Washington relations, and are still remembered as the “Nixon shocks.” While some of these were in the realm of security (including Nixon’s opening to China and the promulgation of the Nixon Doctrine), the others were in the trade area. These included a ten percent surcharge on all imports entering the US and suspended the convertibility of the dollar (i.e., removed the US from the gold standard).36 Part of the “shock” was the fundamental nature of these shifts. Even more damaging, however, was the failure of the Nixon Administration to consult their Japanese counterparts, catching them wholly off-guard. It took several years for the effects of these shocks to wear off. If the United States is intent upon expanding space relations with the PRC, then it would behoove it to consult Japan, in order to minimize the prospect of a “space shock.” Failing to do so may well incur a Japanese reaction. The decision on the part of Japan to build an explicitly intelligence-focused satellite was in response to the North Korean missile test of 1999, suggesting that Tokyo is fully capable of undertaking space-oriented responses when it is concerned.37 That, in turn, would potentially arouse the ire of China. The tragic history of Sino-Japanese relations continues to cast a baleful influence upon current interactions between the two states. If there is not a “space race” currently underway between Beijing and Tokyo, it would be most unfortunate if American actions were to precipitate one.

#### **Japan is the linchpin for Asian region stability, prolif is likely and possible – risks arms race and preemptive strikes**

Mcbride 19, James Mcbride, 10-3-2019, "How Japan Could Go Nuclear," Foreign Affairs, <https://www.foreignaffairs.com/articles/asia/2019-10-03/how-japan-could-go-nuclear> //tanya

In a speech on September 6, the U.S. special representative for North Korea, Stephen Biegun, warned that Japan might respond to the growing nuclear threat from North Korea by developing nuclear weapons of its own. Japan has long had the means to go nuclear, thanks to its sophisticated nuclear power industry. But since agreeing to a security treaty in 1951, Japan has relied on Washington’s “extended deterrence”—the promise that any attack on Japan will trigger a retaliatory attack from the United States. The Japanese government’s confidence in that commitment has fluctuated over the last half century, and Biegun is not the first U.S. official to fret that Tokyo will lose faith in it altogether. On three occasions over the past 50 years, Japan weighed the merits and disadvantages of developing nuclear weapons. The first delicate moment came in the 1960s, after China began nuclear tests. Then, during the 1990s after the Cold War, Japanese officials worried that Washington might feel less resolved in defending Japan from Moscow’s nuclear might. Most recently, Japan faced a major new challenge to its west after North Korea developed nuclear weapons in 2006. At each juncture, however, Japanese security strategists concluded that it made more sense to rely on the extended deterrence provided by the United States. In exchange, Japan presented itself to U.S. policymakers as a linchpin for peace and stability in Northeast Asia, a regional hub for the deployment of U.S. troops and military equipment (as it was during the Korean and Vietnam Wars), and a bulwark against China. Today, the U.S. security guarantee looks less and less reliable. This summer, President Donald Trump repeatedly [called the security treaty unfair](https://www.factcheck.org/2019/07/trump-on-unfair-u-s-japan-security-treaty/) and reportedly [mused](https://www.bloomberg.com/news/articles/2019-06-25/trump-muses-privately-about-ending-postwar-japan-defense-pact) in private about canceling the treaty altogether. He has tolerated North Korean missile tests that threaten Japan. And during his election campaign, he suggested that it might even serve Japanese and South Korean interests if both nations developed nuclear weapons. There are still powerful historical, cultural, and institutional reasons for Japan to resist going nuclear, but Biegun is right to worry that the country could head in that direction—though it is the U.S. president, as much as North Korea, who may push Tokyo toward nuclear proliferation. THE NUCLEAR TABOO As the only country to experience a nuclear bombing, Japan is a leading proponent of nonproliferation. Quietly, however, it pursues a strategy of “nuclear hedging,” preserving the capacity to develop nuclear weapons without intending to do so. Officials occasionally reveal the existence of this policy. In the wake of the Fukushima nuclear disaster in 2011, for example, former Defense Minister Shigeru Ishiba, a prominent Liberal Democratic Party politician, explained that Japan couldn’t shut down its nuclear power plants because the nuclear fuel cycle—the industrial processes that turn uranium into electricity and recycle the waste—was necessary in order to maintain “[technical deterrence](http://nautilus.org/napsnet/napsnet-weekly/nautilus-peace-and-security-13-november/).” Japan is the only nation that has the ability to enrich uranium and reprocess plutonium but has no nuclear weapons. In theory, Japan could develop a small atomic arsenal in as little as a year or two. It would need to produce weapons-grade plutonium, a process that would most likely require repurposing civil reactors. It would also need to reengineer its advanced space launch rockets to deliver nuclear warheads. Japanese scientists are technically capable of both tasks and could accomplish them on a tight timetable if the government felt compelled to minimize concerns about safety, secrecy, reliability, and accuracy (and shirk its international obligations). A more thorough, careful process in keeping with Japan’s usual modus operandi would take three or four years. Scientists would face another hurdle in finding a place to test weapons in the crowded Japanese archipelago. The most recent known government study, conducted in 2006, concluded that Japan had the technical expertise and facilities to develop a small nuclear warhead but that doing so would take three to five years and cost over $2 billion. Japan is the only nation that has the ability to enrich uranium and reprocess plutonium but has no nuclear weapons. An indigenous nuclear program would be intensely provocative to China, sparking a further acceleration in Beijing’s buildup of nuclear and conventional weapons. Pursuing nuclear weapons would also increase the risk of a preemptive nuclear strike from North Korea and provoke South Korea to seek its own nuclear arsenal, inflaming regional tensions. WEAPONS OF LAST RESORT The scientific establishment would likely comply with a directive to produce nuclear weapons only in the event of a sharp deterioration in Japan’s security situation. In the imaginings of Japanese policymakers, the most likely scenarios would be if South Korea goes nuclear or if the Koreas unify and keep Pyongyang’s existing arsenal. Japanese officials watched with interest when South Korean President Moon Jae-in extolled the benefits of unification with North Korea in an [August 15 speech](https://en.yna.co.kr/view/AEN20190815003200325) commemorating liberation from Japan. While Moon has insisted that a unified Korea would not retain nuclear arms, Japan remains wary in light of the pro-nuclear sentiments on both halves of the Korean peninsula. Unlike in South Korea, where mainstream politicians and newspaper columnists advocate for an indigenous nuclear weapons program, in Japan advocates for nuclear weapons remain largely on the far-right fringe. It is, however, increasingly acceptable to discuss nuclear arms as a future policy option. After North Korea’s first nuclear test in 2006, for example, then Foreign Minister Taro Aso called for a public debate about the circumstances that would warrant a serious reconsideration of Japan’s non-nuclear policy. Of course, Tokyo’s stance on nuclear weapons is shaped most fundamentally by its faith in the credibility of U.S. nuclear deterrence. Over the years, that credibility came into question when the United States lost the Vietnam War, withdrew from the Philippines, failed to prevent China and then North Korea from acquiring nuclear weapons, and reduced its own nuclear arsenal. Trump has done more than any of his predecessors to undermine the credibility of U.S. nuclear deterrence. But Trump has done more than any of his predecessors to undermine the credibility of U.S. nuclear deterrence. In what was perhaps his most flagrant public display of disregard for Japan’s security interests, he argued with Abe at the G-7 summit in April this year over whether North Korea’s missile launches broke UN resolutions. (They clearly did.) Although the presence of U.S. troops in Japan provides a measure of reassurance, Trump’s “America first” mentality is further reason for Japan to keep nuclear options in reserve. Any Japanese move toward developing nuclear weapons should be seen as a cry for help. In the past, when Japanese leaders have hinted to Washington that they were considering going nuclear, their intent was to encourage a stronger U.S. security commitment to Japan. Aso’s call for a public debate in 2006 elicited a reaffirmation of that commitment from Secretary of State Condoleezza Rice. Aso followed an old script: in 1964, Prime Minister Eisaku Sato similarly raised the prospect of going nuclear to persuade President Lyndon B. Johnson to strengthen Washington’s pledge to safeguard Japanese security. Washington should learn from that history and work to assuage Japan’s fears, starting with clear statements from Trump that reassure Tokyo, refuse to pander to North Korean provocations, and discourage nuclear proliferation in an already tense region.

#### It goes nuclear – mad fails

**Kroenig, 14** – Associate Professor and International Relations Field Chair, Department of Government, Georgetown (Matthew, February. “The History of Proliferation Optimism: Does It Have a Future?” Journal of Strategic Studies Vol 38, Issue 1-2. http://www.matthewkroenig.com/The%20History%20of%20Proliferation%20Optimism\_Feb2014.pdf)

First and foremost, proliferation **optimists present an oversimplified view of nuclear deterrence theory**. Optimists argue that since the advent of Mutually Assured Destruction (MAD), any nuclear war would mean national suicide and, therefore, no rational leader would ever choose to start one. Furthermore, they argue that the requirements for rationality are not high. Rather, leaders must value their own survival and the survival of their nation and understand that intentionally launching a nuclear war would threaten those values. Many analysts and policymakers attempt to challenge the optimists on their own turf and question whether the leaders of potential proliferant states are fully rational.34 Yet, these debates overlook the fact that, apart from the optimists, leading nuclear deterrence theorists believe that nuclear proliferation contributes to a **real risk of nuclear war even in a situation of MAD among rational states**.35 Moreover, realizing that nuclear war is possible does not depend on peculiar beliefs about the possibility of escaping MAD.36 Rather, as we will discuss below, these theorists understand that some risk of nuclear war is **necessary in order for deterrence to function**. To be sure, in the 1940s, Viner, Brodie, and others argued that MAD rendered war among major powers obsolete, but nuclear deterrence theory soon advanced beyond that simple understanding.37 After all, great power political competition does not end with nuclear weapons. And nuclear-armed states still seek to threaten nuclear-armed adversaries. States cannot credibly threaten to launch a suicidal nuclear war, but they still want to coerce their adversaries. This leads to a credibility problem: how can states credibly threaten a nuclear-armed opponent? Since the 1960s, academic nuclear deterrence theory has been devoted almost exclusively to answering this question.38 And their answers do not give us reasons to be optimistic. Thomas Schelling was the first to devise a rational means by which states can threaten nuclear-armed opponents.39 He argued that leaders cannot credibly threaten to intentionally launch a suicidal nuclear war, but they can make a ‘threat that leaves something to chance’. 40 They can engage in a process, the nuclear crisis, which increases the risk of nuclear war in an attempt to force a less resolved adversary to back down. As states escalate a nuclear crisis there is an **increasing probability that the conflict will spiral out of control** **and result in an inadvertent or accidental nuclear exchange**. As long as the benefit of winning the crisis is greater than the incremental increase in the risk of nuclear war, however, threats to escalate nuclear crises are inherently credible. In these games of nuclear brinkmanship, the state that is willing to run the greatest risk of nuclear war before backing down will win the crisis, as long as it does not end in catastrophe. It is for this reason that Thomas Schelling called great power politics in the nuclear era a ‘**competition in risk taking’**. 41 This does not mean that states eagerly bid up the risk of nuclear war. Rather, they face gut-wrenching decisions at each stage of the crisis. They can quit the crisis to avoid nuclear war, but only by ceding an important geopolitical issue to an opponent. Or they can the escalate the crisis in an attempt to prevail, but only at the risk of suffering a possible nuclear exchange. Since 1945 there were have been 20 high stakes nuclear crises in which ‘rational’ states like the United States run a frighteningly-real risk of nuclear war.42 By asking whether states can be deterred, therefore, proliferation optimists are **asking the wrong question**. The right question to ask is: what risk of nuclear war is a specific state willing to run against a particular opponent in a given crisis? Optimists are likely correct when they assert that a nuclear-armed Iran will not intentionally commit national suicide by launching a bolt-from-the-blue nuclear attack on the United States or Israel. This does not mean that Iran will never use nuclear weapons, however. Indeed, it is almost inconceivable to think that a nuclear-armed Iran would not, at some point, find itself in a crisis with another nuclear-armed power. It is also inconceivable that in those circumstances, Iran would not be willing to run some risk of nuclear war in order to achieve its objectives. If a nuclear-armed Iran and the United States or Israel were to have a geopolitical conflict in the future, over the internal politics of Syria, an Israeli conflict with Iran’s client Hizballah, the US presence in the Persian Gulf, shipping through the Strait of Hormuz, or some other issue, do we believe that Iran would immediately capitulate? Or is it possible that Iran would push back, possibly brandishing nuclear weapons in an attempt to coerce its adversaries? If the latter, there is a risk that proliferation to Iran could result in nuclear war and proliferation optimists are wrong to dismiss it out of hand. An optimist might counter that nuclear weapons will never be used, even in a crisis situation, because states have such a strong incentive, namely national survival, to ensure that nuclear weapons are not used. But this objection ignores the fact that leaders operate under competing pressures. Leaders in nuclear-armed states also have strong incentives to convince their adversaries that nuclear weapons might be used. Historically we have seen that leaders take actions in crises, such as **placing nuclear weapons on high alert** and **delegating nuclear launch authority to low-level commanders**, to **purposely increase the risk of nuclear war** in an attempt to force less-resolved opponents to back down. Moreover, not even the optimists’ first principles about the irrelevance of nuclear posture stand up to scrutiny. Not all nuclear wars would be equally devastating.43 Any nuclear exchange would have devastating consequences no doubt, but, if a crisis were to spiral out of control and result in nuclear war, any sane leader would rather face a country with five nuclear weapons than one with 5,000. Similarly, any sane leader would be willing to run a greater risk of nuclear war against the former state than against the latter. Indeed, scholars have demonstrated that states are willing to run greater risks and are, therefore, more likely to win nuclear crises when they enjoy nuclear superiority over their opponents.44 Proliferation optimists might be correct that no rational leader would choose to launch a suicidal nuclear war, but, depending on the context, **any sane leader would almost certainly be willing to risk one**. Nuclear deterrence theorists have also proposed a second scenario under which rational leaders would be willing to instigate a nuclear exchange: limited nuclear war.45 For example, by launching a single nuclear weapon against a small city, a nuclear-armed state could signal its willingness to escalate a crisis, while leaving its adversary with enough left to lose to deter the adversary from launching a full-scale nuclear response. In a future crisis between China and the United States, for example, China could choose to launch a nuclear strike on a US military base in East Asia to demonstrate its seriousness. In that situation, with the continental United States intact, would Washington choose to launch a full-scale nuclear war on China that could result in the destruction of many American cities? Or would it back down? China might decide to strike after calculating that Washington would prefer a humiliating retreat over a full-scale nuclear war. If launching a limited nuclear war could be a rational strategic move under certain circumstances, it then follows that **the spread of nuclear weapons increases the risk of nuclear use**. To be sure, some strategic thinkers, including Henry Kissinger, advocated limited nuclear war as a viable strategy only to recant the position later due to fears of uncontrollable escalation. Yet, this does not change the fact that leading nuclear deterrence theorists maintain that limited nuclear war is possible among rational leaders in a MAD world.46

#### Even a small nuclear war causes extinction and destroys the ozone

Starr, ’14 Steven Starr, the Senior Scientist for Physicians for Social Responsibility and Director of the Clinical Laboratory Science Program at the University of Missouri. Starr has published in the Bulletin of the Atomic Scientists and the Strategic Arms Reduction (STAR) website of the Moscow Institute of Physics and Technology, June 11th, 2014, “There Can be No Winners in a Nuclear War”, Truth Out, <https://truthout.org/articles/there-can-be-no-winners-in-a-nuclear-war/>, EO

Nuclear war has no winner. Beginning in 2006, several of the world’s leading climatologists (at Rutgers, UCLA, John Hopkins University, and the University of Colorado-Boulder) published a series of studies that evaluated the long-term environmental consequences of a nuclear war, including baseline scenarios fought with merely 1% of the explosive power in the US and/or Russian launch-ready nuclear arsenals. They concluded that the consequences of even a “small” nuclear war would include catastrophic disruptions of global climate and massive destruction of Earth’s protective ozone layer. These and more recent studies predict that global agriculture would be so negatively affected by such a war, a global famine would result, which would cause up to 2 billion people to starve to death. These peer-reviewed studies – which were analyzed by the best scientists in the world and found to be without error – also predict that a war fought with less than half of US or Russian strategic nuclear weapons would destroy the human race. In other words, a US-Russian nuclear war would create such extreme long-term damage to the global environment that it would leave the Earth uninhabitable for humans and most animal forms of life. A recent article in the Bulletin of the Atomic Scientists, “Self-assured destruction: The climate impacts of nuclear war,” begins by stating: “A nuclear war between Russia and the United States, even after the arsenal reductions planned under New START, could produce a nuclear winter. Hence, an attack by either side could be suicidal, resulting in self-assured destruction.” In 2009, I wrote “Catastrophic Climatic Consequences of Nuclear Conflicts” for the International Commission on Nuclear Non-proliferation and Disarmament. The article summarizes the findings of these studies. It explains that nuclear firestorms would produce millions of tons of smoke, which would rise above cloud level and form a global stratospheric smoke layer that would rapidly encircle the Earth. The smoke layer would remain for at least a decade, and it would act to destroy the protective ozone layer (vastly increasing the UV-B reaching Earth) as well as block warming sunlight, thus creating Ice Age weather conditions that would last 10 years or longer. Following a US-Russian nuclear war, temperatures in the central US and Eurasia would fall below freezing every day for one to three years; the intense cold would completely eliminate growing seasons for a decade or longer. No crops could be grown, leading to a famine that would kill most humans and large animal populations. Electromagnetic pulse from high-altitude nuclear detonations would destroy the integrated circuits in all modern electronic devices, including those in commercial nuclear power plants. Every nuclear reactor would almost instantly meltdown; every nuclear spent fuel pool (which contain many times more radioactivity than found in the reactors) would boil off, releasing vast amounts of long-lived radioactivity. The fallout would make most of the US and Europe uninhabitable. Of course, the survivors of the nuclear war would be starving to death anyway. Once nuclear weapons were introduced into a US-Russian conflict, there would be little chance that a nuclear holocaust could be avoided. Theories of “limited nuclear war” and “nuclear de-escalation” are unrealistic. In 2002 the Bush administration modified US strategic doctrine from a retaliatory role to permit preemptive nuclear attack; in 2010, the Obama administration made only incremental and miniscule changes to this doctrine, leaving it essentially unchanged. Furthermore, Counterforce doctrine – used by both the US and Russian military – emphasizes the need for preemptive strikes once nuclear war begins. Both sides would be under immense pressure to launch a preemptive nuclear first-strike once military hostilities had commenced, especially if nuclear weapons had already been used on the battlefield. Both the US and Russia each have 400 to 500 launch-ready ballistic missiles armed with a total of at least 1800 strategic nuclear warheads, which can be launched with only a few minutes warning. Both the US and Russian Presidents are accompanied 24/7 by military officers carrying a “nuclear briefcase,” which allows them to transmit the permission order to launch in a matter of seconds. Yet top political leaders and policymakers of both the US and Russia seem to be unaware that their launch-ready nuclear weapons represent a self-destruct mechanism for the human race. For example, in 2010, I was able to publicly question the chief negotiators of the New START treaty, Russian Ambassador Anatoly Antonov and (then) US Assistant Secretary of State Rose Gottemoeller, during their joint briefing at the UN (during the Non-Proliferation Treaty Review Conference). I asked them if they were familiar with the recent peer-reviewed studies that predicted the detonation of less than 1% of the explosive power contained in the operational and deployed US and Russian nuclear forces would cause catastrophic changes in the global climate, and that a nuclear war fought with their strategic nuclear weapons would kill most people on Earth. They both answered “no.” More recently, on April 20, 2014, I asked the same question and received the same answer from the US officials sent to brief representatives of the NGOS at the Non-Proliferation Treaty Preparatory Committee meeting at the UN. None of the US officials at the briefing were aware of the studies. Those present included top officials of the National Security Council. It is frightening that President Obama and his administration appear unaware that the world’s leading scientists have for years predicted that a nuclear war fought with the US and/or Russian strategic nuclear arsenal means the end of human history. Do they not know of the existential threat these arsenals pose to the human race . . . or do they choose to remain silent because this fact doesn’t fit into their official narratives? We hear only about terrorist threats that could destroy a city with an atomic bomb, while the threat of human extinction from nuclear war is never mentioned – even when the US and Russia are each running huge nuclear war games in preparation for a US-Russian war. Even more frightening is the fact that the neocons running US foreign policy believe that the US has “nuclear primacy” over Russia; that is, the US could successfully launch a nuclear sneak attack against Russian (and Chinese) nuclear forces and completely destroy them. This theory was articulated in 2006 in “The Rise of U.S. Nuclear Primacy,” which was published in Foreign Affairs by the Council on Foreign Relations. By concluding that the Russians and Chinese would be unable to retaliate, or if some small part of their forces remained, would not risk a second US attack by retaliating, the article invites nuclear war. Colonel Valery Yarynich (who was in charge of security of the Soviet/Russian nuclear command and control systems for 7 years) asked me to help him write a rebuttal, which was titled “Nuclear Primacy is a Fallacy.” Colonel Yarynich, who was on the Soviet General Staff and did war planning for the USSR, concluded that the “Primacy” article used faulty methodology and erroneous assumptions, thus invalidating its conclusions. My contribution lay in my knowledge of the recently published (in 2006) studies, which predicted even a “successful” nuclear first-strike, which destroyed 100% of the opposing side’s nuclear weapons, would cause the citizens of the side that “won” the nuclear war to perish from nuclear famine, just as would the rest of humanity.

## 3

#### Private sector is key to mining – empirics prove public sector alone is insufficient

Gilbert 21, Alex Gilbert, 4-26-2021, "Mining in Space Is Coming," Milken Institute Review, <https://www.milkenreview.org/articles/mining-in-space-is-coming> //wr tanya

Space exploration is back. after decades of disappointment, a combination of better technology, falling costs and a rush of competitive energy from the private sector has put space travel front and center. indeed, many analysts (even some with their feet on the ground) believe that commercial developments in the space industry may be on the cusp of starting the largest resource rush in history: mining on the Moon, Mars and asteroids. While this may sound fantastical, some baby steps toward the goal have already been taken. Last year, NASA awarded contracts to four companies to extract small amounts of lunar regolith by 2024, effectively beginning the [era of commercial space mining](https://payneinstitute.mines.edu/wp-content/uploads/sites/149/2020/09/Payne-Institute-Commentary-The-Era-of-Commercial-Space-Mining-Begins.pdf). Whether this proves to be the dawn of a gigantic adjunct to mining on earth — and more immediately, a key to unlocking cost-effective space travel — will turn on the answers to a host of questions ranging from what resources can be efficiently. As every fan of science fiction knows, the resources of the solar system appear virtually unlimited compared to those on Earth. There are whole other planets, dozens of moons, thousands of massive asteroids and millions of small ones that doubtless contain humungous quantities of materials that are scarce and very valuable (back on Earth). Visionaries including Jeff Bezos [imagine heavy industry moving to space](https://www.fastcompany.com/90347364/jeff-bezos-wants-to-save-earth-by-moving-industry-to-space) and Earth becoming a residential area. However, as entrepreneurs look to harness the riches beyond the atmosphere, access to space resources remains tangled in the realities of economics and governance. That said, there’s no grass growing under potential pioneers’ feet. Potential economic, scientific and even security benefits underlie an emerging [geopolitical competition](https://nationalinterest.org/feature/geostrategic-importance-outer-space-resources-154746) to pursue space mining. The United States is rapidly emerging as a front-runner, in part due to its ambitious Artemis Program to lead a multinational consortium back to the Moon. But it is also a leader in creating a legal infrastructure for mineral exploitation. The United States has adopted the world’s first space resources law, recognizing the property rights of private companies and individuals to materials gathered in space. However, the United States is hardly alone. Luxembourg and the United Arab Emirates (you read those right) are racing to codify space-resources laws of their own, hoping to attract investment to their entrepot nations with business-friendly legal frameworks. China reportedly views space-resource development as a national priority, part of a strategy to challenge U.S. economic and security primacy in space. Meanwhile, Russia, Japan, India and the European Space Agency all harbor space-mining ambitions of their own. Governing these emerging interests is an outdated treaty framework from the Cold War. Sooner rather than later, we’ll need [new agreements](https://issues.org/new-policies-needed-to-advance-space-mining/) to facilitate private investment and ensure international cooperation. Back up for a moment. For the record, space is already being heavily exploited, because space resources include non-material assets such as orbital locations and abundant sunlight that enable satellites to provide services to Earth. Indeed, satellite-based telecommunications and global positioning systems have become indispensable infrastructure underpinning the modern economy. Mining space for materials, of course, is another matter. In the past several decades, planetary science has confirmed what has long been suspected: celestial bodies are potential sources for dozens of natural materials that, in the right time and place, are incredibly valuable. Of these, water may be the most attractive in the near-term, because — with assistance from solar energy or nuclear fission — H2O can be split into hydrogen and oxygen to make rocket propellant, [facilitating in-space refueling](https://www.theverge.com/2018/8/23/17769034/nasa-moon-lunar-water-ice-mining-propellant-depots). So-called “rare earth” metals are also potential targets of asteroid miners intending to service Earth markets. Consisting of 17 elements, including lanthanum, neodymium, and yttrium, these critical materials (most of which are today mined in China at great environmental cost) are required for electronics. And they loom as bottlenecks in making the transition from fossil fuels to renewables backed up by battery storage. The Moon is a prime [space mining target](https://theconversation.com/mining-the-moon-110744). Boosted by NASA’s mining solicitation, it is likely the first location for commercial mining. The Moon has several advantages. It is relatively close, requiring a journey of only several days by rocket and creating communication lags of only a couple seconds — a delay small enough to allow remote operation of robots from Earth. Its low gravity implies that relatively little energy expenditure will be needed to deliver mined resources to Earth orbit. Asteroids are another near-term [mining target](https://foreignpolicy.com/2016/04/28/the-asteroid-miners-guide-to-the-galaxy-space-race-mining-asteroids-planetary-research-deep-space-industries/). There are all sorts of space rocks hurtling through the solar system, with varying amounts of water, rare earth metals and other materials on board. The asteroid belt between the orbits of Mars and Jupiter contains most of them, many of which are greater than a kilometer in diameter. Although the potential water and mineral wealth of the asteroid belt is vast, the long distance from Earth and requisite travel times and energy consumption rule them out as targets in the near term. The prospects for space mining are being driven by technological advances across the space industry. The rise of reusable rocket components and the now-widespread use of off-the-shelf parts are lowering both [launch and operations costs](https://aerospace.csis.org/data/space-launch-to-low-earth-orbit-how-much-does-it-cost/). Once limited to government contract missions and the delivery of telecom satellites to orbit, private firms are now emerging as leaders in developing “[NewSpace](https://www.sciencedirect.com/science/article/pii/S0094576519313451" \t "_blank)” activities — a catch-all term for endeavors including orbital tourism, orbital manufacturing and mini-satellites providing specialized services. The space sector, with a market capitalization of $400 billion, could grow to [as much as $1 trillion](https://milkeninstitute.org/videos/infinity-and-beyond-business-space) by 2040 as private investment soars. In the long term, production in space to supply Earth could drive massive growth in the space industry — but not with commodities competing with terrestrial production. Rather, Earth markets are likely to be most receptive to the exotic: specialized materials and alloys manufactured in microgravity conditions, large-satellite services such as [space-based solar power](https://www.globalpolicyjournal.com/blog/21/10/2019/emerging-competition-space-solar-power), or unique products like helium-3. The latter two are particularly promising, as they could provide large contributions to global decarbonization after 2050. Other nations are following the U.S. lead in developing space-resources law and policy. As noted earlier, Luxembourg has passed a space mining law of its own, [prioritizing space resources](https://space-agency.public.lu/en/space-resources/the-initiative.html) and forming partnerships with space agencies worldwide. The United Arab Emirates is moving toward a similar law, as the country looks to space as part of the oil-drenched state’s modernization plans. As Japan continues scientific sampling missions, its government is currently [considering a space mining law](https://www.japantimes.co.jp/news/2020/11/06/national/science-health/japan-bill-space-samples/) of its own. The nature of China’s space ambitions isn’t easy to decipher, but [space mining and lunar exploration](https://www.thecairoreview.com/wp-content/uploads/2019/05/cr33-global-forum.pdf) are clearly part of the strategy. Indeed, many U.S. advocates of space mining point to Chinese ambitions as a reason for the United States to get out ahead of the pack of liberal democracies with space capabilities.

#### Asteroid mining generates way less emissions than earth mining

Emerging Technology 18, Emerging Technology, 10-19-2018, "Asteroid mining might actually be better for the environment," MIT Technology Review, <https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/> //tanya

For a certain kind of investor, asteroid mining is a path to untold riches. Astronomers have long known that asteroids are rich in otherwise scarce resources such as platinum and water. So an obvious idea is to mine this stuff and return it to Earth—or, in the case of water, to a moon base or Earth-orbiting space station. There is no shortage of interest in these ventures. In the last decade, investors have funded half a dozen companies that have set their sights on various nearby rocks. To many observers, it’s only a matter of time before such a mission gets the green light. But profit margins are only part of the picture. A potentially more significant aspect of these missions is the impact they will have on Earth’s environment. But nobody has assessed this environmental impact in detail. Today, that changes thanks to the work of Andreas Hein and colleagues at the University of Paris-Saclay in France. These guys have calculated the greenhouse-gas emissions from asteroid-mining operations and compared them with the emissions from similar Earth-based activities. Their results provide some eyebrow-raising insights into the benefits that asteroid mining might provide. The calculations are relatively straightforward. Rocket launches release significant amounts of greenhouse gases into the atmosphere. The fuel on board the first stage of a rocket burns in Earth’s atmosphere to form carbon dioxide. For kerosene-burning rockets, one kilogram of fuel creates three kilograms of CO2. (The second and third stages operate outside the Earth’s atmosphere and so can be ignored.) Reentries are just as damaging. That’s because a significant mass of a re-entering vehicle ablates in the upper atmosphere, producing NOx such as nitrous oxide (N2O), a greenhouse gas that is about 300 times more potent than CO2. By one estimate, the space shuttle released about 20% of its mass in the form of N2O every time it returned to Earth. Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO2 into Earth’s atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO2 per kilogram of platinum. That needs to be compared with the emission from Earth-based mining. Here, platinum mining generates significant greenhouse gases, mostly from the energy it takes to remove this stuff from the ground. Indeed, the numbers are huge. The mining industry estimates that producing one kilogram of platinum on Earth releases around 40,000 kilograms of carbon dioxide. “The global warming effect of Earth-based mining is several orders of magnitude larger,” say Hein and co. The figures for water are also encouraging. In this case, the authors calculate the greenhouse-gas emissions from an asteroid-mining operation that returns water to anywhere within the moon’s orbit, a so-called cis-lunar orbit.  They compare this to the emissions from sending the same volume of water from Earth into orbit. The big difference is that a water-carrying vehicle from Earth can haul only a small percentage of its mass as water. But an asteroid-mining spacecraft can transport a significant multiple of its mass as water to cis-lunar orbit. “Substantial savings in greenhouse gas emissions can be achieved,” say Hein and co. This interesting work should help to focus minds on the environmental impacts of mining, which are rapidly increasing in profile. But it is only a first step. There is significant uncertainty in the numbers here, so these will need to be better understood. Other factors will also eventually need to be taken into account.

#### And it’s key to to space based solar power

Taylor 19, Chris Taylor, 5-2-2019, "How asteroid mining will save the Earth — and mint trillionaires," Mashable, <https://mashable.com/feature/asteroid-mining-space-economy> //ML recut tanya

“The asteroid mining bubble has burst,” [declared The Space Review](http://www.thespacereview.com/article/3633/1), one of the few online publications to even pay attention. Currently, the world’s richest person and its most well-known entrepreneur, Jeff Bezos and Elon Musk, respectively, are working on the relatively cheap reusable rockets asteroid pioneers will need. (As I was writing this, Bezos announced in an email blast that one of his New Shepherd rockets had flown to space and back five times like it was nothing, delivering 38 payloads for various customers while remaining entirely intact.)  Officially, the mission is to help us figure out how the solar system formed. Unofficially, it will help us understand whether all those useful metals clump together at the heart of an asteroid, as some theorize. If so, it’s game on for asteroid prospectors. If not, we can still get at the metals with other techniques, such as optical mining (which basically involves sticking an asteroid in a bag and drilling with sunlight; sounds nuts to us, but [NASA has proved it in the lab](https://www.nasa.gov/directorates/spacetech/niac/2017_Phase_I_Phase_II/Sustainable_Human_Exploration/)). It’ll just take more time. The mission is essential, Joyce declares, to save Earth from its major problems. First of all, the fictional billionaire wheels in a fictional Nobel economist to demonstrate the actual truth that the entire global economy is sitting on a [mountain of debt](https://www.washingtonpost.com/opinions/the-247-trillion-global-debt-bomb/2018/07/15/64c5bbaa-86c2-11e8-8f6c-46cb43e3f306_story.html?noredirect=on&utm_term=.5fb3ff1155d9). It has to keep growing or it will implode, so we might as well take the majority of the industrial growth off-world where it can’t do any more harm to the biosphere. Secondly, there’s the climate change fix. Suarez sees asteroid mining as the only way we’re going to build [solar power satellites](https://en.wikipedia.org/wiki/Space-based_solar_power). Which, as you probably know, is a form of uninterrupted solar power collection that is theoretically more effective, inch for inch, than any solar panels on Earth at high noon, but operating 24/7. (In space, basically, it’s always double high noon).  The power collected is beamed back to large receptors on Earth with large, low-power microwaves, which researchers think will be harmless enough to let humans and animals pass through the beam. A space solar power array like [the one China is said to be working on](https://www.forbes.com/sites/scottsnowden/2019/03/12/solar-power-stations-in-space-could-supply-the-world-with-limitless-energy/#2d3f78a54386) could reliably supply 2,000 gigawatts — or over 1,000 times more power than the largest solar farm currently in existence. “We're looking at a 20-year window to completely replace human civilization's power infrastructure,” Suarez told me, citing the report of the Intergovernmental Panel on Climate Change on the coming catastrophe. Solar satellite technology “has existed since the 1970s. What we were missing is millions of tons of construction materials in orbit. Asteroid mining can place it there.” The expectation is that a lot of these space businesses — and all the orbital infrastructure designed to support them — will be automated, controlled remotely via telepresence, and monitored by AI. But Suarez is adamant that thousands if not millions of actual human workers will thrive in the space economy, even as robots take their jobs in old industries back on Earth. In short, Suarez has carefully laid out a vision of the orbital economy that offers something for everyone in our divided society. For Green New Deal Millennials, there’s the prospect of removing our reliance on fossil fuels at a stroke and literally lifting dirty industries off the face of the planet. For libertarians and other rugged individualists, there’s a whole new frontier to be developed, largely beyond the reach of government.

#### SBSP solves climate change

Garretson 17, Lt. Col. Peter Garretson, 6-19-2017, "The Space Review: Better than Paris: space solar power," No Publication, https://www.thespacereview.com/article/3266/1 //wr tanya

A national program in space-based solar power (SBSP) could do more for solving climate change than the Paris Accord ever could. SBSP is the advanced energy source that “shovel ready,” is fully renewable, produces no greenhouse gasses, is not intermittent, has 24-hour availability, could be made-in-America and could scale to all global demand six times over. Within a generation, we could transform our society to abundant clean energy, enable a $300-trillion global economy, create five million new jobs, drive all carbon emissions to zero, and then have spare energy to suck carbon out of the air. Now if that’s technically feasible—and a lot of credible institutions have said that it is, including NASA, the Department of Energy, the Department of Defense, the International Academy of Astronautics, and the National Academies—then why isn’t this on the agenda? Maybe because our national space program has been run by public servants who think about flags and footprints to show off national plumage, and not businesspeople looking for new markets and competitive advantage. We need to go into space if we want to continue to have a growing civilization. If you take baseline energy usage on Earth and compound it at just 3 percent a year for 500 years you have to cover the entire surface of the Earth with solar cells. That's just not going to happen. If we want to continue to grow—another route would be to just face stasis and not continue to grow—I don't think that's as interesting, I don't think you want to survive on this planet, I think you want to–you know—thrive and do amazing things. And to do that we need to go out into the solar system… I predict that in the next few hundred years, all heavy industry will move off the planet. It will just be way more convenient to do it in space, where you have better access to resources, better access to 24-hour solar power. You know, solar power on Earth is not that great because the planet shades us half the time. In space you get power all the time. So there will be a lot of advantages to doing heavy manufacturing there, and Earth will end up zoned residential and light industry. You know, we want to go to space to save the Earth. Mike Snead, a visionary formerly at Air Force Research Lab noted that the Paris accords instantiated what were anticipated to be an annual transfer of $100 billion to nations considered “victims of climate change.” (See “A Trump Administration path to advance commercial space solar power”, The Space Review, December 12, 2016.) That $100 billion could be spent to much greater effect on space solar power. Past estimates have suggested that the total non-recurring capital to develop economic solar power satellites, build factories, and launch fleets to turn them out, one after another, would only be about $100 billion (spent over 10 years), with industry paying 90 percent of that, after less than $10 billion of taxpayer investment to help prove initial designs. That’s one-tenth the cost of the International Space Station, and less than America is spending on its Apollo-on-Steroids Space Launch System (SLS). It’s not even a percent of what we spent on our overseas adventures in Iraq and Afghanistan, not even a percent of what we are considering on national infrastructure. But private industry can only do so much. Major new markets require action on the part of the government to advance pre-competitive technology, establish clear policies, lower barriers to entry, and establish a business- and innovation-friendly environment of authorization, regulation, and liability. Government can accelerate US advantage and cultivate national strategic industries by using becoming anchor customers and making advanced purchases. At least until the actual stand-up of the National Space Council, the true center of gravity for comprehensive space power—and the only meaningful source of US government space leadership—is now Congress. Not NASA: they are tone deaf to anything that is not planting new flags and footprints or compelling new science. Not the Air Force, as they are entirely focused on warfighting, missing out entirely on the larger conversation about space industrialization. No, it only a few visionary leaders in Congress who are engaged and understand the vast opportunities for wealth and power afforded by the energy and material wealth of the inner solar system. Solar power has been a key part of humanity's clean energy repertoire. We spread masses of sunlight-harvesting panels on solar fields, and many people power their homes by decorating their roofs with the rectangles.  But there's a caveat to this wonderful power source. Solar panels can't collect energy at night. To work at peak efficiency, they need as much sunlight as possible. So to maximize these sun catchers' performance, researchers are toying with a plan to send them to a place where the sun never sets: outer space. Theoretically, if a bunch of solar panels were blasted into orbit, they'd soak up the sun even on the foggiest days and the darkest nights, storing an enormous amount of power. If that power were wirelessly beamed down to Earth, our planet could breathe in renewable clean energy, 24/7. That would significantly reduce our carbon footprint.

#### It’s try or die – climate change is a threat multiplier and causes extinction

Sears 20 — Nathan Alexander Sears is a PhD Candidate in Political Science at the University of Toronto. Before beginning his PhD, he was a Professor of International Relations at the Universidad de Las Américas, Quito. His research focuses on international security and the existential threats to humanity posed by nuclear weapons, climate change, biotechnology, and artificial intelligence. (“Great Powers, Polarity, and Existential Threats to Humanity: An Analysis of the Distribution of the Forces of Total Destruction in International Security” International Studies Association, 2021 Annual Conference, March/April 2021. https://www.researchgate.net/profile/Nathan-Sears-2/publication/350500094\_Great\_Powers\_Polarity\_and\_Existential\_Threats\_to\_Humanity\_An\_Analysis\_of\_the\_Distribution\_of\_the\_Forces\_of\_Total\_Destruction\_in\_International\_Security/links/60639248a6fdccbfea1a4cc4/Great-Powers-Polarity-and-Existential-Threats-to-Humanity-An-Analysis-of-the-Distribution-of-the-Forces-of-Total-Destruction-in-International-Security.pdf)//JLPark

Climate Change

Humanity faces existential risks from the large-scale destruction of Earth’s natural environment making the planet less hospitable for humankind (Wallace-Wells 2019). The decline of some of Earth’s natural systems may already exceed the “planetary boundaries” that represent a “safe operating space for humanity” (Rockstrom et al. 2009). Humanity has become one of the driving forces behind Earth’s climate system (Crutzen 2002). The major anthropogenic drivers of climate change are the burning of fossil fuels (e.g., coal, oil, and gas), combined with the degradation of Earth’s natural systems for absorbing carbon dioxide, such as deforestation for agriculture (e.g., livestock and monocultures) and resource extraction (e.g., mining and oil), and the warming of the oceans (Kump et al. 2003). While humanity has influenced Earth’s climate since at least the Industrial Revolution, the dramatic increase in greenhouse gas emissions since the mid-twentieth century—the “Great Acceleration” (Steffen et al. 2007; 2015; McNeill & Engelke 2016)— is responsible for contemporary climate change, which has reached approximately 1°C above preindustrial levels (IPCC 2018). Climate change could become an existential threat to humanity if the planet’s climate reaches a “Hothouse Earth” state (Ripple et al. 2020). What are the dangers? There are two mechanisms of climate change that threaten humankind. The direct threat is extreme heat. While human societies possesses some capacity for adaptation and resilience to climate change, the physiological response of humans to heat stress imposes physical limits—with a hard limit at roughly 35°C wet-bulb temperature (Sherwood et al. 2010). A rise in global average temperatures by 3–4°C would increase the risk of heat stress, while 7°C could render some regions uninhabitable, and 11–12°C would leave much of the planet too hot for human habitation (Sherwood et al. 2010). The indirect effects of climate change could include, inter alia, rising sea levels affecting coastal regions (e.g., Miami and Shanghai), or even swallowing entire countries (e.g., Bangladesh and the Maldives); extreme and unpredictable weather and natural disasters (e.g., hurricanes and forest fires); environmental pressures on water and food scarcity (e.g., droughts from less-dispersed rainfall, and lower wheat-yields at higher temperatures); the possible inception of new bacteria and viruses; and, of course, large-scale human migration (World Bank 2012; Wallace-Well 2019; Richards, Lupton & Allywood 2001). While it is difficult to determine the existential implications of extreme environmental conditions, there are historic precedents for the collapse of human societies under environmental pressures (Diamond 2005). Earth’s “big five” mass extinction events have been linked to dramatic shifts in Earth’s climate (Ward 2008; Payne & Clapham 2012; Kolbert 2014; Brannen 2017), and a Hothouse Earth climate would represent terra incognita for humanity.

Thus, the assumption here is that a Hothouse Earth climate could pose an existential threat to the habitability of the planet for humanity (Steffen et al. 2018., 5). At what point could climate change cross the threshold of an existential threat to humankind? The complexity of Earth’s natural systems makes it extremely difficult to give a precise figure (Rockstrom et al. 2009; ). However, much of the concern about climate change is over the danger of crossing “tipping points,” whereby positive feedback loops in Earth’s climate system could lead to potentially irreversible and self-reinforcing “runaway” climate change. For example, the melting of Arctic “permafrost” could produce additional warming, as glacial retreat reduces the refractory effect of the ice and releases huge quantities of methane currently trapped beneath it. A recent study suggests that a “planetary threshold” could exist at global average temperature of 2°C above preindustrial levels (Steffen et al. 2018; also IPCC 2018). Therefore, the analysis here takes the 2°C rise in global average temperatures as representing the lower-boundary of an existential threat to humanity, with higher temperatures increasing the risk of runaway climate change leading to a Hothouse Earth.

# Case

## Solvency

#### All your solvency advocates assume the aff creates legal institutions and frameworks to create sustainable use of outer space – there’s no internal link implementation of the plan

#### Russia and China say no, or the plan gets watered down.

**Bahney and Pearl 19** [Benjamin Bahney and Jonathan Pearl, 3-26-2019, "Why Creating a Space Force Changes Nothing," BENJAMIN BAHNEY and JONATHAN PEARL are Senior Fellows at the Lawrence Livermore National Laboratory’s Center for Global Security Research and contributing authors to [Cross Domain Deterrence: Strategy in an Era of Complexity](https://archive.md/o/Hlbi1/https:/www.amazon.com/Cross-Domain-Deterrence-Strategy-Era-Complexity/dp/0190908653). Foreign Affairs, [https://www.foreignaffairs.com/articles/space/2019-03-26/why-creating-space-force-changes-nothing accessed 12/10/21](https://www.foreignaffairs.com/articles/space/2019-03-26/why-creating-space-force-changes-nothing%20accessed%2012/10/21)] Adam

As Russia and China continue to push forward, U.S. policymakers may be tempted to use treaties and diplomacy to head off their efforts entirely. This option, although alluring on paper, is simply not feasible. Existing treaties designed to limit military competition in space have had little success in actually doing so. The 1967 Outer Space Treaty bans parties from placing nuclear weapons or other weapons of mass destruction in space, on the moon, or on other celestial bodies, but it has no formal mechanism for verifying compliance, and places no restrictions on the development or deployment in space of conventional antisatellite weapons. Even if it were possible to convince Moscow and Beijing of the benefits of comprehensive space arms control, existing technology makes it extremely difficult to verify compliance with the necessary treaty provisions—and without comprehensive and reliable verification, treaties are toothless. Moreover, regulating the development and deployment of antisatellite weapons is extremely difficult, both because they include such a broad and diverse range of technologies and because many types of antisatellite weapons can be concealed or explained away as having some other use. Unsurprisingly, Russia and China’s draft Treaty on the Prevention of Placement of Weapons in Space, which they have been pushing for several years now, has an unenforceable definition of what constitutes a “weapon” and does nothing at all to address ground-based antisatellite weapons development.

#### The plan gets circumvented through private/public partnerships

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

NASA's future is in private space companies' hands. 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. 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. Those space stations — to be built by Blue Origin, Northrop Grumman and Nanoracks with partners — are expected to act as hubs where NASA astronauts will be able to live and work after the International Space Station ends. "You see the emergence of the set of players that will be active in a commercialized [low-Earth orbit] future, and then beyond," the Secure World Foundation's Ian Christensen told Axios. NASA has also awarded a contract to SpaceX to build a lander designed to bring humans to the surface of the Moon using its still-in-development Starship as part of the agency's Artemis program, expected to land its first crew by 2025. But now, the agency is getting more ambitious with these partnerships for its Moon program and space stations, in particular. Yes, but: This model of public/private partnership can pose risks for NASA, particularly when it comes to extremely difficult pieces of technology. For budget reasons, NASA is relying on SpaceX as its sole provider of a human lander to get people to the Moon, even though other companies like Blue Origin bid on the project. The space agency awarded SpaceX $2.9 billion.

## adv 1

#### 1] no link uq – a) public sector launches would still continue and increase and fill in as a result

#### 2] no link uq – squo proves zero cascade but we need solutions

David 21, Leonard David, 4-14-2021, "Space Junk Removal Is Not Going Smoothly," Scientific American, <https://www.scientificamerican.com/article/space-junk-removal-is-not-going-smoothly/> //wr tanya

Consider the February 2009 run-in between a dead Russian Cosmos satellite and a commercial Iridium spacecraft, which produced an enormous amount of debris. Finding ways to remove at least some of all that space junk should be a top global priority, says Donald Kessler, a retired NASA senior scientist for orbital debris research. In the late 1970s he foretold the possibility of a scenario that has been dubbed the Kessler syndrome: as the density of space rubbish increases, a cascading, self-sustaining runaway cycle of debris-generating collisions can arise that might ultimately make low-Earth orbit too hazardous to support most space activities. “There is now agreement within the community that the debris environment has reached a ‘tipping point’ where debris would continue to increase even if all launches were stopped,” Kessler says. “It takes an Iridium-Cosmos-type collision to get everyone’s attention. That’s what it boils down to.... And we’re overdue for something like that to happen.” As for the Kessler syndrome, “it has already started,” the debris expert says. “There are collisions taking place all the time—less dramatic and not at the large size scale,” Kessler adds. A new entrant in grappling with this worrisome state of affairs is the just launched End-of-Life Services by Astroscale Demonstration (ELSA-d) mission. ELSA-d is a two-satellite mission developed by Astroscale, a Japan-based satellite services company: it consists of a “servicer” satellite designed to safely remove debris from orbit and a “client” one that doubles as an object of interest. The project aims to showcase a magnetic system that can capture stable and even tumbling objects, whether for disposal or servicing in orbit. Following a multiphase test agenda, the servicer and client will then deorbit together, disintegrating during their fiery plunge into Earth’s atmosphere. ELSA-d is now circling in Earth orbit. The mission was lofted on March 22 via a Russian Soyuz rocket that tossed scads of other hitchhiking satellites into space. Following the liftoff, Astroscale’s founder and CEO Nobu Okada said [ELSA-d will prove out debris-removal capabilities](https://astroscale.com/astroscale-celebrates-successful-launch-of-elsa-d/) and “propel regulatory developments and advance the business case for end-of-life and active debris removal services.” The launch is a step toward realizing “safe and sustainable development of space for the benefit of future generations,” he said. The most serious risks, she says, come from debris particles between one and 10 centimeters in size. “There’s far more of them than whole defunct spacecraft, and there is a far greater probability of collision,” Gorman says. “While debris this size might not cause a catastrophic breakup, collision with it can certainly damage working satellites and create new debris particles.” Turning her attention to satellite mega constellations, Gorman worries about their effects in a low-Earth orbital environment that is already congested. “We also know that orbital dynamics can be unpredictable,” she says. “I want to see some of these mega constellation operators releasing their long-term modeling for collisions as more and more satellites are launched.”

#### 3] private companies are key – gov has zero incentive to do so, 1ac silverstein just says governments should and that it’s good but doesn’t warrant an incentive – err neg on empirics

Katz 21, Miranda Katz, 10-31-2021, "Space Debris: Another Frontier in the Commercialization of Space — Columbia Journal of Transnational Law," Columbia Journal of Transnational Law, https://www.jtl.columbia.edu/bulletin-blog/space-debris-another-frontier-in-the-commercialization-of-space //wr tanya

Space “Junk” is a threat to any spacefaring operator, be they a sovereign or private actor. The current legal framework does not directly address space debris, leaving the door open for private companies to not only solve the technical problems of clean up, but also craft the policy that supports their involvement. In the Summer of 2021, we got a glimpse of what some hope will be commonplace in the future: space tourism.  While it might be billionaires and their associates for now, if this technology is to follow the arc of many other advancements previously reserved for the rich (cell phones and air travel, for example), eventually there may come a time in the future where space tourism is a realistic financial goal for those of more restricted means.  As humanity broaches this great commercial frontier, it will have to clear the great and neglected hurdle of “space junk,” and current trends appear to indicate that industry will shape not only the technology designed to solve the problem, but the policy as well. Outside the realms of fictional space-thrillers, even the smallest pieces of space junk can present real danger.  In 2016, a tiny piece of space junk, believed 0to be a paint chip or a piece of metal no more than a few thousandths of a millimeter across, cracked the window of the International Space Station.  In May 2021, a piece of space debris punctured the robotic arm of the International Space Station.  This is seriously concerning, as, according to the European Space Agency, there are 670,000 pieces of space debris larger than 1cm and 170,000,000 between 1mm and 1cm in width. Unfortunately8, public action and policy struggles to keep up with these risks.  International law affords little clarity on the problem, as its control is a novel, emerging field with many technical tracking and removal challenges.  None of the existing space treaties directly tackle the issue, rendering responsibility for it ambiguous.  Absent such responsibility, legal incentives are non-existent.  Guidelines are occasionally issued by international governing bodies, but provide little legal significance and are more targeted at the practicalities of tracking and removal. The nation best positioned to notify space actors of collision risks is the United States, and the burden of that task currently falls on the Department of Defense.  However, the Trump administration issued a directive in 2018, shifting the responsibility from the DoD to the Department of Commerce, and the transition has yet to materialize, leaving DoD struggling to keep pace with increasing commercial activity.  In the face of public paralysis, addressing the problem through industry looks more and more attractive. This has led some to call for a new legal order that still leaves room for government, but reframes who the rules exist to serve.  Rather than our current, rudimentary treaty regime designed to prevent international conflict, commentators have called for an additional regime resembling maritime law that preserves the interests of a more diverse set of stakeholders, including those in the future that can bring technology and interests to space that may not yet exist.  These commentators shun the common conception that space regulation should resemble air-traffic control, which is suited to a narrower set of uses (transport).  Under such a “maritime” regime, the light touch of central regulatory bodies, and perhaps their non-existence, is preferred, just as it has been on the seas.  This way, individual nations have a degree of flexibility in instituting controls they see fit while leaving room for industry to address problems and introduce new uses for space. Furthermore, governments seem ready and willing to construct the legal and incentive framework in concert with such private action.  In a joint statement this summer, G7 members expressed openness to resolving the technical aspects of the debris problem with private institutions, and there is some promising progress.  Apple co-founder Steve Wozniak signaled his plans to address the problem through a new company with a telling name: Privateer Space.  Astroscale, a UK-based company, successfully launched a pair of satellites in the Spring of 2021 that will remove certain space debris from orbit.  Astroscale also stated their desire to work with governments and international governing bodies to craft policy with private efforts to control the problem top of mind.   In light of public policy’s silence on space debris, the initiative of actors like Astroscale involving themselves in policy may be advised, as it could promote further private investment in technology for space debris removal.  A popular policy recommendation among experts is the establishment of public-private partnerships, and Astroscale has entered several such agreements including with Japan and the European Space Agency.  Other actors include ClearSpace, OneWeb, and D-Orbit.

#### 4] No debris cascades—This ev answers all aff warrants

Fange 2017 (Daniel Von Fange, Web Application Engineer, Founder and Owner of LeanCoder, Full Stack, Polyglot Web Developer, “Kessler Syndrome is Over Hyped”, 5/21/2017, http://braino.org/essays/kessler\_syndrome\_is\_over\_hyped/)

Kessler Syndrome is overhyped. A chorus of online commenters great any news of upcoming low earth orbit satellites with worry that humanity will to lose access to space. I now think they are wrong. What is Kessler Syndrome? Here’s the popular view on Kessler Syndrome. Every once in a while, a piece of junk in space hits a satellite. This single impact destroys the satellite, and breaks off several thousand additional pieces. These new pieces now fly around space looking for other satellites to hit, and so exponentially multiply themselves over time, like a nuclear reaction, until a sphere of man-made debris surrounds the earth, and humanity no longer has access to space nor the benefits of satellites. It is a dark picture. Is Kessler Syndrome likely to happen? I had to stop everything and spend an afternoon doing back-of-the-napkin math to know how big the threat is. To estimate, we need to know where the stuff in space is, how much mass is there, and how long it would take to deorbit. The orbital area around earth can be broken down into four regions. Low LEO - Up to about 400km. Things that orbit here burn up in the earth’s atmosphere quickly - between a few months to two years. The space station operates at the high end of this range. It loses about a kilometer of altitude a month and if not pushed higher every few months, would soon burn up. For all practical purposes, Low LEO doesn’t matter for Kessler Syndrome. If Low LEO was ever full of space junk, we’d just wait a year and a half, and the problem would be over. High LEO - 400km to 2000km. This where most heavy satellites and most space junk orbits. The air is thin enough here that satellites only go down slowly, and they have a much farther distance to fall. It can take 50 years for stuff here to get down. This is where Kessler Syndrome could be an issue. Mid Orbit - GPS satellites and other navigation satellites travel here in lonely, long lives. The volume of space is so huge, and the number of satellites so few, that we don’t need to worry about Kessler here. GEO - If you put a satellite far enough out from earth, the speed that the satellite travels around the earth will match the speed of the surface of the earth rotating under it. From the ground, the satellite will appear to hang motionless. Usually the geostationary orbit is used by big weather satellites and big TV broadcasting satellites. (This apparent motionlessness is why satellite TV dishes can be mounted pointing in a fixed direction. You can find approximate south just by looking around at the dishes in your northern hemisphere neighborhood.) For Kessler purposes, GEO orbit is roughly a ring 384,400 km around. However, all the satellites here are moving the same direction at the same speed - debris doesn’t get free velocity from the speed of the satellites. Also, it’s quite expensive to get a satellite here, and so there aren’t many, only about one satellite per 1000km of the ring. Kessler is not a problem here. How bad could Kessler Syndrome in High LEO be?Let’s imagine a worst case scenario. An evil alien intelligence chops up everything in High LEO, turning it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s 839,985,870 1cm cubes. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are tiny - less than 1 in 10,000. So even in the worst case, we don’t lose access to space. Now though you can travel through the debris, you couldn’t keep a satellite alive for long in this orbit of death. Kessler Syndrome at its worst just prevents us from putting satellites in certain orbits. In real life, there’s a lot of factors that make Kessler syndrome even less of a problem than our worst case though experiment. Debris would be spread over a volume of space, not a single orbital surface, making collisions orders of magnitudes less likely.Most impact debris will have a slower orbital velocity than either of its original pieces - this makes it deorbit much sooner.Any collision will create large and small objects. Small objects are much more affected by atmospheric drag and deorbit faster, even in a few months from high LEO. Larger objects can be tracked by earth based radar and avoided. The planned big new constellations are not in High LEO, but in Low LEO for faster communications with the earth. They aren’t an issue for Kessler. Most importantly, all new satellite launches since the 1990’s are required to include a plan to get rid of the satellite at the end of its useful life (usually by deorbiting) So the realistic worst case is that insurance premiums on satellites go up a bit. Given the current trend toward much smaller, cheaper micro satellites, this wouldn’t even have a huge effect. I’m removing Kessler Syndrome from my list of things to worry about.

#### 5] they cant answer why we don’t see collisions rn – munoz is literally from 2 years ago but we don’t see collisions rn theres no brightline in the 1ac means you err neg on probability – they cant tell u how much more

#### 6] no ilink to johnson – the probability of nuke war is low, empirically proven by 2009 satellite collision – nothing happened

## adv 2

#### 1] No IL between establishing outer space as a global commons and an equitable distribution of space to states – and if the aff does then that’s just blatantly extra topical which is a voting issue for limits and ground since they can take on an infinite amount of permutations of planks to solve for neg ground which hurts in depth clash and engagement

#### 2] Climate change worsens inequality – at worst they get zero solvency and at best vote neg bc climate innov solves

Garthwaite 19, Josie Garthwaite, 4-22-2019, "Climate change has worsened global economic inequality," Stanford Earth, <https://earth.stanford.edu/news/climate-change-has-worsened-global-economic-inequality> //tanya

Climate change has worsened global economic inequality The gap between the economic output of the world’s richest and poorest countries is 25 percent larger today than it would have been without global warming, according to new research from Stanford University. A new Stanford University [study](https://www.pnas.org/content/early/2019/04/16/1816020116) shows global warming has increased economic inequality since the 1960s. Temperature changes caused by growing concentrations of greenhouse gases in Earth’s atmosphere have enriched cool countries like Norway and Sweden, while dragging down economic growth in warm countries such as India and Nigeria. The study, co-authored with [Marshall Burke](https://earth.stanford.edu/people/marshall-burke#gs.4cquln), a Stanford assistant professor of Earth system science, finds that, from 1961 to 2010, global warming decreased the wealth per person in the world’s poorest countries by 17 to 30 percent. Meanwhile, the gap between the group of nations with the highest and lowest economic output per person is now approximately 25 percent larger than it would have been without climate change. “For most countries, whether global warming has helped or hurt economic growth is pretty certain,” said Burke. Tropical countries, in particular, tend to have temperatures far outside the ideal for economic growth. “There’s essentially no uncertainty that they’ve been harmed.” It’s less clear how warming has influenced growth in countries in the middle latitudes, including the United States, China and Japan. For these and other temperate-climate nations, the analysis reveals economic impacts of less than 10 percent. “A few of the largest economies are near the perfect temperature for economic output. Global warming hasn’t pushed them off the top of the hill, and in many cases, it has pushed them toward it,” Burke said. “But a large amount of warming in the future will push them further and further from the temperature optimum.” While the impacts of temperature may seem small from year to year, they can yield dramatic gains or losses over time. “This is like a savings account, where small differences in the interest rate will generate large differences in the account balance over 30 or 50 years,” said Diffenbaugh, the Kara J. Foundation professor in Stanford’s [School of Earth, Energy & Environmental Sciences](https://earth.stanford.edu/) (Stanford Earth). For example, after accumulating decades of small effects from warming, India’s economy is now 31 percent smaller than it would have been in the absence of global warming. The researchers emphasize the importance of increasing sustainable energy access for economic development in poorer countries. “The more these countries warm up, the more drag there’s going to be on their development,” Diffenbaugh said. “Historically, rapid economic development has been powered by fossil fuels. Our finding that global warming has exacerbated economic inequality suggests that there is an added economic benefit of energy sources that don’t contribute to further warming.”

#### 3] zero solvency – werholf is ab neolib in general which they obviously don’t solve

#### 4] they don’t solve all privatization or corporate colonialism – view the 1ac through the scope of solvency they have

#### 5] no democratic resource distribution that levine perscribes, means no solvency