# 1AC

## Advocacy

#### I Affirm: Resolved: The Appropriation of Outer Space by Private Entities is Unjust.

## Definitions

#### I propose the following definitions for clarity in today’s debate round:

#### Appropriation

**UN Outer Space Treaty ’67** (United Nation Outer Space Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 1967, Article II. [https://www.unoosa.org/pdf/publications/STSPACE11E.pdf Signed 27 January 1967](https://www.unoosa.org/pdf/publications/STSPACE11E.pdf%20Signed%2027%20January%201967)) // ELog

Article II Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

#### I’ll defend that colonization of space would be an appropriation – colonizing would probably require a claim of sovereignty, and definitely require use and occupation

#### Private entities

**US Code ‘47** (US Code, Title 6, Chapter 6, Subchapter I, Section 1501. Definitions <https://www.law.cornell.edu/uscode/text/6/1501#15_A> Enacted by Congress 1947) // ELog

(15)Private entity (A)In general Except as otherwise provided in this paragraph, the term “[private entity](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-625312480-168358316&term_occur=1&term_src=title:6:chapter:6:subchapter:I:section:1501)” means any [person](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-991716523-125484930&term_occur=169&term_src=title:6:chapter:6:subchapter:I:section:1501) or private group, organization, proprietorship, partnership, trust, cooperative, corporation, or other commercial or nonprofit entity, including an officer, employee, or agent thereof. (B)Inclusion The term “[private entity](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-625312480-168358317&term_occur=4&term_src=title:6:chapter:6:subchapter:I:section:1501)” includes a [State,](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-80204913-794772950&term_occur=193&term_src=title:6:chapter:6:subchapter:I:section:1501) [tribal,](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-865479038-2019934296&term_occur=3&term_src=title:6:chapter:6:subchapter:I:section:1501) or [local government](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-801009210-2019934304&term_occur=3&term_src=title:6:chapter:6:subchapter:I:section:1501) performing utility services, such as electric, natural gas, or water services. (C)Exclusion The term “[private entity](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-625312480-168358317&term_occur=5&term_src=title:6:chapter:6:subchapter:I:section:1501)” does not include a [foreign](https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_id=6-USC-677674796-125484930&term_occur=133&term_src=title:6:chapter:6:subchapter:I:section:1501) power as defined in [section 1801 of title 50](https://www.law.cornell.edu/uscode/text/50/1801).

#### This means what governments can and cannot do in space is irrelevant to this debate – it is a question only of what private entities can do and how just it is

#### The resolution asks whether appropriation is unjust – that’s defined by Oxford Languages as “not based on or behaving according to what is morally right and fair.” (<https://www.google.com/search?q=unjust+definition&oq=unjust+definition&aqs=chrome..69i57j0i512l4j0i22i30l5.4449j1j4&sourceid=chrome&ie=UTF-8>)

#### This means it is not the Affirmative’s burden to prove that a world where private entities do not appropriate space is achievable, but rather, that such a world would be preferable to one where they did appropriate space

## Value and Criterion

#### The value is life – I’ll defend it as the biological state of being alive – prefer it

#### It’s intrinsic good – other values are subjective, being alive is objectively preferable

#### It’s a precondition to other values – we can’t have equality, justice, value to life, etc. if we are already dead

#### It’s quantifiable – we can measure whether someone is alive or not, but moral values are invisible and subjective

#### The value criterion is reverse utilitarianism – I’ll defend it as achieving the minimum amount of suffering – prefer it

#### It’s measurable – we can objectively compare body counts – that’s important for debates with a forced decision at the end, anything else necessitates judge intervention

#### It supercharges reversibility – I’ll isolate impacts of extinction, which is the ultimate irreversible impact. If we go extinct, that’s it forever

#### Combined, my value and value criterion means you’ll evaluate the round based on who can avoid the most death

## Contention 1 - Capitalism

#### Private space development shields impacts of Earthly capitalism and exports them universally

**Temmen ’21** (Jens Temmen; Assistant Professor of American Studies at Heinrich-Heine-University Dusseldorf. “WHY BILLIONAIRES IN SPACE ARE NOT GOING TO MAKE THE WORLD A BETTER PLACE” <https://blog.degruyter.com/today-space-is-virgin-territory-why-billionaires-in-space-are-not-going-to-make-the-world-a-better-place/> 14 July 2021) // ELog

On July 11th 2021, Virgin Galactic founder, billionaire and self-declared new space tourism pioneer Richard Branson staged the first commercial flight of his company’s supersonic space-plane Unity – with Branson aboard himself and thus upstaging Amazon founder Jeff Bezos‘ own flight by just a few days. Virgin Galactic lauded the perfectly orchestrated performance as following the path of the Apollo missions, while also heralding a new and invigorated phase of space exploration – this time with commercial flights and space tourism leading the way. Branson and the other so-called New Space Entrepreneurs, Elon Musk and Jeff Bezos, might be competitors in their private race to space, yet all of them are deeply invested in surrounding their private enterprises with a shared narrative of a utopian future for humanity in outer space, and even as much as humanity‘s survival in face of climate change on Earth, by way of becoming a multiplanetary species. For the most part that story isn’t new, of course. The idea that entering and colonizing outer space provides a unifying experience for humanity has been popularized by science-fiction for quite a while now – a tune that many planetary scientists, by the way, have happily sung along with. What has changed is that in the latest version of that popular narrative, the only path leading towards utopia goes through a privatized space industry. Yet in spite of allegedly pointing the way into a better, more just, and more sustainable future for humanity, most of these imaginaries tend to wrap their visions into the rather stale and very earthly language of discovery and exploration, of new frontiers, terra nullius (“nobody’s land“), and of colonization – imageries and terms which have and continue to justify removal, extraction, exploitation and genocide. The billionaires’ space race is no exception to that rule: the quote that marked Branson’s entry into sub-orbital height – “Today space is Virgin territory“ – is not just a clever pun on the company’s name, but also revealingly invokes the misogynist and colonial notions of “untouched“ land and people that are ready for the taking. These notions have served Euro-American empires for centuries as justification for brutally claiming new territories and racially hierarchizing their population. But what’s the harm, one might ask, in rehashing these concepts in context of the exploration of outer space? With no Indigenous population (that we know of) that can be removed, no pre-colonial civilization in the way of Earth’s future colonies on Moon and Mars, isn’t space colonialism something truly new, completely divorced from the history of terrestrial colonialism? Branson, Musk and Bezos would most certainly agree. “Contrary to what the private space industry (and national space agencies, for that matter) wants us to believe, the exploration and colonization of outer space is a very terrestrial undertaking.” The question ignores the fact that contrary to what the private space industry (and national space agencies, for that matter) wants us to believe, the exploration and colonization of outer space is a very terrestrial undertaking. Steeped in capitalism – a system that Branson, Musk and Bezos have mastered and thrived in – and the geopolitical stratagems of Earth’s nation-states, space exploration today is not so much driven by changing humanity as it goes into space, but rather by changing outer space to make it fit into the logics of profit and territorial control on Earth. And we are in the thick of it: Branson’s latest attempt to establish space travel as a new branch of the tourism industry is just one of many recent steps – including the establishment of US Space Force, the ratification of the Artemis Accords, and the signing on of Musk’s SpaceX as a contractor for NASA – to make outer space safe for capitalism. The point of the performative character of the billionaires’ space race, the images of grandeur and individualism, the bells and whistles, its alleged subscription to a more just future for humanity, is to distract, then. It is a shiny packaging that wraps-up and obscures the mundane fact that if colonizing outer space is allegedly about fundamentally changing societally structures that govern Earth and humanity, the New Space Entrepreneurs are certainly not the ones to bring about that change – it would simply be against their self-interest. In Earth’s past and present, the colonial language of virgin land and terra nullius served to obscure the human cost of colonization by dehumanizing colonized peoples. Space exploration, as imagined by Branson, Musk and Bezos, also has a cost. The wealth that all three of them have acquired through their business ventures, which puts them into the position to reach for the stars (and greater profits), builds on unleashed neoliberalism, capitalist exploitation, and, overall, less-than altruistic business models. Their vision of humanity in space is likewise designed for the few and wealthy, and built on the back of the many. And the cost could increase even further. While all of humanity is facing the unprecedented threat of climate change, which urges us to find sustainable solutions fast, Elon Musk and others offer us the seemingly quick fix of abandoning Earth altogether and to weather out the storm on Mars. In spite of being completely unfeasible from a scientific standpoint, the idea has still gained traction among technoliberalists, and is thus withdrawing attention and resources from communities mostly in the Global South for whom climate change is not a threat in the distant future. In addition, the noise and smoke created by the hyper-masculine performances of Branson, Musk and Bezos block our view of the tangible benefits that space exploration has to offer and that we should readily invest in. Current Mars exploration projects, for example, offer insights into how atmospheric changes impact planetary climates – information that could prove invaluable in our battle against climate change on Earth. All of this is a reminder that we should not abandon the idea altogether that space exploration can offer us new and vital insights. Space exploration is, however, not going to magically change humanity or how we live. If we want to continue to hope that space exploration will fulfill the promise of a better future for humanity, changing our perspectives on life on Earth must come first.

**Capitalism is terminally unsustainable and makes extinction inevitable**

**Foster ‘19** (John Bellamy; Professor of Sociology @ the University of Oregon, Ph.D. in Political Science @ York University, editor of the Monthly Review, former Critical Essay Editor/Archives Editor, Organization & Environment, editor and author of numerous books and articles about economics, environment, and capitalism [John, “Capitalism Has Failed—What Next?” 2/1/2019, <https://monthlyreview.org/2019/02/01/capitalism-has-failed-what-next/>, DKP)

Less than two decades into the twenty-first century, it is evident that **capitalism has failed** as a social system. The world is mired in economic stagnation, financialization, and the most extreme inequality in human history, accompanied by mass unemployment and underemployment, precariousness, poverty, hunger, wasted output and lives, and what at this point can only be called a planetary ecological “death spiral.”1 The digital revolution, the greatest technological advance of our time, has rapidly mutated from a promise of free communication and liberated production into new means of surveillance, control, and displacement of the working population. The institutions of liberal democracy **are at the point of collapse**, while fascism, the rear guard of the capitalist system, is again on the march, along with patriarchy, racism, imperialism, and war. To say that capitalism is a failed system is not, of course, to suggest that its breakdown and disintegration is imminent.2 It does, however, mean that it has passed from being a historically necessary and creative system at its inception to being a historically unnecessary and destructive one in the present century. Today, more than ever, the world is faced with the epochal choice between “the revolutionary reconstitution of society at large and the common ruin of the contending classes.”3 Indications of this failure of capitalism are everywhere. Stagnation of investment punctuated by bubbles of financial expansion, which then inevitably burst, now characterizes the so-called free market.4 Soaring inequality in income and wealth has its counterpart in the declining material circumstances of a majority of the population. Real wages for most workers in the United States have barely budged in forty years despite steadily rising productivity.5 Work intensity has increased, while work and safety protections on the job have been systematically jettisoned. Unemployment data has become more and more meaningless due to a new institutionalized underemployment in the form of contract labor in the gig economy.6 Unions have been reduced to mere shadows of their former glory as capitalism has asserted totalitarian control over workplaces. With the demise of Soviet-type societies, social democracy in Europe has perished in the new atmosphere of “liberated capitalism.”7 The capture of the surplus value produced by overexploited populations in the poorest regions of the world, via the global labor arbitrage instituted by multinational corporations, is leading to an unprecedented amassing of financial wealth at the center of the world economy and relative poverty in the periphery.8 Around $21 trillion of offshore funds are currently lodged in tax havens on islands mostly in the Caribbean, constituting “the fortified refuge of Big Finance.”9 Technologically driven monopolies resulting from the global-communications revolution, together with the rise to dominance of Wall Street-based financial capital geared to speculative asset creation, have further contributed to the riches of today’s “1 percent.” Forty-two billionaires now enjoy as much wealth as half the world’s population, while the three richest men in the United States—Jeff Bezos, Bill Gates, and Warren Buffett—have more wealth than half the U.S. population.10 In every region of the world, inequality has increased sharply in recent decades.11 The gap in per capita income and wealth between the richest and poorest nations, which has been the dominant trend for centuries, is rapidly widening once again.12 More than 60 percent of the world’s employed population, some **two billion people**, now work in the impoverished informal sector, forming a massive global proletariat. The global reserve army of labor is some 70 percent larger than the active labor army of formally employed workers.13 Adequate **health care**, **housing**, **education**, and **clean water** and **air** are increasingly out of reach for large sections of the population, even in wealthy countries in North America and Europe, while transportation is becoming more difficult in the United States and many other countries due to irrationally high levels of dependency on the automobile and disinvestment in public transportation. Urban structures are more and more characterized by **gentrification** and **segregation**, with cities becoming the playthings of the well-to-do while marginalized populations are shunted aside. About half a million people, most of them children, are homeless on any given night in the United States.14 New York City is experiencing a major rat infestation, attributed to warming temperatures, mirroring trends around the world.15 In the United States and other high-income countries, life expectancy is in decline, with a remarkable resurgence of Victorian illnesses related to poverty and exploitation. In Britain, gout, scarlet fever, whooping cough, and even scurvy are now resurgent, along with tuberculosis. With inadequate enforcement of work health and safety regulations, black lung disease has returned with a vengeance in U.S. coal country.16 Overuse of antibiotics, particularly by capitalist agribusiness, is leading to an **antibiotic-resistance crisis**, with the dangerous growth of superbugs generating increasing numbers of deaths, which by mid–century could surpass annual cancer deaths, prompting the World Health Organization to declare a “global health emergency.”17 These dire conditions, arising from the workings of the system, are consistent with what Frederick Engels, in the Condition of the Working Class in England, called “social murder.”18 At the instigation of giant corporations, philanthrocapitalist foundations, and neoliberal governments, public education has been restructured around corporate-designed testing based on the implementation of robotic common-core standards. This is generating massive databases on the student population, much of which are now being surreptitiously marketed and sold.19 The corporatization and privatization of education is feeding the progressive subordination of children’s needs to the cash nexus of the commodity market. We are thus seeing a dramatic return of Thomas Gradgrind’s and Mr. M’Choakumchild’s crass utilitarian philosophy dramatized in Charles Dickens’s Hard Times: “Facts are alone wanted in life” and “You are never to fancy.”20 Having been reduced to intellectual dungeons, many of the poorest, most racially segregated schools in the United States are mere **pipelines for prisons or the military.**21 More than two million people in the United States are behind bars, a higher rate of incarceration than any other country in the world, **constituting a new Jim Crow.** The total population in prison is nearly equal to the number of people in Houston, Texas, the fourth largest U.S. city. African Americans and Latinos make up 56 percent of those incarcerated, while constituting only about 32 percent of the U.S. population. Nearly 50 percent of American adults, and a much higher percentage among African Americans and Native Americans, have an immediate family member who has spent or is currently spending time behind bars. Both black men and Native American men in the United States are nearly three times, Hispanic men nearly two times, more likely to die of police shootings than white men.22 Racial divides are now widening across the entire planet. Violence against women and the expropriation of their unpaid labor, as well as the higher level of exploitation of their paid labor, are integral to the way in which power is organized in capitalist society—and how it seeks to divide rather than unify the population. More than a third of women worldwide have experienced physical/sexual violence. Women’s bodies, in particular, are objectified, reified, and commodified as part of the normal workings of monopoly-capitalist marketing.23 The mass media-propaganda system, part of the larger corporate matrix, is now merging into a social media-based propaganda system that is more porous and seemingly anarchic, but more universal and more than ever favoring money and power. Utilizing modern marketing and surveillance techniques, which now dominate all digital interactions, vested interests are able to tailor their messages, largely unchecked, to individuals and their social networks, creating concerns about “fake news” on all sides.24 Numerous business entities promising technological manipulation of voters in countries across the world have now surfaced, auctioning off their services to the highest bidders.25 The elimination of net neutrality in the United States means further concentration, centralization, and control over the entire Internet by monopolistic service providers. Elections are increasingly prey to unregulated “dark money” emanating from the coffers of corporations and the billionaire class. Although presenting itself as the world’s leading democracy, the United States, as Paul Baran and Paul Sweezy stated in Monopoly Capital in 1966, “is democratic in form and plutocratic in content.”26 In the Trump administration, following a long-established tradition, 72 percent of those appointed to the cabinet have come from the higher corporate echelons, while others have been drawn from the military.27 War, engineered by the United States and other major powers at the apex of the system, has become perpetual in strategic oil regions such as the Middle East, and threatens to escalate into a global thermonuclear exchange. During the Obama administration, the United States was engaged in wars/bombings in seven different countries—Afghanistan, Iraq, Syria, Libya, Yemen, Somalia, and Pakistan.28 Torture and assassinations have been reinstituted by Washington as acceptable instruments of war against those now innumerable individuals, group networks, and whole societies that are branded as terrorist. A new Cold War and nuclear arms race is in the making between the United States and Russia, while Washington is seeking to place road blocks to the continued rise of China. The Trump administration has created a new space force as a separate branch of the military in an attempt to ensure U.S. dominance in the militarization of space. Sounding the alarm on the increasing dangers of a nuclear war and of climate destabilization, the distinguished Bulletin of Atomic Scientists moved its doomsday clock in 2018 to two minutes to midnight, the closest since 1953, when it marked the advent of thermonuclear weapons.29 Increasingly severe economic sanctions are being imposed by the United States on countries like Venezuela and Nicaragua, despite their democratic elections—or because of them. Trade and currency wars are being actively promoted by core states, while racist barriers against immigration continue to be erected in Europe and the United States as some 60 million refugees and internally displaced peoples flee devastated environments. Migrant populations worldwide have risen to 250 million, with those residing in high-income countries constituting more than 14 percent of the populations of those countries, up from less than 10 percent in 2000. Meanwhile, ruling circles and wealthy countries seek to wall off islands of power and privilege from the mass of humanity, who are to be left to their fate.30 More than three-quarters of a billion people, over 10 percent of the world population, are chronically malnourished.31 Food stress in the United States keeps climbing, leading to the rapid growth of cheap dollar stores selling poor quality and toxic food. Around forty million Americans, representing one out of eight households, including nearly thirteen million children, are food insecure.32 Subsistence farmers are being pushed off their lands by agribusiness, private capital, and sovereign wealth funds in a global depeasantization process that constitutes the greatest movement of people in history.33 Urban overcrowding and poverty across much of the globe is so severe that one can now reasonably refer to a “planet of slums.”34 Meanwhile, the world housing market is estimated to be worth up to $163 trillion (as compared to the value of gold mined over all recorded history, estimated at $7.5 trillion).35 The Anthropocene epoch, first ushered in by the Great Acceleration of the world economy immediately after the Second World War, has generated enormous rifts in planetary boundaries, extending from climate change to ocean acidification, to the sixth extinction, to disruption of the global nitrogen and phosphorus cycles, to the loss of freshwater, to the disappearance of forests, to widespread toxic-chemical and radioactive pollution.36 It is now estimated that 60 percent of the world’s wildlife vertebrate population (including mammals, reptiles, amphibians, birds, and fish) have been wiped out since 1970, while the worldwide abundance of invertebrates has declined by 45 percent in recent decades.37 What climatologist James Hansen calls the “species exterminations” resulting from accelerating climate change and rapidly shifting climate zones are only compounding this general process of biodiversity loss. Biologists expect that half of all species will be facing extinction by the end of the century.38 If present climate-change trends continue, the “global carbon budget” associated with a 2°C increase in average global temperature will be broken in sixteen years (while a 1.5°C increase in global average temperature—staying beneath which is the key to long-term stabilization of the climate—will be reached in a decade). Earth System scientists warn that the world is now perilously close to a Hothouse Earth, in which catastrophic climate change will be locked in and irreversible.39 The ecological, social, and economic costs to humanity of continuing to increase carbon emissions by 2.0 percent a year as in recent decades (rising in 2018 by 2.7 percent—3.4 percent in the United States), and failing to meet the minimal 3.0 percent annual reductions in emissions currently needed to avoid a catastrophic destabilization of the earth’s energy balance, are simply incalculable.40 Nevertheless, major energy corporations continue to lie about climate change, promoting and bankrolling climate denialism—while admitting the truth in their internal documents. These corporations are working to accelerate the extraction and production of fossil fuels, including the dirtiest, most greenhouse gas-generating varieties, reaping enormous profits in the process. The melting of the Arctic ice from global warming is seen by capital as a new El Dorado, opening up massive additional oil and gas reserves to be exploited without regard to the consequences for the earth’s climate. In response to scientific reports on climate change, Exxon Mobil declared that it intends to extract and sell all of the fossil-fuel reserves at its disposal.41 Energy corporations continue to intervene in climate negotiations to ensure that any agreements to limit carbon emissions are defanged. Capitalist countries across the board are putting the accumulation of wealth for a few above combatting climate destabilization, threatening the very future of humanity. Capitalism is best understood as a competitive class-based mode of production and exchange geared to the accumulation of capital through the exploitation of workers’ labor power and the private appropriation of surplus value (value generated beyond the costs of the workers’ own reproduction). The mode of economic accounting intrinsic to capitalism designates as a value-generating good or service anything that passes through the market and therefore produces income. It follows that the greater part of the social and environmental costs of production outside the market are excluded in this form of valuation and are treated as mere negative “externalities,” unrelated to the capitalist economy itself—whether in terms of the shortening and degradation of human life or the destruction of the natural environment. As environmental economist K. William Kapp stated, “capitalism must be regarded as an economy of unpaid costs.”42 We have now reached a point in the twenty-first century in which the externalities of this irrational system, such as the costs of war, the depletion of natural resources, the waste of human lives, and the disruption of the planetary environment, now far exceed any future economic benefits that capitalism offers to society as a whole. The accumulation of capital and the amassing of wealth are increasingly occurring at the expense of an irrevocable rift in the social and environmental conditions governing human life on earth.43

## Contention 2 – Grid Collapse

#### Private space development wrecks cyber security

Lospinoso, January 13, 2022, Josh Lospinoso is an ex-Army sergeant and Oxford-educated cybersecurity expert who is CEO and co-founder of Shift5, which protects planes, trains and tanks from cyber threats, Space race needs better cybersecurity, https://thehill.com/opinion/cybersecurity/589542-space-race-needs-better-cybersecurity

**The rise in satellites, rockets and shuttles is creating an expanded attack surface. Just like transportation, energy, and other vital industries,** space systems need protection. And while we probably won’t see civilians launching into space anytime soon, Blue Origin and Virgin Galactic are making such travel more feasible by the day. A proposed bill in the U.S. House of Representatives — the Space Infrastructure Act — would designate space as a critical infrastructure sector. It would be a good first step. Given how much equipment is in space and how dependent we are on it, it makes sense to classify it as critical infrastructure. There are more than 6,500 satellites in orbit; a record 1,283 launched in 2020 alone**. They are integral to cellular communications, Global Positioning System (GPS) navigation, monitoring weather and climate**, managing Internet of Things systems for agriculture, and keeping energy and other critical infrastructure running. And this infrastructure is disconcertingly fragile. **Outages have widespread, cascading, and potentially catastrophic consequences. One disabled satellite can affect vast networks on earth, leaving regions without cellular and other services.** ***This makes them attractive targets for malicious attackers***. The risk is so great that the director of the Defense Department’s Space Development Agency has cited cyber attacks against satellites as a greater threat than missiles. The threat is not theoretical Attacks have been going on for many years and have recently ramped up. In 2018, hackers infected U.S. computers that control satellites. Iranian hacking groups tried to trick satellite companies into installing malware in 2019. And one report concluded that Russia has been hacking the global navigation satellite system (GNSS) and sending spoofed navigation data to thousands of ships, throwing them off course**. While there haven’t been any public reports of direct hacks on satellites, vulnerabilities in ground stations have been exploited to try to alter satellite flight paths**, among other aims. **There are a number of ways satellites can be attacked. Hackers could compromise ground control systems to take control of space equipment remotely or inject malware into communications between terrestrial computers and satellites. They can spoof, or snoop on communications for espionage purposes, or disrupt signals.** Imagine a weather data outage during a hurricane or data glitches that lead to power blackouts or supply chain delays. The economic costs would be vast. A cyber attack on the Global Positioning System alone could cost the U.S. $1 billion a day, according to Brian Scott, director of critical infrastructure cybersecurity for the National Security Council. Federal initiatives are a good starting point Lawmakers in Washington, D.C., are taking notice of this fast-growing threat. The 2020 National Defense Authorization Act established a new military branch — Space Force. Meanwhile, President Biden is reviewing the first comprehensive cybersecurity policy for space systems, dubbed Space Policy Directive 5. It requires capabilities to prevent jamming and spoofing of communications and unauthorized access of equipment in orbit. The Space Infrastructure Act, proposed by U.S. Reps. Ted Lieu (D-Calif.) and Ken Calvert (R-Calif.) this summer, is another key measure that would put space on par with other industries by classifying it as a critical infrastructure domain. This move would enable more private and public collaboration on cybersecurity for space assets. One critical infrastructure sector that has dealt with similar cybersecurity concerns is transportation. Transportation operators that have invested in IT security measures have taken first steps, but efforts are on the rise to bolster proactive risk management that demonstrate a more complete understanding of infrastructure security. Under DHS Secretary Alejandro Mayorkas, the TSA has introduced regulations that urge operators to appoint a cybersecurity coordinator, report incidents to CISA within 24 hours, complete vulnerability assessments within information technology (IT) and operational technology (OT) systems, and develop an incident response plan based on security issues discovered. Another critical infrastructure that has work to do is the U.S. military. The Government Accountability Office released reports in 2018 and 2021 chiding the DOD for the poor to non-existent cybersecurity protection on its most critical fleet assets, ranging from fighter jets to tanks to aircraft carriers. These systems were never designed with cybersecurity requirements. As these systems have become more networked and interconnected, the DOD has an enormous, latent problem on its hands that it’s only beginning to grapple with. Fix the technology gaps. Satellite systems were not designed with security in mind. They have weak encryption and use legacy systems that are not easily patched or updated. And some of the navigation protocols are broken — I’ve built systems that spoof some of those protocols and discovered that it’s pretty trivial to do so with a few thousand dollars of investment. Traditional IT security solutions don’t protect the OT layers that satellites rely on. These security lapses make satellites vulnerable to hacking. Learn from IT security. Securing space assets is achievable, especially if we lean on the decades of hard lessons in securing IT networks. These include basics such as setting best practices like understanding your assets and observing what’s happening there to help detect attacks. Vendors should harden the code running on space systems and use the principle of least privilege for accessing the systems. These same lessons have been applied to transportation OT systems successfully. It shouldn’t take as long to get there with space systems. Agree on standards. This includes establishing reasonable security measures and sharing threat information, as well as developing a common cybersecurity architecture. The U.S. is in the early stages of devising cybersecurity rules for other critical infrastructure — like freight and passenger rail systems — and should get started with space now too. Realign incentives. Vendors and customers need more motivation to adopt risk mitigation approaches. When critical infrastructure goes out of service, millions of people can be affected. The total economic loss from these outages is orders of magnitude higher than the expenses incurred by the infrastructure operator. For example, Colonial Pipeline paid a $6.5 million ransom to get their gas pipelines flowing again, but that pales in comparison to the net effect of millions of people on the eastern seaboard who couldn’t pump gas. After the attack, we saw efforts from the U.S. government to apply regulations regarding breach reporting for pipeline systems, and we’re seeing similar efforts in the transportation sector. Federal regulations and the risk of bottom-line impact compel most companies to improve cybersecurity practices — which would benefit space technology as well. W***ith SpaceX, Amazon, and others launching new satellites weekly and commercial space travel on the horizon, the stakes will only get higher if we don’t work to secure these systems.*** Satellites aren’t just communication equipment; they are infrastructure we rely on to keep our hospitals open, streets lit, internet on, food delivered and emergency systems working. It’s time to make security for these systems a national priority before a disaster strikes.

#### Grid vulnerability risks cascading systems collapse

**CNA** Military Advisory Board, advisory group of retired flag and general officers from the

Army, Navy, Air Force, and Marine Corps, November, 20**15**, National Security and

Assured U.S. Electrical Power, https://www.cna.org/CNA\_files/PDF/National-Security-Assured-Electrical-Power.pdf

A Stacked Deck: Grid Susceptibility and Heightened Threats

Today’s grid is built on the model that power comes from large stationary power-generation facilities, flows through hundreds of thousands of miles of transmission lines and high-voltage transformers, and finally reaches consumers (see Figure 1).1

As the grid has evolved incrementally to meet the needs of our growing and increasingly urban population, power plants have grown in size and distance from consumers, and they have decreased in number [3]. Today’s grid—actually comprising three grids: the Eastern, Western, and Texas Interconnects—is rigid. It is designed for power to flow in one direction. It has little flexibility and many vulnerable points of failure that can result in the collapse of large segments. Within the transmission portion of the grid, there are 55,000 transmission substations,2 and according to a Federal Energy Regulatory Commission study, the loss of just nine of these nodes could result in a regional or nationwide outage that could last for weeks or possibly months, with restoration delayed by lack of available replacements [6]. Power utilities are prepared to address events that take one or even two transformers offline, but a natural disaster or coordinated attack that severely damages or fully disables more than two transformers could result in cascading blackouts [8]. No federal rules require utilities to protect these substations unless they are connected to nuclear power plants.

In our 2009 report, Powering America’s Defense: Energy and the Risks to National Security [9], we linked the vulnerability of the fragile domestic electricity grid to weather, accidents, and attacks, with the associated impacts on military installations. In the six years since the release of the report, the risks associated with attacks—such as those by transnational terrorist groups (e.g., al Qaeda, ISIL/ISIS), adversarial governments, and “lonewolf” perpetrators, as well as cyberattacks—have increased dramatically. Several recent incidents give us growing cause for concern, since they may be precursors of future threats.

Physical attacks

The design of the grid and its inherent vulnerabilities are known to our enemies—foreign and domestic. In 2013, the Pacific Gas and Electric (PG&E) Metcalf Transmission Substation located outside San Jose, CA, was the target of a sophisticated sniper attack. The Metcalf Substation supplies power to Silicon Valley, an American landmark of innovation. During the attack, gunmen fired on and disabled 17 transformers, causing $15 million worth of damage. The attackers have not been apprehended and their ultimate purpose remains unknown. The Federal Bureau of Investigation ruled out terrorism, but various independent investigations of the attack have pointed to its high degree of “sophistication.” Some investigators concluded that the Metcalf Substation incident was a “dress rehearsal” for other attacks on a much larger portion of the grid [10] [11].

Although the Metcalf incident was one of the most coordinated attacks on a substation to date, attacks on substations are not isolated. In 2013, shots were fired at grid infrastructure in eastern Colorado, while two years earlier an individual broke into a critical hydro-electric converter station in Vermont with threatening intent. The individuals involved in all of these incidents remain at large [12].

#### Causes extinction

**Friedemann 16** [Alice. Transportation expert, founder of EnergySkeptic.com and author of “When Trucks Stop Running, Energy and the Future of Transportation,” worked at American Presidential Lines for 22 years, where she developed computer systems to coordinate the transit of cargo between ships, rail, trucks, and consumers, Jan 24, 2016, “Electromagnetic pulse threat to infrastructure (U.S. House hearings),” Energy Skeptic, http://energyskeptic.com/2016/the-scariest-u-s-house-session-ever-electromagnetic-pulse-and-the-fall-of-civilization]

Modern civilization cannot exist for a protracted period without electricity. Within days of a blackout across the U.S., a blackout that could encompass the entire planet, emergency generators would run out of fuel, telecommunications would cease as would transportation due to gridlock, and eventually no fuel. Cities would have no running water and soon, within a few days, exhaust their food supplies. Police, Fire, Emergency Services and hospitals cannot long operate in a blackout. Government and Industry also need electricity in order to operate. The EMP Commission warns that a natural or nuclear EMP event, given current unpreparedness, would likely result in societal collapse.

#### AND nuclear lashout

**Tilford 12** [Robert Tilford, Writer for The Examiner, July 27, 2012, “Cyber Attackers Could Easily Shut Down the Electric Grid for the Entire East Coast,” http://www.examiner.com/article/cyber-attackers-could-easily-shut-down-the-electric-grid-for-the-entire-east-coa]

“Cyber attackers could all too easily shut down the electric grid for the entire east coast, the west coast, and the middle part of our country”, said Senator Grassley on July 26, 2012. “Any one attack could leave dozens of major cities and tens of millions of Americans without power. We know, because we were shown in a room here in the Capitol, how an attack could take place and what damage it would do, so we know this is not just make believe”, he said. So what would a cyber attack look like anyway? The Senator explained: “Without ATMs or debit card readers, commerce would immediately grind to a halt. My daughter, who lives here in the DC area, lost power when the storm hit. They waited for a number of hours, and then they took all the food out of their freezer, they gave away what they could, and they threw the rest away. And that was the way it was all over. Their power was out for about a week, and it made it very difficult. They are fortunate enough to have a basement, and the heat wasn’t oppressive down there. Without refrigeration, food would rot on the shelves, the freezers would have to be emptied, and people could actually go hungry. Without gas pumps, transportation arteries would clog with abandoned vehicles. Without cell phones or computers, whole regions of the country would be cut off from communication and families would be unable to reach each other. Without air conditioning and without lifesaving technology and the service of hospitals and nursing homes, the elderly and sick would become much sicker and die. Most major hospitals have backup power, but it is only for a limited amount of time. It depends on how much fuel they can store, and that is very limited”, Senator Grassley said. The devastation that the Senator describes is truly unimaginable. To make matters worse a cyber attack that can take out a civilian power grid, for example could also ~~cripple~~ harm the U.S. military. The senator notes that is that the same power grids that supply cities and towns, stores and gas stations, cell towers and heart monitors also power “every military base in our country.” “Although bases would be prepared to weather a short power outage with backup diesel generators, within hours, not days, fuel supplies would run out”, he said. Which means military command and control centers could go dark. Radar systems that detect air threats to our country would shut Down completely. “Communication between commanders and their troops would also go silent. And many weapons systems would be left without either fuel or electric power”, said Senator Grassley. “So in a few short hours or days, the mightiest military in the world would be left scrambling to maintain base functions”, he said. We contacted the Pentagon and officials confirmed the threat of a cyber attack is something very real. Top national security officials—including the Chairman of the Joint Chiefs, the Director of the National Security Agency, the Secretary of Defense, and the CIA Director— have said, “preventing a cyber attack and improving the nation’s electric grids is among the most urgent priorities of our country” (source: Congressional Record). So how serious is the Pentagon taking all this? Enough to start, or end a war over it, for sure (see video: Pentagon declares war on cyber attacks http://www.youtube.com/watch?v=\_kVQrp\_D0kY&feature=relmfu ). A cyber attack today against the US could very well be seen as an “Act of War” and could be met with a “full scale” US military response. That could include the use of “nuclear weapons”, if authorized by the President.

## Underview

#### The role of the ballot is to evaluate whether the resolution claim is true or false – anything else is arbitrary and moots half of the Aff’s speech time – the 1AR is too short to readjust

#### I get new 1AR theory – anything else allows infinite unchecked abuse in the NC and the NR is long enough to answer any theory

# 1NC

#### Appropriation:

Oxford Dictionary notes that appropriation is “the action of taking something for one's own use, “Note that under this definition resource extraction would qualify was appropriation

#### Private Entities:

Cornell Law explains that a private entity is “person or private group, organization, proprietorship, partnership, trust, cooperative, corporation, or other commercial or nonprofit entity, including an officer, employee, or agent thereof.” This means that, when discussing private entities, both individual billionaires or the companies they fund would fit into the definition.

#### Justice:

Giving each their due

### Resolution

I negate the resolution Resolved: The appropriation of outer space by private entities is unjust.

### Framework

#### I negate the topic, Resolved: The appropriation of outer space by private entities is unjust.

#### My value is: Maximizing life

#### My Criterion is: Reduction of Human Suffering

Defined as we ought to do that which minimizes the pain and suffering of other people because of their worth as human beings and because we value the well-being of all people

#### Wayne **Pomerleau 10**, Gonzaga University, xx-xx-2010, “Western Theories of Justice, https://iep.utm.edu/justwest/#SH4b

Nussbaum, like Pogge (and unlike Nozick and Nielsen), does not so much reject Rawls’s liberal conception of justice as extend its explicit application.  In Sex and Social Justice, she argues for a feminist interpretation of justice, using what she calls a “capabilities approach” that connects with “the tradition of Kantian liberalism,” nowadays represented by Rawls, tapping into their “notions of dignity and liberty,” as a foundation for discussing the demands of justice regarding “women’s equality and women’s human rights.”  The feminism she embraces has five key dimensions:  (1) an internationalism, such that it is not limited to any one particular culture; (2) a humanism, such as affirms a basic equal worth in all human beings and promotes justice for all; (3) a commitment to liberalism as the perspective that best protects and promotes the “basic human capacities for choice and reasoning” that render all humans as having an equal worth; (4) a sensitivity to the cultural shaping of our preferences and desires; and (5) a concern for sympathetic understanding between the sexes.  She expresses an appreciation for the primary goods at the core of Rawls’s theory, while asserting that his analysis does not go far enough.  She offers her own list of ten “central human functional capabilities” that must be respected by a just society:  (1) life of a normal, natural duration; (2) bodily health and integrity, including adequate nourishment and shelter; (3) bodily integrity regarding, for example, freedom of movement and security against assault; (4) freedom to exercise one’s senses, imagination, and thought as one pleases, which includes freedom of expression; (5) freedom to form emotional attachments to persons and things, which includes freedom of association; (6) the development and exercise of practical reason, the capacity to form one’s own conception of the good and to try to plan one’s own life, which includes the protection of freedom of conscience; (7) freedom of affiliation on equal terms with others, which involves provisions of nondiscrimination; (8) concern for and possible relationships with animals, plants, and the world of nature;

Judge, you should value my value of maximizing life highest in this round as you can’t have justice without life. If justice means giving each their due, people are due a life which is not cut short.

### Contention 1- Hegemony

#### The affirmative kills off the US private space sector, undercutting US national security

Joshua Hampson 16, Security Studies Fellow at the Niskanen Center, Masters of Arts in International Relations and Economics from the University of St. Andrews, “WHY NATIONAL SECURITY NEEDS COMMERCIAL OUTER SPACE”, Niskanen Center, 10/7/2016, https://niskanencenter.org/blog/national-security-needs-commercial-outer-space/

Take commercial space-launch services, such as those offered by Blue Origin, Orbital ATK, and Musk’s SpaceX. The capabilities provided by innovative, cost-effective launch services, if allowed to develop more or less freely, will benefit America’s national security. However, to enjoy the full value of these services, the U.S. government must not stand in the way of their development. National security will be best served if the government promotes an active, dynamic market that serves commercial interests and avoids a nearsighted, risk-averse idea of its security interests in space. The military and intelligence communities rely on satellites for coordination, communication, and reconnaissance. For a long time, the United States did not have to worry very much about satellites once they got into orbit. Today, however, there is a growing number of countries with active and burgeoning involvement in space operations. Potential rival powers are looking at America’s satellite constellations as a vulnerability to exploit. There are serious concerns that, in a security crisis, a sophisticated country could destroy or degrade America’s space capabilities. Satellites, with their unique operational high ground, are hard to replace with other systems. Even if the military can develop alternatives, the wider defense community—and the economy that underpins U.S. military strength—would still rely on commercial space infrastructure. Mitigating risks to America’s space system requires developing resilient, dynamic constellations. This means increasing the number of satellites, as well as having plans to replace them quickly if needed. But replacing satellites is expensive. Until recently, the only launch systems used by the U.S. military were provided by United Launch Alliance (ULA). ULA uses two legacy systems that are reliable, but costly. The Delta 4, for instance, costs between $164-350 million per launch. The Atlas V has a smaller price tag, but comes with added national security concerns because it uses Russian rockets. New commercial companies want to launch satellites that don’t rely on foreign production, and for much less money. SpaceX recently won a contract with the Air Force to launch a GPS satellite for only $83 million. With its Falcon 9 reusable rocket system, it hopes to bring costs down to $43 million. Other American companies, while not yet certified to launch for the military, are also working to build approved rockets. Orbital ATK was awarded a contract to develop a heavy lift rocket for the Air Force, and Blue Origin wants to compete directly with SpaceX’s Falcon 9. Not only do these competing companies drive down costs, but they also force ULA to innovate. To compete against SpaceX’s cheaper rockets, ULA wants to develop a completely new system. However, new systems come with risk—as demonstrated by the recent explosion of a SpaceX rocket. Cheaper rockets do not help in a crisis if they blow up. That’s why the U.S. government has an “assured access” policy of maintaining two proven launch vehicles. New providers then must demonstrate reliability. How can the U.S. military both promote cheaper launches while being confident it won’t lose its equipment during launch? Launch companies need to demonstrate reliability over time. But the government is unlikely to award enough contracts to each company to give each a suitable track record. The military could support specific companies, like it has with ULA, but those companies would likely prioritize maintaining proven systems over innovating future, untested ones. Thus, in order for multiple companies to get enough practice, these companies need non-governmental customers. Problems with commercial launches, while costly, do not have the same consequences that the loss of a national security satellite would. Promoting commercial use of space could provide launch companies the experience needed to work with the military and intelligence communities. This is important because while commercialization of outer space seems likely, it is not a foregone conclusion. Concerns about international tension, space debris, or even domestic national security could lead to overregulation. If implemented without foresight, such regulations could kill the industries that launch providers need to test new, innovative, and cheaper services. Commercialized outer space is not just a dream for billionaires who want to go to Mars, but an issue of national security. If the United States wants to own the high ground of outer space, it needs to be able to quickly and cheaply launch new satellites, or other equipment, into orbit quickly. American innovators can help with this, working through risks to produce new services and capabilities. An open, competitive market—with the draw from new profits to be made—will find and fix problems before the government spends a dollar on new technologies. Promoting this market will give private companies the needed practice, and the United States the innovation needed to stay on top.

#### US commercial space leadership is necessary to prevent Chinese dominance and secure US space dominance

Autry and Kwast 2019 – Director of the Southern California Commercial Spaceflight Initiative-USC, PhD & former Prof of Entrepreneurship & Strategy-UC Irvine; Lt. Gen & Cmdr-USAF, Prof-Air University

Greg Autry, PhD & MBA-UC Irvine, Director of the Southern California Commercial Spaceflight Initiative-USC, served on the NASA Agency Review Team and as White House Liaison at NASA, former Professor of Entrepreneurship, Strategy, & Econ-UC Irvine, on the editorial board of the New Space Journal, co-author of Death by China, Beijing’s Fight for the Final Frontier, and Steven L. Kwast, Lt Gen-USAF, Commander & President of Air University-Maxwell AFB, MA in Public Policy-Harvard's Kennedy School of Government, former National Defense Fellow-Institute for the Study of Conflict, Ideology and Policy at Boston University, America Is Losing the Second Space Race to China, 22 August 2019, <https://foreignpolicy.com/2019/08/22/america-is-losing-the-second-space-race-to-china/>

America Is Losing the Second Space Race to China The private sector can give the United States a much-needed rocket boost. The current U.S. space defense strategy is inadequate and on a path to failure. President Donald Trump’s vision for a Space Force is big enough. As he said on June 18, “It is not enough to merely have an American presence in space. We must have American dominance in space.” But the Air Force is not matching this vision. Instead, the leadership is currently focused on incremental improvements to existing equipment and organizational structures. Dominating the vast and dynamic environment of space will require revolutionary capabilities and resources far deeper than traditional Department of Defense thinking can fund, manage, or even conceive of. success depends on a much more active partnership with the commercial space industry— and its disruptive capabilities. U.S. military space planners are preparing to repeat a conflict they imagined back in the 1980s, which never actually occurred, against a vanished Soviet empire. Meanwhile, China is executing a winning strategy in the world of today. It is burning hard toward domination of the future space markets that will define the next century. They are planning infrastructure in space that will control 21st-century telecommunications, energy, transportation, and manufacturing. In doing so, they will acquire trillion-dollar revenues as well as the deep capabilities that come from continuous operational experience in space. This will deliver space dominance and global hegemony to China’s authoritarian rulers. Despite the fact that many in the policy and intelligence communities understand exactly what China is doing and have been trying to alert leadership, Air Force leadership has convinced the White House to fund only a slightly better satellite command with the same leadership, while sticking a new label onto their outmoded thinking. A U.S. Space Force or Corps with a satellite command will never fulfill Trump’s call to dominate space. Air Force leadership is demonstrating the same hubris that Gen. George Custer used in convincing Congress, over President Ulysses S. Grant’s better experience intuition, that he could overtake the Black Hills with repeating rifles and artillery. That strategy of technological overconfidence inflamed conflict rather than subduing it, and the 7th Cavalry were wiped out at the Battle of the Little Bighorn. The West was actually won by the settlers, ranchers, miners, and railroad barons who were able to convert the wealth of the territory itself into the means of holding it. They laid the groundwork that made the 20th century the American Century and delivered freedom to millions of people in Europe and Asia. Of course, they also trampled the indigenous people of the American West in their wake—but empty space comes with no such bloody cost. The very emptiness and wealth of this new, if not quite final, frontier, however, means that competition for resources and strategic locations in cislunar space (between the Earth and moon) will be intense over the next two decades. The outcome of this competition will determine the fate of humanity in the next century. China’s impending dominance will neutralize U.S. geopolitical power by allowing Beijing to control global information flows from the high ground of space. Imagine a school in Bolivia or a farmer in Kenya choosing between paying for a U.S. satellite internet or image provider or receiving those services for free as a “gift of the Chinese people.” It will be of little concern to global consumers that the news they receive is slanted or that searches for “free speech” link to articles about corruption in Western democracies. Nor will they care if concentration camps in Tibet and the Uighur areas of western China are obscured, or if U.S. military action is presented as tyranny and Chinese expansion is described as peacekeeping or liberation. China’s aggressive investment in space solar power will allow it to provide cheap, clean power to the world, displacing U.S. energy firms while placing a second yoke around the developing world. Significantly, such orbital power stations have dual use potential and, if properly designed, could serve as powerful offensive weapons platforms. China’s first step in this process is to conquer the growing small space launch market. Beijing is providing nominally commercial firms with government-manufactured, mobile intercontinental ballistic missiles they can use to dump launch services on the market below cost. These start-ups are already undercutting U.S. pricing by 80 percent. Based on its previous success in using dumping to take out U.S. developed industries such as solar power modules and drones, China will quickly move upstream to attack the leading U.S. launch providers and secure a global commercial monopoly. Owning the launch market will give them an unsurmountable advantage against U.S. competitors in satellite internet, imaging, and power. The United States can still build a strategy to win. At this moment, it holds the competitive advantage in every critical space technology and has the finest set of commercial space firms in the world. It has pockets of innovative military thinkers within groups like the Defense Innovation Unit, under Mike Griffin, the Pentagon’s top research and development official. If the United States simply protects the intellectual property its creative minds unleash and defend its truly free markets from strategic mercantilist attack, it will not lose this new space race. The United States has done this before. It beat Germany to the nuclear bomb, it beat the Soviet Union to the nuclear triad, and it won the first space race. None of those victories was achieved by embracing the existing bureaucracy. Each of them depended on the president of the day following the only proven path to victory in a technological domain: establish a small team with a positively disruptive mindset and empower that team to investigate a wide range of new concepts, work with emerging technologies, and test innovative strategies. Today that means giving a dedicated Space Force the freedom to easily partner with commercial firms and leverage the private capital in building sustainable infrastructure that actually reduces the likelihood of conflict while securing a better economic future for the nation and the world.

#### US commercial space leadership solves extinction

Beames 18 – Chairman of the SmallSat Alliance & Exec Chairman of York Space Systems, former Principal Director of Space & Intel-Office of UnderSecDef AT&L

Charles Beames, Chairman of the SmallSat Alliance, Executive Chairman of York Space Systems, former Principal Director of Space and Intelligence in the Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics (OUSD(AT&L)), active early stage investor in entrepreneurial space, former President of Vulcan Aerospace where he was responsible for asset allocation within a privately held aerospace investment portfolio exceeding $1B, Col. (ret.) in the USAF where he served 23 years in space & intelligence leadership positions around the world, SmallSat Alliance is on a path toward a new space horizon, first appeared in the July 2018 issue of SpaceNews Magazine, available at <https://spacenews.com/op-ed-smallsat-alliance-is-on-a-path-toward-a-new-space-horizon/>

We find ourselves still at the dawn of a new space century, mindful of the victories and setbacks of our past, eager to pass the torch to the next generation of space visionaries, scientists, engineers, and enthusiasts. We look to the future not just to see how much bigger, faster, or higher we can reach, but also how the United States, and specifically the U.S. space community, can again inspire the nations of the world to align with us, as it did in the 20th century. The SmallSat Alliance is an alliance of companies developing, producing, and operating in all segments of the ‘next generation’ space economy; championing renewed U.S. leadership in the burgeoning commercial space economy, and advocating for the transformation of government-led space capabilities. We are experienced space professionals who have chosen to join with others leveraging our decades of hard-won experience, to develop smarter ways to explore space in the 21st century. A wonderful outgrowth of the legacy space program is the commercial, entrepreneurial, and job-creating commercial space business that it bequeathed. These next-generation enterprises range from multi-million-dollar startups providing rideshare opportunities or components for small satellites to multi-billion-dollar space data-analytic platforms reinventing urban car service and agricultural production. The early returns of this economic revolution are already on our doorstep: space data capabilities are exponentially growing elements of the 21st century world economy. Beginning with the dreams and funding by successful tech entrepreneurs, enormous venture investments are already delivering wondrous benefits to the world. Commercial Space – Profit and Non-Profit There are really two major categories in the commercial sector, the profit driven and the non-profit. The classic for-profit companies include not only those designing, building, launching, and operating satellites but also the tech sector that is turning that raw space data into gold through machine-learning analytics. Since for-profit companies are no longer dependent upon the revenues generated by the Cold War space race culture of a bygone era, this new generation of space companies is able to more efficiently capitalize on Moore’s Law, the nonstop exponential growth in chip density, and the associated networking technology co-evolving with it. This new generation is building profitable businesses helping to clean up our oceans of garbage and debris with satellite surveillance, reconnoitering to assist in enforcing laws that protect our oceans from illegal, unregulated, unlicensed fishing, something that is rapidly depleting the world’s most valuable and essential lifeforms. It’s leading in the innovative use of low-cost satellite constellations to produce ubiquitous remote-sensing data, enabling small business owners to be more profitable and less wasteful. For example, precise timing signals from space are already optimizing transportation of people, goods, and services, with even further gains anticipated with the introduction of artificial intelligence to assist drivers, perhaps even someday replacing them entirely. The non-profit sector is the other side of commercial space, concerned more for the general welfare of society, but every bit as integral to this new space enterprise. Much like every century before it in human history, ours is not without its unique challenges, some of which have been a consequence of the last, and all of which the space data domain can be leveraged to help solve. Examples are endless, but one challenge that this new space community is uniquely well-adapted for is to further inform worldwide resource allocation, for the 21st century and beyond. These two primary resources are sustainable water, and the materials needed for adequate housing for an ever-increasing human population, As cities and urbanization continue to expand, governmental planning challenges such as transportation design optimization for goods and services are only the beginning. Additionally, through using inexpensive remote sensing technologies, some members are designing space data analytics to mitigate human suffering from plagues, contain outbreaks, and combating illegal poaching. Some are connecting with other non-profits to curtail human trafficking for the sex trade or forced labor for migrant debt repayment. Still others are helping non-governmental organizations in their work to expose the use of children as soldiers. Addressing these challenges has little to do with resuscitating dreams conceived by long deceased science-fiction writers and much more to do with turning “swords back into plowshares” to solve real threats to humanity. Other non-profit initiatives include pursuing an even more foundational understanding of who we are and how to be the best custodians of our environment. Much as exploring and monitoring the world’s oceans has advanced civilization through a better understanding of human life and the planet, so too does exploring and monitoring from space. Low Earth orbit (LEO) provides a unique vantage point to look back on the planet and understand what is happening, anticipate what might happen and prepare for the future. In addition to better understanding Earth, responsible and rapid exploitation of the low Earth orbit domain will enhance the understanding of the solar system and the rest of the universe. Small satellites already offer low-cost platforms to study and explore what lies beyond the Earth. Other members are pioneering the use of zero-carbon, hydrogen-based reusable propulsion systems to ensure we don’t worsen our atmosphere using kerosene-fueled rockets for the coming tsunami of satellite launches. Finally, a mission ensuring the general welfare and planet survival for the next thousand years is finally confronting the existential threat that asteroids and comets pose to humanity. These extra-terrestrial, deep-space threats are passing dangerously close to our planet, and today we have no solar map of them and no defense.

### Contention 2- Asteroid Mining

#### Asteroid mining is only possible by private, commercial actors appropriating space – mining asteroids makes space exploration sustainable and solves environmental destruction on Earth

Britt, 2021

Hugo Britt, Ph.D. Doctor of Philosophy in English Literature University of Melbourne, is a freelance content writer who believes that every topic is fascinating if you dig deeply enough. Hugo is the co-founder of content marketing agency Discontent. “Companies Are Preparing for Space Mining”, Aug 19, 2021, <https://www.thomasnet.com/insights/companies-are-preparing-for-space-mining/>, accessed 1/10/21, sb

When LA-based blues and rock band Canned Heat wrote “Poor Moon” in the same year Neil Armstrong took his famous giant leap, their lyrics reflected the Cold-War-era concern that spacefaring nations would one day scar the moon by testing a bomb on its surface. While this, thankfully, hasn’t yet happened, the moon — along with all the other planets, moons, and asteroids in the solar system — could one day be mined for resources to meet Earth’s ever-growing needs. Why Mine Off-Earth? Space Exploration Is Expensive While the price tag involved in establishing a human colony on the Moon or Mars is mind-boggling, the costs of sustaining off-Earth colonies and keeping them resupplied indefinitely are even more so — unless the settlements can somehow pay for themselves. Mining for much-needed metals and sending them back to Earth could change the game for space exploration, transforming off-world ventures from prohibitively expensive to financially viable. That being said, bringing a heavy payload of minerals down through Earth’s atmosphere is not currently feasible. Futurists believe that instead, minerals mined in space will be used in space as humanity spreads outwards. Rare Earth Materials Are Abundant There are around two million near-earth asteroids brimming with rare earth minerals, precious metals, iron, and nickel. The Moon contains helium-3, yttrium, samarium, and lanthanum, while Mars contains an abundance of magnesium, aluminum, titanium, iron, chromium, and trace amounts of lithium, cobalt, tungsten, and other metals. Importantly, many planetary bodies contain water, which through hydrolysis can be used as rocket fuel. It Helps with Sustainability. Earth’s resources are finite. Non-renewable metal resources are [and] inherently unsustainable, and mining causes environmental degradation all over the world. The answer is to source our minerals off-world. Off-world minerals are exhaustible as well, but the argument is that mining lifeless rocks such as the Moon or asteroids is infinitely preferable to continuing to damage Earth’s fragile biosphere. Discoveries May Be Made Opening space to commercial mining does not mean that science takes a back seat. Space-mining interests could drive scientific advancement by discovering extremely rare or unknown minerals on other planetary bodies. Robotics Would Do the Work While countless lives have been lost on Earth over the centuries due to mining accidents and disasters, it is likely that humans will not have to risk their lives by traveling in-person to off-world mining sites. Regolith-sampling probes are already in use and provide an early glimpse of what a scaled-up robotic mining craft may one day look like. Off-Earth Mining and Space Law The 1967 Outer Space Treaty is unclear in terms of whether any country — or private company — can claim mineral rights in space. It states that “exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind.” The 1979 Moon Treaty was an attempt to declare the Moon and its natural resources to be CHM (Common Heritage of Mankind). Significantly, it called for “an equitable sharing [by all countries] in the benefits derived from these resources.” Most nations, including the U.S., did not ratify this treaty. Recently, the U.S. has accelerated its efforts to create a legal framework for the exploitation of resources in space. The Obama administration signed the U.S. Commercial Space Launch Competitiveness Act of 2015, allowing U.S. citizens to “engage in the commercial exploration and exploitation of space resources.” In April 2020, the Trump administration issued an executive order supporting U.S. mining on the Moon and asteroids. In May 2020, NASA unveiled the Artemis Accords, which included the development of safety zones around lunar mining sites. Former NASA administrator Jim Bridenstine said: “It’s time to establish the regulatory certainty to extract and trade space resources,” and clarified in a separate statement that: “We do believe we can extract and utilize the resources of the moon, just as we can extract and utilize tuna from the ocean.” NASA planned an Asteroid Redirect Mission which involved collecting a multi-ton boulder from an asteroid and redirecting it into a stable orbit around the moon, but the mission was canceled in 2017. What Companies Are Preparing for a Future of Space Mining? One thing that is becoming clear is that off-earth mining is unlikely to be a state-run activity. Instead, several private companies are jockeying to be first in line to access minerals in space. iSpace (Japan) has a mission to “help companies access new business opportunities on the moon,” including the extraction of water and mineral resources to spearhead a space-based economy. Planetary Resources (defunct) was founded in 2009 with the goal of developing a robotic asteroid mining industry. Despite having high-profile founding investors including Alphabet’s Larry Page, Eric Schmidt, and Virgin Group founder Richard Branson, Planetary ran into financial trouble in 2018 and was gone by 2020. Deep Space Industries (defunct) was another early mover that intended to explore, examine, sample, and harvest minerals from asteroids. DSI was acquired by Bradford Space in 2019. Offworld is an AI company building “universal industrial robots to do the heavy lifting [including mining] on Earth, the Moon, asteroids, and Mars.” The Asteroid Mining Corporation (UK) is a venture currently crowdfunding for a 2023 satellite mission called “El Dorado,” which will conduct a spectral survey of 5,000 asteroids to identify the most valuable for mining. Alongside the U.S., the tiny European nation of Luxembourg has also developed a space mining framework and has subsequently emerged as a European hub for the fledgling industry.

#### Asteroid mining solves climate change, resource shortages, and environmental degradation – independently its impacts outweigh the aff

Hlimi 14 [Tina Hlimi, Canadian lawyer with a Bachelors and Masters Degrees in Environmental Sciences from McGill University, 2014, “THE NEXT FRONTIER: AN OVERVIEW OF THE LEGAL AND ENVIRONMENTAL IMPLICATIONS OF NEAR-EARTH ASTEROID MINING,” ANNALS OF AIR AND SPACE LAW, https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2546924]/Kankee

A. THE ENVIRONMENTAL BENEFITS OF NEAR EARTH ASTEROID HARVESTING Let us recapitulate what we have already found. Shortage of resources is not a fact; it is an illusion born of ignorance. Scientifically and technically feasible improvements in launch vehicles will make departure from Earth easy and inexpensive. Once we have a foothold in space, the mass of the asteroid belt will be at our disposal, permitting us to provide for the material needs of a million times as many people as Earth can hold. Solar power can provide all the energy needs of this vast civilization (10,000,000 billion people) from now until the Sun expires. Using less than one percent of the helium-3 energy resources of Uranus and Neptune for fusion propulsion, we could send a billion interstellar arks, each containing a billion people, to the stars. There are about a billion Sun-like stars in our galaxy. We have the resources to colonise the entire Milky Way. 122 In addition to demystifying the legal doctrine governing outer space natural resource appropriation it is also necessary to weigh the benefits and detriments of space-faring activities. Foremost, States around the world are developing at unprecedented rates and the human population is mounting in conjunction with demand for natural resources to sustain the current and newly established western standard of living. One of the fastest growing nations, China, is experiencing unhindered growth facilitated by fossil fuel use from coal and extensive mining. This has caused substantial water, soil and air degradation. In the face of these troubles, NEA mining could be the key to preserving the Earth's bounty and replenishing contaminated water supplies. The influx of natural resources could thwart the burning of dirty coal and fossil fuels, thereby mitigating the effects of climate change, such as, rising sea level, atmospheric pollution, melting of sea ice and rising temperatures. NEA harvesting could also protect the ocean and the fragile and largely unexplored deep seabeds 123 from oil and gas drilling. It could furthermore protect ecosystems from rare-earth mineral mining predominantly used to fuel the electronics sector. 124 NEA mining is especially pertinent as China restricted its global exports of rare-earth minerals in 2009, incongruously citing the need to protect the environment. Unfortunately, the supply cuts have forced dependent States like Japan, the United States and South Korea to heighten rare-Earth mineral exploration. This accordingly led to Japan's 2011 discovery of rare-earth minerals in the ocean-bed deposits of the Pacific Exclusive Economic Zone (PEEZ) thereby necessitating risky, deep-sea mining techniques, which may result in marine pollution if not carefully designed and developed. Other States, which have joined the environmentally destructive rare-earth mineral exploration movement include India, Canada, Tanzania, Australia, Brazil and Vietnam., There is accordingly much competition and exploration for rare-earth minerals which could result in significant exploitation of untouched areas like the PEEZ seabed and Mongolia.125 Other regions which may soon be targeted for mineral and hydrological resources include Antarctica and the Arctic. With the advent of technological advances, environmentally destructive practices such as refining may soon occur in outer space, sparing the Earth of pollution. 126 Accordingly, NEA mining is a viable technology for preserving the Earth's environment by curbing atmospheric and marine pollution, enhancing water supply and quality and mitigating the effects of climate change; all while allowing humankind to maintain and even improve their standard of living through increased technologies, consumption and population growth. B. THE ENVIRONMENTAL CONSEQUENCES OF NEAR EARTH ASTEROID MINING

#### Capitalism will expand elsewhere if not in space

**Shamas & Holden, 2019**, Victor Shamas &, Oslo Metropolitan University, Work Research Institute (AFI), Oslo, Norway; Thomas Holden, Independent scholar, Oslo, Norway, 2019, Palgrave Communications, One giant leap for capitalistkind: private enterprise in outer space, https://www.nature.com/articles/s41599-019-0218-9

Outer space serves at least two purposes in this regard. In the short-to medium-term, it allows for the export of surplus capital into emerging industries, such as satellite imaging and communication. These are significant sites of capital accumulation: global revenues in the worldwide satellite market in 2016 amounted to $260 billion (SIA, 2017, p. 4). Clearly**, much of this activity is taking place ‘on the ground'; it is occurring in the ‘terrestrial economy'. But all that capital would have to find some other meaningful or productive outlet were it not for the expansion of capital into space**.

#### Governments solve the excesses of capitalism in space

Tim Fernolz, 2019, How to build a space economy that avoids the mistakes of terrestrial capitalism, https://qz.com/work/1767415/can-nasa-build-a-space-economy-that-leaves-capitalisms-problems-behind/

The good news is that **we aren’t close to a world like the one depicted in the movie Elysium, where the ultra-wealthy repair to space and leave the rest of us behind. Our public and private interests will be far more intertwined**, in part because governments have designed it that way. **Most of the major space agencies are compelled by law in their home countries to support private economic activity, which means for example that NASA, by law, views the success of US companies in space as part of its mission, and not a distraction or a threat.** The reality is that **public space agencies, particularly NASA in the United States, remain the largest spenders in space and control the conditions for private organizations acting in orbit. Their challenge—and opportunity—is to manage the transition to a new, multi-stakeholder world in orbit by successfully subsidizing new initiatives without letting the benefits escape the public at large. Much of the work of establishing our space economy is prosaically earthly: Competition policy, labor rights, and corporate taxation. But with critiques of capitalism’s distributional failures at the center of public discourse, there are also sweeping challenges to address: Namely, can the orbital economy be structured better than its terrestrial analogue?**

#### Asteroid mining makes post-scarcity possible

Elvis, July 19, 2021, Martin Elvisis a senior astrophysicist at the Center for Astrophysics | Harvard & Smithsonian. He is the author of Asteroids: How Love, Fear, and Greed Will Determine Our Future in Space (2021), Riches in space: Asteroids could pay for so much space exploration, <https://aeon.co/essays/asteroid-mining-could-pay-for-space-exploration-and-adventure>

**These vast material supplies could make for an era that people call ‘post-scarcity’, where there’s plenty for everyone, just as there is in the 23rd century of the Star Trek science fiction franchise. The starship crew on Star Trek don’t work to keep themselves fed and housed, that’s taken for granted. They work for adventure and exploration. Asteroid wealth could help all of us take a step towards that happy state.**

#### Private space development wrecks cyber security

Lospinoso, January 13, 2022, Josh Lospinoso is an ex-Army sergeant and Oxford-educated cybersecurity expert who is CEO and co-founder of Shift5, which protects planes, trains and tanks from cyber threats, Space race needs better cybersecurity, https://thehill.com/opinion/cybersecurity/589542-space-race-needs-better-cybersecurity

**The rise in satellites, rockets and shuttles is creating an expanded attack surface. Just like transportation, energy, and other vital industries,** space systems need protection. And while we probably won’t see civilians launching into space anytime soon, Blue Origin and Virgin Galactic are making such travel more feasible by the day. A proposed bill in the U.S. House of Representatives — the Space Infrastructure Act — would designate space as a critical infrastructure sector. It would be a good first step. Given how much equipment is in space and how dependent we are on it, it makes sense to classify it as critical infrastructure. There are more than 6,500 satellites in orbit; a record 1,283 launched in 2020 alone**. They are integral to cellular communications, Global Positioning System (GPS) navigation, monitoring weather and climate**, managing Internet of Things systems for agriculture, and keeping energy and other critical infrastructure running. And this infrastructure is disconcertingly fragile. **Outages have widespread, cascading, and potentially catastrophic consequences. One disabled satellite can affect vast networks on earth, leaving regions without cellular and other services.** ***This makes them attractive targets for malicious attackers***. The risk is so great that the director of the Defense Department’s Space Development Agency has cited cyber attacks against satellites as a greater threat than missiles. The threat is not theoretical Attacks have been going on for many years and have recently ramped up. In 2018, hackers infected U.S. computers that control satellites. Iranian hacking groups tried to trick satellite companies into installing malware in 2019. And one report concluded that Russia has been hacking the global navigation satellite system (GNSS) and sending spoofed navigation data to thousands of ships, throwing them off course**. While there haven’t been any public reports of direct hacks on satellites, vulnerabilities in ground stations have been exploited to try to alter satellite flight paths**, among other aims. **There are a number of ways satellites can be attacked. Hackers could compromise ground control systems to take control of space equipment remotely or inject malware into communications between terrestrial computers and satellites. They can spoof, or snoop on communications for espionage purposes, or disrupt signals.** Imagine a weather data outage during a hurricane or data glitches that lead to power blackouts or supply chain delays. The economic costs would be vast. A cyber attack on the Global Positioning System alone could cost the U.S. $1 billion a day, according to Brian Scott, director of critical infrastructure cybersecurity for the National Security Council. Federal initiatives are a good starting point Lawmakers in Washington, D.C., are taking notice of this fast-growing threat. The 2020 National Defense Authorization Act established a new military branch — Space Force. Meanwhile, President Biden is reviewing the first comprehensive cybersecurity policy for space systems, dubbed Space Policy Directive 5. It requires capabilities to prevent jamming and spoofing of communications and unauthorized access of equipment in orbit. The Space Infrastructure Act, proposed by U.S. Reps. Ted Lieu (D-Calif.) and Ken Calvert (R-Calif.) this summer, is another key measure that would put space on par with other industries by classifying it as a critical infrastructure domain. This move would enable more private and public collaboration on cybersecurity for space assets. One critical infrastructure sector that has dealt with similar cybersecurity concerns is transportation. Transportation operators that have invested in IT security measures have taken first steps, but efforts are on the rise to bolster proactive risk management that demonstrate a more complete understanding of infrastructure security. Under DHS Secretary Alejandro Mayorkas, the TSA has introduced regulations that urge operators to appoint a cybersecurity coordinator, report incidents to CISA within 24 hours, complete vulnerability assessments within information technology (IT) and operational technology (OT) systems, and develop an incident response plan based on security issues discovered. Another critical infrastructure that has work to do is the U.S. military. The Government Accountability Office released reports in 2018 and 2021 chiding the DOD for the poor to non-existent cybersecurity protection on its most critical fleet assets, ranging from fighter jets to tanks to aircraft carriers. These systems were never designed with cybersecurity requirements. As these systems have become more networked and interconnected, the DOD has an enormous, latent problem on its hands that it’s only beginning to grapple with. Fix the technology gaps. Satellite systems were not designed with security in mind. They have weak encryption and use legacy systems that are not easily patched or updated. And some of the navigation protocols are broken — I’ve built systems that spoof some of those protocols and discovered that it’s pretty trivial to do so with a few thousand dollars of investment. Traditional IT security solutions don’t protect the OT layers that satellites rely on. These security lapses make satellites vulnerable to hacking. Learn from IT security. Securing space assets is achievable, especially if we lean on the decades of hard lessons in securing IT networks. These include basics such as setting best practices like understanding your assets and observing what’s happening there to help detect attacks. Vendors should harden the code running on space systems and use the principle of least privilege for accessing the systems. These same lessons have been applied to transportation OT systems successfully. It shouldn’t take as long to get there with space systems. Agree on standards. This includes establishing reasonable security measures and sharing threat information, as well as developing a common cybersecurity architecture. The U.S. is in the early stages of devising cybersecurity rules for other critical infrastructure — like freight and passenger rail systems — and should get started with space now too. Realign incentives. Vendors and customers need more motivation to adopt risk mitigation approaches. When critical infrastructure goes out of service, millions of people can be affected. The total economic loss from these outages is orders of magnitude higher than the expenses incurred by the infrastructure operator. For example, Colonial Pipeline paid a $6.5 million ransom to get their gas pipelines flowing again, but that pales in comparison to the net effect of millions of people on the eastern seaboard who couldn’t pump gas. After the attack, we saw efforts from the U.S. government to apply regulations regarding breach reporting for pipeline systems, and we’re seeing similar efforts in the transportation sector. Federal regulations and the risk of bottom-line impact compel most companies to improve cybersecurity practices — which would benefit space technology as well. W***ith SpaceX, Amazon, and others launching new satellites weekly and commercial space travel on the horizon, the stakes will only get higher if we don’t work to secure these systems.*** Satellites aren’t just communication equipment; they are infrastructure we rely on to keep our hospitals open, streets lit, internet on, food delivered and emergency systems working. It’s time to make security for these systems a national priority before a disaster strikes.