# 1nc

## 1

#### a] interpretation: “THE appropriation of outer space” is a generic indefinite singular. The aff may not defend a subset of appropriation of outer space by private entities being unjust.

#### The definite article “the” makes the rez a definite singular – it’s generic

CCC n.d. [Capital Community College, a nonprofit 501 c-3 organization that supports scholarships, faculty development, and curriculum innovation.] “Articles, Determiners, and Quantifiers.” Capital Community College. <http://grammar.ccc.commnet.edu/grammar/determiners/determiners.htm#articles> TG

The three articles — a, an, the — are a kind of adjective. The is called the definite article because it usually precedes a specific or previously mentioned noun; a and an are called indefinite articles because they are used to refer to something in a less specific manner (an unspecified count noun). These words are also listed among the noun markers or determiners because they are almost invariably followed by a noun (or something else acting as a noun). caution CAUTION! Even after you learn all the principles behind the use of these articles, you will find an abundance of situations where choosing the correct article or choosing whether to use one or not will prove chancy. Icy highways are dangerous. The icy highways are dangerous. And both are correct. The is used with specific nouns. The is required when the noun it refers to represents something that is one of a kind: The moon circles the earth. The is required when the noun it refers to represents something in the abstract: The United States has encouraged the use of the private automobile as opposed to the use of public transit. The is required when the noun it refers to represents something named earlier in the text. (See below..) If you would like help with the distinction between count and non-count nouns, please refer to Count and Non-Count Nouns. We use a before singular count-nouns that begin with consonants (a cow, a barn, a sheep); we use an before singular count-nouns that begin with vowels or vowel-like sounds (an apple, an urban blight, an open door). Words that begin with an h sound often require an a (as in a horse, a history book, a hotel), but if an h-word begins with an actual vowel sound, use an an (as in an hour, an honor). We would say a useful device and a union matter because the u of those words actually sounds like yoo (as opposed, say, to the u of an ugly incident). The same is true of a European and a Euro (because of that consonantal "Yoo" sound). We would say a once-in-a-lifetime experience or a one-time hero because the words once and one begin with a w sound (as if they were spelled wuntz and won). Merriam-Webster's Dictionary says that we can use an before an h- word that begins with an unstressed syllable. Thus, we might say an hisTORical moment, but we would say a HIStory book. Many writers would call that an affectation and prefer that we say a historical, but apparently, this choice is a matter of personal taste. For help on using articles with abbreviations and acronyms (a or an FBI agent?), see the section on Abbreviations. First and subsequent reference: When we first refer to something in written text, we often use an indefinite article to modify it. A newspaper has an obligation to seek out and tell the truth. In a subsequent reference to this newspaper, however, we will use the definite article: There are situations, however, when the newspaper must determine whether the public's safety is jeopardized by knowing the truth. Another example: "I'd like a glass of orange juice, please," John said. "I put the glass of juice on the counter already," Sheila replied. Exception: When a modifier appears between the article and the noun, the subsequent article will continue to be indefinite: "I'd like a big glass of orange juice, please," John said. "I put a big glass of juice on the counter already," Sheila replied. Generic reference: We can refer to something in a generic way by using any of the three articles. We can do the same thing by omitting the article altogether. A beagle makes a great hunting dog and family companion. An airedale is sometimes a rather skittish animal. The golden retriever is a marvelous pet for children. Irish setters are not the highly intelligent animals they used to be. The difference between the generic indefinite pronoun and the normal indefinite pronoun is that the latter refers to any of that class ("I want to buy a beagle, and any old beagle will do.") whereas the former (see beagle sentence) refers to all members of that class.

#### The upward entailment test and adverb test determine the genericity of a definite singular

Leslie 16 [Sarah-Jane Leslie, Ph.D., Princeton, 2007. Dean of the Graduate School and Class of 1943 Professor of Philosophy. Served as the vice dean for faculty development in the Office of the Dean of the Faculty, director of the Program in Linguistics, and founding director of the Program in Cognitive Science at Princeton University.] “Generic Generalizations.” Stanford Encyclopedia of Philosophy. April 24, 2016. <https://plato.stanford.edu/entries/generics/> TG

1. Generics and Logical Form In English, generics can be expressed using a variety of syntactic forms: bare plurals (e.g., “tigers are striped”), indefinite singulars (e.g., “a tiger is striped”), and definite singulars (“the tiger is striped”). However, none of these syntactic forms is dedicated to expressing generic claims; each can also be used to express existential and/or specific claims. Further, some generics express what appear to be generalizations over individuals (e.g., “tigers are striped”), while others appear to predicate properties directly of the kind (e.g., “dodos are extinct”). These facts and others give rise to a number of questions concerning the logical forms of generic statements. 1.1 Isolating the Generic Interpretation Consider the following pairs of sentences: (1)a.Tigers are striped. b.Tigers are on the front lawn. (2)a.A tiger is striped. b.A tiger is on the front lawn. (3)a.The tiger is striped. b.The tiger is on the front lawn. The sentence pairs above are prima facie syntactically parallel—both are subject-predicate sentences whose subjects consist of the same common noun coupled with the same, or no, article. However, the interpretation of first sentence of each pair is intuitively quite different from the interpretation of the second sentence in the pair. In the second sentences, we are talking about some particular tigers: a group of tigers in ([1b](https://plato.stanford.edu/entries/generics/#ex1b)), some individual tiger in ([2b](https://plato.stanford.edu/entries/generics/#ex2b)), and some unique salient or familiar tiger in ([3b](https://plato.stanford.edu/entries/generics/#ex3b))—a beloved pet, perhaps. In the first sentences, however, we are saying something general. There is/are no particular tiger or tigers that we are talking about. The second sentences of the pairs receive what is called an existential interpretation. The hallmark of the existential interpretation of a sentence containing a bare plural or an indefinite singular is that it may be paraphrased with “some” with little or no change in meaning; hence the terminology “existential reading”. The application of the term “existential interpretation” is perhaps less appropriate when applied to the definite singular, but it is intended there to cover interpretation of the definite singular as referring to a unique contextually salient/familiar particular individual, not to a kind. There are some tests that are helpful in distinguishing these two readings. For example, the existential interpretation is upward entailing, meaning that the statement will always remain true if we replace the subject term with a more inclusive term. Consider our examples above. In ([1b](https://plato.stanford.edu/entries/generics/#ex1b)), we can replace “tiger” with “animal” salva veritate, but in ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) we cannot. If “tigers are on the lawn” is true, then “animals are on the lawn” must be true. However, “tigers are striped” is true, yet “animals are striped” is false. ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) does not entail that animals are striped, but ([1b](https://plato.stanford.edu/entries/generics/#ex1b)) entails that animals are on the front lawn (Lawler 1973; Laca 1990; Krifka et al. 1995). Another test concerns whether we can insert an adverb of quantification with minimal change of meaning (Krifka et al. 1995). For example, inserting “usually” in the sentences in ([1a](https://plato.stanford.edu/entries/generics/#ex1a)) (e.g., “tigers are usually striped”) produces only a small change in meaning, while inserting “usually” in ([1b](https://plato.stanford.edu/entries/generics/#ex1b)) dramatically alters the meaning of the sentence (e.g., “tigers are usually on the front lawn”). (For generics such as “mosquitoes carry malaria”, the adverb “sometimes” is perhaps better used than “usually” to mark off the generic reading.)

#### It applies to “the appropriation of outer space” – 1] upward entailment test – “the appropriation of outer space is unjust” doesn’t entail that “the use of outer space is unjust” because it doesn’t mean compulsory voting in dictatorships, 2] adverb test – “the appropriation of outer space is usually unjust” doesn’t mean anything substantially different

#### b] violation – they only defend mining

#### c] vote neg:

#### 1] limits – they can pick any form of appropriation from internet satellites to asteroid mining to moon basing and there’s no universal disad since they’re all different and require different uses space – explodes neg prep and leads to random appropriation of the week affs which makes cutting stable neg links impossible. PICs don’t solve – it’s absurd to say neg potential abuse justifies the aff being flat out not T, which leads to a race towards abuse. Limits key to reciprocal engagement since they create a caselist for neg prep.

#### 2] TVA – read the aff as an advantage to a whole rez aff.

#### D] paradigm issues:

#### 1] accessibility – it is literally impossible for me to cut nc’s to every possible aff, esp bc i am not from a big school which has multiple resources

#### 2] fairness and education are voters: debate’s a competitive activity that requires equal opportunities for both sides and it’s why schools fund debate

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

## 2

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

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

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

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

#### B] violation: The Aff is a positive action – it creates a new concept for Space ie by restricting mining

#### C] vote neg:

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

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

#### c/a paradigm issues

## 3

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

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

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

#### Mining is key to solving climate change

Duran 21, Paloma Duran, 11-3-2021, "Is Space Mining the Best Option to Face Climate Change?," Mexico Business, <https://mexicobusiness.news/mining/news/space-mining-best-option-face-climate-change> //tanya

Is Space Mining the Best Option to Face Climate Change? Going to net zero means that more mining is needed. Experts have said that the current supply cannot support the necessary metals demand for the green transition. As a result, new mining alternatives have gained greater relevance, among them is space mining. Several countries, including Mexico, have shown their interest in this alternative, creating a new space race. “The solar system can support a billion times greater industry than we have on Earth. When you go to vastly larger scales of civilization, beyond the scale that a planet can support, then the types of things that civilization can do are incomprehensible to us … We would be able to promote healthy societies all over the world at the same time that we would be reducing the environmental burden on the Earth,” said Dr. Phil Metzger, Planetary Scientist at the University of Central Florida. Currently, there are several attempts to address global warming and transition to a net zero carbon economy. There has been an increasing interest in renewable energy and infrastructure, which has increased demand for various minerals, especially lithium, cobalt, nickel, copper and rare earth elements. However, according to experts, the world is close to entering a metals supercycle, where demand will exceed available supply, causing prices to skyrocket. Consequently, the mining industry has sought alternatives to achieve the required supply. Options include recycling and improved mine waste management, sea mining and space mining. The latter is considered one of the alternatives with the greatest potential. According to a study from the Space Policy Journal, The use of extraterrestrial resources to facilitate space science and exploration, there have been important advances in the field of robots and nanotechnology, which would allow a closed supply chain through the use of self-replicating robots in a few decades. “Asteroid mining will be one of the means through which humanity expands into space. Saving planet Earth could very well happen as a result, but only in the long run. Between growing demand, the danger posed by climate change and the possible need to look off-world for human survival, asteroid mining may be an inevitability. In other words, it is not a question of can we or should we, but when will we?” said Matthew S. Williams, Author and Writer for Universe Today and the curator of the publication’s Guide to Space section.

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

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Climate Change

Humanity faces existential risks from the large-scale destruction of Earth’s natural environment making the planet less hospitable for humankind (Wallace-Wells 2019). The decline of some of Earth’s natural systems may already exceed the “planetary boundaries” that represent a “safe operating space for humanity” (Rockstrom et al. 2009). Humanity has become one of the driving forces behind Earth’s climate system (Crutzen 2002). The major anthropogenic drivers of climate change are the burning of fossil fuels (e.g., coal, oil, and gas), combined with the degradation of Earth’s natural systems for absorbing carbon dioxide, such as deforestation for agriculture (e.g., livestock and monocultures) and resource extraction (e.g., mining and oil), and the warming of the oceans (Kump et al. 2003). While humanity has influenced Earth’s climate since at least the Industrial Revolution, the dramatic increase in greenhouse gas emissions since the mid-twentieth century—the “Great Acceleration” (Steffen et al. 2007; 2015; McNeill & Engelke 2016)— is responsible for contemporary climate change, which has reached approximately 1°C above preindustrial levels (IPCC 2018). Climate change could become an existential threat to humanity if the planet’s climate reaches a “Hothouse Earth” state (Ripple et al. 2020). What are the dangers? There are two mechanisms of climate change that threaten humankind. The direct threat is extreme heat. While human societies possesses some capacity for adaptation and resilience to climate change, the physiological response of humans to heat stress imposes physical limits—with a hard limit at roughly 35°C wet-bulb temperature (Sherwood et al. 2010). A rise in global average temperatures by 3–4°C would increase the risk of heat stress, while 7°C could render some regions uninhabitable, and 11–12°C would leave much of the planet too hot for human habitation (Sherwood et al. 2010). The indirect effects of climate change could include, inter alia, rising sea levels affecting coastal regions (e.g., Miami and Shanghai), or even swallowing entire countries (e.g., Bangladesh and the Maldives); extreme and unpredictable weather and natural disasters (e.g., hurricanes and forest fires); environmental pressures on water and food scarcity (e.g., droughts from less-dispersed rainfall, and lower wheat-yields at higher temperatures); the possible inception of new bacteria and viruses; and, of course, large-scale human migration (World Bank 2012; Wallace-Well 2019; Richards, Lupton & Allywood 2001). While it is difficult to determine the existential implications of extreme environmental conditions, there are historic precedents for the collapse of human societies under environmental pressures (Diamond 2005). Earth’s “big five” mass extinction events have been linked to dramatic shifts in Earth’s climate (Ward 2008; Payne & Clapham 2012; Kolbert 2014; Brannen 2017), and a Hothouse Earth climate would represent terra incognita for humanity. Thus, the assumption here is that a Hothouse Earth climate could pose an existential threat to the habitability of the planet for humanity (Steffen et al. 2018., 5). At what point could climate change cross the threshold of an existential threat to humankind? The complexity of Earth’s natural systems makes it extremely difficult to give a precise figure (Rockstrom et al. 2009; ). However, much of the concern about climate change is over the danger of crossing “tipping points,” whereby positive feedback loops in Earth’s climate system could lead to potentially irreversible and self-reinforcing “runaway” climate change. For example, the melting of Arctic “permafrost” could produce additional warming, as glacial retreat reduces the refractory effect of the ice and releases huge quantities of methane currently trapped beneath it. A recent study suggests that a “planetary threshold” could exist at global average temperature of 2°C above preindustrial levels (Steffen et al. 2018; also IPCC 2018). Therefore, the analysis here takes the 2°C rise in global average temperatures as representing the lower-boundary of an existential threat to humanity, with higher temperatures increasing the risk of runaway climate change leading to a Hothouse Earth.

## 4

#### CP text: states ought to join the artemis accords

Rajagopalan 21, Rajeswari Pillai Rajagopalan, 6-8-2021, "The Artemis Accords and Global Lunar Governance," ORF, <https://www.orfonline.org/research/the-artemis-accords-and-global-lunar-governance/> //tanya

NASA, the U.S. civil space agency, announced the [Artemis Accords](https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf) in October 2020. It is an agreement for lunar exploration and beyond, with participation of both international partners and commercial players. The program envisages the landing of the first woman on the Moon by 2024. The Artemis Accords are guided by key principles of peaceful exploration, transparency, interoperability, emergency assistance, registration of objects, release of scientific data, preserving outer space heritage, preventing harmful interference, and safe disposal of space debris. These are also principles enshrined in the existing international space law including the foundational legal instrument, the Outer Space Treaty (OST) of 1967, and the accords thus can reinforce the existing international space regime. On May 31, New Zealand became the 11th country to sign the Artemis Accords. A few days earlier, on May 24, Republic of Korea signed the accords. These two countries join Australia, Canada, Italy, Japan, Luxembourg, the United Kingdom, the United Arab Emirates, Ukraine, and the United States. The U.S. lead on this issue is important, but many important space powers, including Russia, China, and India, are yet to sign on to the accords. With more countries and industries pursuing lunar missions, there is a need for basic rules governing these activities that will minimize damage and evolve a set of good practices that would contribute to responsible behavior during lunar operations. Nevertheless, developing new governance measures to guide such activities is not going to be an easy matter. With more countries and industries pursuing lunar missions, there is a need for basic rules governing these activities that will minimize damage and evolve a set of good practices that would contribute to responsible behavior during lunar operations. Nevertheless, developing new governance measures to guide such activities is not going to be an easy matter Welcoming New Zealand to the accords, NASA Administrator Bill Nelson [claimed](https://www.nasa.gov/feature/new-zealand-signs-artemis-accords) that the accords are “simple, universal principles [that] will enable the next generation of international partnerships for the exploration of the Moon and beyond.” Announcing New Zealand’s signing of the accords, Foreign Minister Nanaia Mahuta [also pointed](https://www.beehive.govt.nz/release/space-exploration-soars-artemis-accords) to principles such as “transparency, interoperability, release of scientific data, sustainable use of resources, safe disposal of debris, and prevention of harmful interference in other’s activities.” She also acknowledged another important aspect: Although international laws exist in these areas, there was a need for “additional rules or standards to ensure the conservation and long-term sustainability” of space. While the Artemis Accords have been developed primarily by the U.S. for pushing lunar exploration, its utility in the broader area of global governance is also important. It would be useful to have spacefaring powers agree upon and comply with a common set of principles, guidelines, and best practices, which could be greatly beneficial for safe and sustainable use of space and maintain space as common heritage for all humankind. This is only a political commitment for ensuring better compliance with the commitments that state parties have already made by being parties to the OST and its four subsidiary agreements. It would be useful to have spacefaring powers agree upon and comply with a common set of principles, guidelines, and best practices, which could be greatly beneficial for safe and sustainable use of space and maintain space as common heritage for all humankind One of the serious problems facing outer space activities is the absence of full compliance by states to their commitments under the existing legal framework. A fuller compliance to treaty commitments by state parties can immediately change the dynamics in terms of openness and transparency, which will help reduce suspicion between different space powers. The need for more confidence building measures that would reassure states of their policies and activities in outer space cannot be emphasized enough. Given that global politics has grown much more competitive, the major spacefaring powers (many of whom are also the major global powers) need to make significant investments in measures that would enhance trust and confidence in each other. Therefore, space powers need to contemplate the global governance challenges they face and how they might address these.

#### It solves case – their author, we’ll read green

Edd Gent 20, freelance science and technology writer, “Space Mining Should Be a Global Project—But It's Not Starting Off That Way,” Singularity Hub, 10-12-2020, https://singularityhub.com/2020/10/12/the-us-is-trying-to-hijack-space-mining-and-there-could-be-disastrous-consequences/

Exploiting the resources of outer space might be key to the future expansion of the human species. But researchers argue that the US is trying to skew the game in its favor, with potentially disastrous consequences. The enormous cost of lifting material into space means that any serious effort to colonize the solar system will require us to rely on resources beyond our atmosphere. Water will be the new gold thanks to its crucial role in sustaining life, as well as the fact it can be split into hydrogen fuel and oxygen for breathing. Regolith found on the surface of rocky bodies like the moon and Mars will be a crucial building material, while some companies think it will eventually be profitable to extract precious metals and rare earth elements from asteroids and return them to Earth. But so far, there’s little in the way of regulation designed to govern how these activities should be managed. Now two Canadian researchers argue in a paper in Science that recent policy moves by the US are part of a concerted effort to refocus international space cooperation towards short-term commercial interests, which could precipitate a “race to the bottom” that sabotages efforts to safely manage the development of space. Aaron Boley and Michael Byers at the University of British Columbia trace back the start of this push to the 2015 Commercial Space Launch Competitiveness Act, which gave US citizens and companies the right to own and sell space resources under US law. In April this year, President Trump doubled down with an executive order affirming the right to commercial space mining and explicitly rejecting the idea that space is a “global commons,” flying in the face of established international norms. Since then, NASA has announced that any countries wishing to partner on its forthcoming Artemis missions designed to establish a permanent human presence on the moon will have to sign bilateral agreements known as Artemis Accords. These agreements will enshrine the idea that commercial space mining will be governed by national laws rather than international ones, the authors write, and that companies can declare “safety zones” around their operations to exclude others. Speaking to Space.com Mike Gold, the acting associate administrator for NASA’s Office of International and Interagency Relations, disputes the authors’ characterization of the accords and says they are based on the internationally-recognized Outer Space Treaty. He says they don’t include agreement on national regulation of mining or companies’ rights to establish safety zones, though they do assert the right to extract and use space resources. But given that they’ve yet to be released or even finalized, it’s not clear how far these rights extend or how they are enshrined in the agreements. And the authors point out that the fact that they are being negotiated bilaterally means the US will be able to use its dominant position to push its interpretation of international law and its overtly commercial goals for space development. Space policy designed around the exploitation of resources holds many dangers, say the paper authors. For a start, loosely-regulated space mining could result in the destruction of deposits that could hold invaluable scientific information. It could also kick up dangerous amounts of lunar dust that can cause serious damage to space vehicles, increase the amount of space debris, or in a worst-case scenario, create meteorites that could threaten satellites or even impact Earth. By eschewing a multilateral approach to setting space policy, the US also opens the door to a free-for-all where every country makes up its own rules. Russia is highly critical of the Artemis Accords process and China appears to be frozen out of it, suggesting that two major space powers will not be bound by the new rules. That potentially sets the scene for a race to the bottom, where countries compete to set the laxest rules for space mining to attract investment. The authors call on other nations to speak up and attempt to set rules through the UN Committee on the Peaceful Uses of Outer Space. Writing in The Conversation, Scott Shackelford from Indiana University suggests a good model could be the 1959 Antarctic Treaty, which froze territorial claims and reserved the continent for “peaceful purposes” and “scientific investigation.” But the momentum behind the US’ push might be difficult to overcome. Last month, the agency announced it would pay companies to excavate small amounts of regolith on the moon. Boley and Byers admit that if this went ahead and was not protested by other nations, it could set a precedent in international law that would be hard to overcome. For better or worse, it seems that US dominance in space exploration means it’s in the driver’s seat when it comes to setting the rules. As they say, to the victor go the spoils.

# Case

## Plan

#### **The plan gets circumvented via private public partnerships – nasa is literally planning on crashing the ISS and handing it off to private companies**

Wetzel 22, Corryn Wetzel (Corryn Wetzel is a freelance science journalist based in Brooklyn. Her work has also appeared in Audubon magazine, National Geographic and others) Smithsonian Magazine, 2-3-2022, "NASA Plans to Crash the International Space Station Into the Ocean in 2031," <https://www.smithsonianmag.com/smart-news/the-international-space-station-will-crash-into-the-ocean-in-2031-nasa-says-180979512/> //tanya

Since the International Space Station (ISS) launched more than two decades ago, it has hosted more than 200 astronauts and aided countless scientific discoveries. The aging spacecraft is approaching its retirement, and like other decommissioned spacecraft, NASA will crash the ISS into a remote part of the Pacific Ocean in a controlled landing planned for 2031, according to [newly released details](https://www.nasa.gov/sites/default/files/atoms/files/2022_iss_transition_report-final_tagged.pdf) from the agency. "While the ISS will not last forever, NASA expects to be able to operate it safely through 2030," the [report](https://www.nasa.gov/sites/default/files/atoms/files/2022_iss_transition_report-final_tagged.pdf) states. The station, which orbits 227 nautical miles above Earth, has served as a science lab in space for astronauts from 19 different countries. It was assembled in sections, starting when a Russian rocket launched the first piece in 1998. Two years and a few module additions later, the station was ready for its first astronauts, which arrived on November 2, 2000. By 2011, the spacecraft was complete with five bedrooms, two bathrooms, a gym, and huge solar arrays to capture energy from the sun. For the past 20 years, the ISS has been able to host around six astronauts at a time, sustaining a human presence in space. To break from its orbit, the ISS will perform thrusting maneuvers that would ensure "safe atmospheric entry,” according to NASA’s report. The football field–length station will crash into the Earth at [Point Nemo](https://oceanservice.noaa.gov/facts/nemo.html), a location in the Pacific Ocean that has been called the “[Spacecraft Cemetery.](https://www.atlasobscura.com/places/spacecraft-cemetery)" Point Nemo is around 3,000 miles off of New Zealand's eastern coast and 2,000 miles north of Antarctica and has been a space junk target for decades. It's estimated that the United States, Russia, Japan, and European space agencies have sunk more than 250 pieces of space debris at the location since 1971, Katie Hunt reports for [CNN](https://www.cnn.com/2022/02/02/world/nasa-international-space-station-retire-iss-scn/index.html). Until the ISS meets its watery end in nine years, the agency plans to make the most of the station, including conducting research, boosting international cooperation, and helping the private spaceflight industry gain more momentum, according to [Scientific American](https://www.scientificamerican.com/article/nasa-plans-a-fiery-end-for-the-international-space-station-by-2031/)’s Mike Wall. "The International Space Station is entering its third and most productive decade as a groundbreaking scientific platform in microgravity," says Robyn Gatens, director of the ISS at NASA Headquarters, in a [statement](https://www.nasa.gov/sites/default/files/atoms/files/2022_iss_transition_report-final_tagged.pdf). "We look forward to maximizing these returns from the space station through 2030 while planning for transition to commercial space destinations that will follow." Next, NASA is looking to private companies to help sustain the ISS and build future stations. Houston-based company Axiom Space has agreed to attach a privately built module to the station as soon as 2024. In December of last year, NASA awarded a total of $415 million to Blue Origin, Nanoracks, and Northrop Grumman to build their own private space stations, according to Jennifer Hassan and Christian Davenport for the [Washington Post](https://www.washingtonpost.com/science/2022/02/03/nasa-international-space-station-decommission-2031-ocean/). NASA plans to act as a customer, paying to send its own astronauts to use private space outposts. "The private sector is technically and financially capable of developing and operating commercial low-Earth orbit destinations, with NASA's assistance," says Phil McAlister, director of commercial space at NASA Headquarters, in a [press release](https://www.nasa.gov/feature/nasa-provides-updated-international-space-station-transition-plan). "We look forward to sharing our lessons learned and operations experience with the private sector to help them develop safe, reliable, and cost-effective destinations in space.”

#### Doesn’t account for future space fairing nations and doesn’t solve if they’re only restricting it

#### No reason why everyone would have to restrict mining if the US is the key actor

## Adv 1

#### 1] the aff doesn’t solve existing debris and it’s inevitable – squo proves collisions don’t cascade but we need solutions

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

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

#### 2] private companies are key – link turns biggs 18

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

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

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

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

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

#### 4] alt causes and resiliency checks

Swinhoe 21, Dan Swinhoe, 5-7-2021, "Just how resilient are satellites?," No Publication, https://www.datacenterdynamics.com/en/analysis/just-how-resilient-are-satellites/

But what about satellites? GPS has become integral to daily life, weather and observation satellites provide a number of information services to commercial companies, and now we’re beginning to see a number of commercial companies provide broadband and 5G connectivity from orbit. Are the satellites we depend on as robust as we need them to be? The costs to build and launch large satellites runs into the tens, if not hundreds of millions of dollars per launch and can take months to prepare, and so the multi-ton satellites flown to Geostationary Earth Orbit (GEO) 35,786 kilometers (22,236 miles) above the Earth are routinely built with multiple layers of redundancy on key systems and payloads and rigorously tested. “Satellites are reliable in the sense that they get strapped into a rocket and blasted into space through several Gs of acceleration and a ton of heat noise and vibration, and then operate in a vacuum with significant temperature shifts as they go from sunlight into the shadow back into sunlight, and radiation,” says Dr. Brian Weeden, director of program planning, Secure World Foundation. “In that sense, they are pretty durable.” Assuming a satellite survives the launch and calls home without any troubles, it faces a constant battle for survival out in the harshness of space. Even Earth satellites in low orbits can see temperature swings of minus 50°C (-58°F) to plus 50°C (122°F) every 90 minutes, which can have a big effect on the equipment onboard, as can the lack of air. Space weather is another major contributor to satellite failures. Many of these bus-sized, multi-ton satellites are out in GEO, thousands of miles from Earth where there is little atmospheric protection from extreme conditions and large amounts of radiation. And the void can be surprisingly active and unpredictable when it comes to weather. X-rays, ultraviolet rays, radiation, and geomagnetic storms can all wreak havoc on-board; components can be damaged by the high current that discharges into the satellite or damaged by high-energy particles that penetrate the satellite.  Sun Outages, where the satellite passes in front of the Sun, don't harm the satellite. However, the sun's interference swamps the signal from the satellite, causing a loss of data. These outages affect the signals from geostationary satellites, and can last for around ten minutes a day during the Equinox - but they are predictable. The University of Reading recently recorded the first ‘space hurricane’ which it described as a ‘1,000km-wide swirling mass of plasma raining electrons several hundred kilometers above the North Pole.’ To better predict coronal ejections from the sun and provide more notice about potential space weather events, the ESA has planned a mission called Lagrange, where spacecraft will be positioned at "Lagrange points", where the gravity of the Earth and Sun balance providing stable locations to observe the sun’s activity a few days ahead of the Earth’s position. Before satellites launch, they go through a rigorous testing regime that can see them placed into climate chambers to simulate the super cold and hot vacuum of space, as well as vibration and shock tests to see how machines cope with the rigors of launch and booster separation en-route to orbit. Satellites are built on the assumption they will never be touched again, so operators want to make sure their investments are built to last. “The systems are built to be resilient and operate autonomously,” says Kevin Bell, VP of space program operations at the Aerospace Corporation, “and have several different kinds of fault management systems built into them; either to self-repair and recover or to go into a safe mode where a human can come in and figure out what happened and recover them. Reliability and testing have improved over the years, and satellites are now less over-engineered as we learn about what actually causes satellites to fail once out in orbit. We are also slowly starting to open up the possibilities to repair, refuel, and potentially upgrade existing satellites even after years in orbit. Northrop Grumman’s Mission Extension Vehicle is the first satellite that can service other satellites and extend their lifespan. MEV-1 completed its first docking to a client satellite, Intelsat IS-901 in February 2020, to keep the satellite operational for a further five years, while MEV-2 is due to dock with the Intelsat IS-1002 satellite in early 2021. Nasa is working on a similar in-orbit service satellite as part of the agency’s OSAM-1/Restore-L project. The arrival of these constellations means the industry is seeing a divergence. There are huge, highly-resilient individual machines in high orbits; and large swarms of small and breakable machines in low orbits that, while individually fragile, create a more resilient overall system because there can be tens or even hundreds of failover points. “You go from a few very large, very expensive, very powerful things to a more distributed set of satellites. Maybe each one individually is not quite as powerful but you've got dozens to hundreds or thousands of them, which is a different kind of resilience,” he says. “The bigger ones are more resilient on an individual basis. We’re seeing a shift towards individual satellites that are probably less resilient, but a system that is more resilient on the whole. If you've got one satellite and it fails you're screwed. If you've got 100, and five of them fail, you're probably okay.” “The new players have effectively scaled for production,” Bell adds. “They're able to evolve because of quantity and the amount of industrial base, it's huge compared to the kinds of quantity and scale we have. They’re trying to look at what it takes to build production lines where you can stabilize the production line and build large unit counts, and they've actually been able to spend more time optimizing testing.” Smaller satellites can be tested more easily; they no longer need cranes and high bays, but can be pushed around on a wheeled cart by a person, which can massively simplify assembly integration and test. And once in space, companies can glean more information about what causes failures. The fact these commercial companies are willing to take risks and fail on some iterations of satellites marks a change from the more traditional companies, which are reluctant to accept the larger costs of failure, and the political ramifications if Government/military agencies are on board.

#### 5] no ilink – mcknight was FIVE YEARS AGO and johnson is false – proven true by the 2009 satellite collision and there’s no brightline in the 1ac – means you err neg on probability

#### Cp solves the internal link to Xu 20 ­– it literally says Without specific coordinating rules, conflicts between multiple States are likely to happen.

#### No miscalc or escalation

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

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

#### Space systems are distributed and resilient---the U.S. knows that and won’t jump straight to the nuclear rung of the escalation ladder

Zack Cooper 18, Senior Fellow for Asian Security at the Center for Strategic and International Studies, and Thomas G. Roberts, Research Assistant and Program Coordinator for the Aerospace Security Project at CSIS, “DETERRENCE IN THE LAST SANCTUARY”, War on the Rocks, 1/2/2018, https://warontherocks.com/2018/01/deterrence-last-sanctuary/

Until recently, resilience in space was largely an afterthought. It was assumed that a conflict in space would likely lead to or precede a major nuclear exchange. Therefore, the focus was on cost-effective architectures that maximized satellite capabilities, often at the cost of resilience. Recently, however, some have hoped that new architectures could enhance resilience and prevent critical military operations from being significantly impeded in an attack. Although resilience can be expensive, American investments in smaller satellites and more distributed space architectures could minimize adversary incentives to carry out first strikes in space. In the late 20th century, minor escalations against space systems were treated as major events, since they typically threatened the superpowers’ nuclear architectures. Today, the proliferation of counter-space capabilities and the wide array of possible types of attacks means that most attacks against U.S. space systems are unlikely to warrant a nuclear response. It is critical that policymakers understand the likely break points in any conflict involving space systems. Strategists should explore whether the characteristics of different types of attacks against space systems create different thresholds, paying particular attention to attribution, reversibility, the defender’s awareness of an attack, the attacker’s ability to assess an attack’s effectiveness, and the risks of collateral damage (e.g., orbital debris). Competitors may attempt to use non-kinetic weapons and reversible actions to stay below the threshold that would trigger a strong U.S. response. The 2017 National Security Strategy warns: Any harmful interference with or an attack upon critical components of our space architecture that directly affects this vital U.S. interest will be met with a deliberate response at a time, place, manner, and domain of our choosing. In order to fulfill this promise, the United States will want to ensure that it has capabilities to respond both above and below various thresholds to ensure a full-spectrum of deterrence options for the full range of potential actors.

#### MAD holds in space

Bowen, 18 – Lecturer in International Relations at the University of Leicester Bleddyn Bowen, “The Art of Space Deterrence,” European Leadership Network. February 20, 2018. https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/ --ASATs create debris – nobody wants to do it – it ruins space for them too so 0 incentive

Fourth, the ubiquity of space infrastructure and the fragility of the space environment may create a degree of existential deterrence. As space is so useful to modern economies and military forces, a large-scale disruption of space infrastructure may be so intuitively escalatory to decision-makers that there may be a natural caution against a wholesale assault on a state’s entire space capabilities because the consequences of doing so approach the mentalities of total war, or nuclear responses if a society begins tearing itself apart because of the collapse of optimised energy grids and just-in-time supply chains. In addition, the problem of space debris and the political-legal hurdles to conducting debris clean-up operations mean that even a handful of explosive events in space can render a region of Earth orbit unusable for everyone. This could caution a country like China from excessive kinetic intercept missions because its own military and economy is increasingly reliant on outer space, but perhaps not a country like North Korea which does not rely on space. The usefulness, sensitivity, and fragility of space may have some existential deterrent effect. China’s catastrophic anti-satellite weapons test in 2007 is a valuable lesson for all on the potentially devastating effect of kinetic warfare in orbit.