# 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] adverb test – “the appropriation of outer space is usually unjust” doesn’t mean anything substantially different

#### b] violation – they spec 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 like hwl which has multiple competitors and coaches helping cut prep in between rounds

#### 2] fairness and education are voters – debate’s a competitive activity that requires equal opportunity 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 Affirmative must only defend that appropriation of outer space is unjust.

#### B] violation: they defend a plan with an actor “states”

#### C] standards – Effects and Extra-T which are voters for predictable limits and ground – allowing the Aff to defend implementation through any number of agreements/mechanisms explodes predictable limits – it shifts the topic to not appropriation good/bad but how we should end it which kills in-depth clash and makes prep impossible

#### c/a paradigm issues

## 3

#### cp text: the ost should be revised to clarify that the language in Article II prohibiting national appropriation does not apply to private companies

it’s what 1ac blake and saletta advocate for:

states seriously consider supplementing the OST.

international cooperation and oversight will benefit all

#### solves 100% of case – legalizes mining and facilitates conflict resolution

Heise 18, Jack Heise, 2018. "Space, The Final Frontier Of Enterprise: Incentivizing Asteroid Mining Under A Revised International Framework". University Of Michigan Law School Scholarship Repository. <https://repository.law.umich.edu/mjil/vol40/iss1/5/>. //tanya

A. The Desirability of an International Framework The preservation of space as a zone governed by international law, in contrast to a system predicated on national jurisdiction, is desirable in that it promotes peace, facilitates dispute resolution, and allows for more coordinated efforts in addressing issues relevant to all entities operating in space.98 As illustrated by the recent legislative activity in the United States and Luxembourg, the risk of inaction is the resultant domination of the extraterrestrial environment by individual nations rather than by international agreement.99 It would take only minor changes to the OST to resolve some of the ambiguities in the status quo and help bring the benefits of asteroid mining to humanity as a whole. A revision of this treaty rather than a wholesale abandonment of the agreement—whether that abandonment is in fact or merely in practice—would better maintain the international character of space. The OST reflects Cold War era concerns about the militarization of space.100 Private companies, now ascendant in the growing space economy, simply do not have the military capacity or intention of sovereign governments. In short, the factual backdrop for the signing of the OST has changed. One straightforward means of authorizing private companies to extract space resources would be to revise the OST to clarify that the language in Article II prohibiting national appropriation does not apply to private companies. This could be achieved by simply adding a sentence to the end of Article VI: Under the revised treaty, companies shall remain under the supervision of the countries in which they are based but are not capable of national appropriation by use or occupation. This revision would create something of a line-drawing problem given the partnerships between sovereign space agencies and private companies,101 as well as a possible loophole by which unscrupulous nations could take advantage of the corporate form. Additional safeguards might be necessary to prevent this possibility. This revision could, however, promote peaceful coexistence and uniformity in space law, as well as create certainty as to the legality of asteroid mining by private companies. An amended OST or a new treaty governing the extraction of space resources would have the benefit of maintaining the peaceful order of space. While admittedly the product of a different era, the post-national and peaceable foundation of the OST is still desirable in an international environment where many nations are armed to the proverbial nuclear teeth. Peaceful use of outer space is a laudable objective and one served most effectively by international agreement rather than by competing national claims of sovereignty.106 An international system would also facilitate dispute resolution. In a borderless and extra-jurisdictional realm like outer space, a system predicated on national sovereignty and ownership is not instructive as to whose laws—or whose choice of law rules—would control in the event of disputed title of an asteroid or the commission of a tort between two actors from different nations.107 The United Nations Convention on the Law of the Sea (the “UNCLOS”) established the International Tribunal for the Law of the Sea (the “ITLOS”) as a means of providing a venue in which similar disputes could be adjudicated between actors with conflicting legal regimes.108 Outer space has a great deal of similarity to the high seas: both are vast, both are easily treated as a non-appropriable international commons, and both are an in-between space in the sense of existing between bodies of terra firma. 109 An international mechanism like ITLOS ought to be established for resolving space disputes such that parties can seek a neutral arbiter to resolve conflict and laws can be uniformly applied to all entities irrespective of their country of origin.110 Finally, an international system could more easily allow for cooperation between nations and private entities in addressing issues that affect the spacefaring community as a whole. The emergence of space debris and the use of nuclear power sources in space are examples of developing issues that bear on the ease and safety of space travel for all.111 Left to national governments or individual corporations, it seems plausible that lack of oversight could result in a tragedy of the commons.112 By contrast, an international framework is well-suited to consider the problems of the space ecosystem in a way that transcends national boundaries. The UNCLOS Preamble, for example, demonstrates an awareness that “problems of ocean space are closely interrelated and need to be considered as a whole.”113 The compelling interests of peace, uniformity, and cooperation in outer space illustrate the desirability of an international framework to govern asteroid mining; to tweak rather than jettison the existing law. The resulting clarity and predictability would incentivize asteroid mining through reducing legal risk and uncertainty. However, a nation-centric, first possession framework has drawbacks that highlight the desirability of an international governance regime for asteroid mining. First, the experience of colonization was one that prompted conflict between colonizers.122 The peaceful character of space is one of the great achievements of the OST, and it should not be jettisoned. Second, a regime characterized by national actors could spark a race to the bottom with respect to domestic regulation, leading to the same “flags of convenience” problem present in the maritime context as asteroid mining and spaceflight companies relocate to avoid taxes, labor and safety standards, and tort liability.123 An international framework, by contrast, could more easily prevent this problem by facilitating the creation of uniform standards for labor, safety, and liability, making relocation to under-regulated states a less attractive prospect. The drawbacks of a system governed by individual nations, in conjunction with the advantages of a global system illustrated above, point to the desirability of a revised framework governing asteroid mining that is international in character. B. A System with Minimal Regulatory Barriers to Entry Whatever approach is chosen to resolve the ambiguities in the OST ought not to be overly restrictive or create burdensome regulatory obstacles for private asteroid mining companies. Substantial regulation could discourage investment and hamper the development of an already capital-intensive and high-risk industry.124 The ideal regulatory system for asteroid mining should maintain an international character for the reasons described in the previous section but should not impose cumbersome regulation on asteroid mining companies at this stage in their development. Rather, allowing norms to develop over time through the resolution of disputes between asteroid mining companies would likely result in the most efficient regulatory system and would be more attractive to companies and nations that might be tempted to disregard the treaty. Robert Ellickson, in his Hypothesis of Wealth-Maximizing Norms, cited the development of whaling norms as supporting the idea that, “when people are situated in a close-knit group, they will tend to develop for the ordinary run of problems norms that are wealth-maximizing.”132 Ellickson defines wealth-maximizing norms as those that minimize the sum of transaction costs and deadweight losses that the members of a group objectively incur.133 Those involved in the group activity are likely to develop rules in a utilitarian manner, preferring “bright-line rules that would eliminate arguments to fuzzy rules that would prolong disputes.”134 The few asteroid mining companies currently in existence are not only a close-knit group under Ellickson’s definition,135 but are best positioned to create rules that will give rise to greater clarity and reduce transaction costs due to their proximity to and soon-to-be-developed experience with the business of asteroid mining. Rules like these would incentivize asteroid mining through greater legal clarity and predictability, thus facilitating the delivery of asteroid mining’s benefits to all mankind. The UNCLOS ratification debate helps illustrate why a more substantial regulatory regime might prove counterproductive for the international community. One of the primary reasons cited by American opponents of ratification is that accession to the treaty would subject American mining companies “to the whims of an unelected and unaccountable bureaucracy and would force them to pay excessive fees to the International Seabed Authority for redistribution to developing countries.”136 While other commentators have dismissed these concerns as “pure nonsense,” noting that these same companies favor accession to the treaty for the sake of having a clear legal claim to mined minerals,137 it is easy to imagine that a similar scheme of bureaucratic redistribution in the context of asteroid mining might be disregarded by the United States. A decision by nations leading the way on asteroid mining to opt out of a treaty would for all practical purposes cripple future treaty efforts. A key advantage of the proposed regulatory framework described in this Note is a practical one: it would offer the attractive prospect of legal clarity without an international bureaucratic bogeyman, making it more likely that key national stakeholders like the United States would sign on. Conclusion Maintaining the international character of outer space while allowing private companies to develop their own governing norms under a slightly revised OST would preempt the outbreak of a new race by sovereign governments to colonize space; create greater certainty for those undertaking the enterprise of asteroid mining; and permit the development of an efficient system tailored to maximize returns on celestial investment. The asteroid mining industry has the potential to confer benefits on all mankind as a means of facilitating space travel, spurring the development of science and technology, mitigating the potential for a calamitous asteroid impact, and facilitating climate change mitigation efforts. As such, it is in the interest of all nations to revise the OST to allow greater certainty in this endeavor. While the “entire unimaginable infinity of creation”138 is still out of reach based on our existing physics and engineering capabilities, asteroid mining is a critical step in beginning to harness celestial resources and more fully explore the intricacies of the universe around us.

## 4

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

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

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

#### 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.

# 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.”

#### You don’t solve – 1ac pelton literally advocates for mining but then you restrict it

#### Doesn’t account for future space fairing nations

## 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

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] no ilink to grego – proven true by the 2009 satellite collision and there’s no brightline in the 1ac – means you err neg on probability

#### 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.

## Adv 2

#### Beard – doesn’t say mining, it’s also about multilateral arms control agreements which they don’t solve

#### Pelton – no reason why space coop spills over to things like terrorism and warming

#### 1] ost thumps the link and things like the wolf amendment which prohibits coop with china prevents the plan from succeeding

#### 2] Their own evidence advocates for private companies

Dr. Joseph N. Pelton 17, PhD in International Relations from Georgetown University, Director Emeritus of the Space and Advanced Communications Research Institute at George Washington University, The New Gold Rush: The Riches of Space Beckon!, p. 1-9

Let’s check in on what some of those very rich and smart guys think about the new space economy and its potential. (We are sorry to say that so far there are no female space billionaires, but surely this, too, will come someday soon.) Of course this twenty-fi rst century breakthrough that we call the New Space economy will not come just from new space commerce. It will also come from the amazing new technologies here on Earth. Vital new terrestrial technologies will accompany this cosmic journey into tomorrow. Information technology, robotics, artifi cial intelligence and commercial space travel systems have now set us on a course to allow us humans to harvest the amazing riches in the skies—new natural resources, new energy, and even totally new ways of looking at the purpose of human existence. If we pursue this course steadfastly, it can be the beginning of a New Space renaissance. But if we don’t seek to realize our ultimate destiny in space, Homo sapiens can end up in the dustbin of history—just like literally millions of already failed species

#### Space cooperation doesn’t lead to broader relations – empirics prove

Sterner 15 (Eric Sterner is a fellow at the George C. Marshall Institute. He held senior staff positions for the U.S. House Science and Armed Services committees and served in DoD and as NASA’s associate deputy administrator for policy and planning, “Talk and Cooperation in Space” 8/6/2015 https://spacenews.com/op-ed-china-talk-and-cooperation-in-space/)

How might cooperation with China benefit the United States? Some hold that cooperation in space helps promote cooperation on Earth. Writing in SpaceNews in 2013, Michael Krepon argued “The more they cooperate in space, the less likely it is that their competition on Earth will result in military confrontation. The reverse is also true.” That sentiment is widespread and flows from the nobility of exploration. **If only it were so.** Unfortunately, a country’s space behavior appears to have little affect on its terrestrial actions. Russia’s multidecadal human spaceflight partnership with the United States did not prevent it from invading and destabilizing Ukraine when it moved toward a closer relationship with the European Union, many of whose members are Russian partners in the International Space Station. Space cooperation **has not, and will not**, prevent the continued worsening of the security environment in Europe, which flows from Russian behavior on Earth, not in space. **Space cooperation with China is similarly unlikely to moderate its behavior**. Tensions in Asia derive from China’s insistence on pressing unlawful territorial claims in the Pacific, most recently by transforming disputed coral reefs into would-be military bases. Ironically, civilian space technology has proved critical in documenting these aggressive moves. To further demonstrate the civil space cooperation does not promote cooperation on Earth, we need look no further than recent history. The NASA administrator’s visit to China in the fall of 2014 nearly coincided with China’s hacking of NOAA, with whom Beijing has a “partnership” in studying climate change. Military confrontation flows from the interaction of hard power in pursuit of competing national interests. Space cooperation falls into the realm of soft power. It has value in strengthening relationships among like-minded states with similar interests. China’s aggressiveness toward its neighbors, its human rights record and its cyberattacks on the United States strongly demonstrate that it and the United States are **not of like minds**. This is not the result of insufficient space cooperation, but of divergent national interests.

**No resource wars – peaceful resolutions**

**Itell 13**, Jeffrey, senior wikistrat analyst, this report summarizes a 14-day crowd-sourced simulation in which over 85 analysts from around the world collaboratively explored scenario pathways countering the conventional wisdom that resource scarcities in the future will lead to “resource wars., “Countering Conventional Wisdom: the Coming Resource Wars,” October, http://wikistrat.wpengine.netdna-cdn.com/wp-content/uploads/2013/10/the\_coming\_resource\_wars-Final-Report.pdf

Politicians can also employ policies that have long proven to be effective under similar economic systems to keep resources flowing. Such is the case with rubber production in southern Thailand, in which falling prices and overproduction have led to political protest and violence. The Thai government’s judicious employment of agriculture price and production controls, proven to work in Europe and the U.S. and already employed for rice in Thailand, could limit turmoil and maintain production by providing equitable subsidies to all agricultural producers, thereby reducing equity concerns between the haves (the rice farmers) and have-nots (almost all other farmers). It has been demonstrated that government assistance to manage agricultural risk can lead to higher production, greater wealth and more agricultural stability, factors that would benefit Thailand’s farmers as well as the entire country’s economy and food stability situation. Finally, the United States faces huge infrastructure demands, including refitting its energy infrastructure for renewable energy. Much of this infrastructure could be funded through U.S. corporate profits. However, U.S. tax laws have resulted in U.S. corporations keeping $1.7 trillion dollars in profits offshore because marginal U.S. corporate tax rates are among the highest in the world. A deal that reduces these tax rates in return for set-aside investments in solar conversion could be a win-win for American corporations and American citizens. Sometimes an emerging technology (plus some smart organizational changes) is all that is necessary to unleash a win-win outcome and avoid a scarcity situation. Consider China: With one-fifth of the world’s population to feed, China is buying up agricultural land in Africa and elsewhere, leading to concerns over who will eat or starve in fallow years. Yet this might prove to be a false concern, as Chinese meat and dairy practices are so weak and technology is improving so rapidly that China will soon be able to increase production over demand on its own land. Chinese meat and dairy consumption will also be aided by the emergence of in vitro technologies, which produce meat and dairy products in laboratories rather than farms. The uranium market also lends itself to a win-win solution. Shortages in uranium production lead many to worry that producers and processors will hoard uranium, which could result in proxy wars and trade by criminal networks. In 2007, the Nuclear Energy Authority estimated that at then-current prices, untapped uranium resources consisted of about 5.5 million tons in known deposits and an additional 10.5 million tons in likely deposits, enough to supply reactors sufficient fuel for 100 years —provided demand did not increase. (At higher prices, known uranium deposits would likely be larger since untapped areas could be explored economically.) Several ongoing technological and mechanistic processes could suppress fuel demand even as demand for nuclear power increases, thus making conflict less likely. New nuclear energy technologies require less fuel and recycle used fuel. Higher demand would lead to higher prices, leading to the cost-effective exploitation of new sources of uranium. Alternatively, the ascent of renewable energy, especially solar, would reduce global demand for uranium fuel. As these examples indicate, there are many ways to address resources shortages in a complex, dynamic economy other than simply looking for more resources. Existing resources can be used more efficiently; substitute products can be found; new technologies can re-popularize obsolete resources (consider the absence of panic over whale oil). The interplay of pricing and the ingenuity under-laying technological process has time and again proven resource scaremongers wrong. Some resource issues present themselves as zero-sum problems. To the extent one side wins, the other side must lose. By their nature, zero-sum resource issues often do not lend themselves to easy political resolutions. Losers must rely on technological advancements or economic forces to make do with available resources. For example, Japan (and most other technologically advanced countries) can defend itself against China’s near-monopoly of rare earth elements – which are essential for many high tech products – by developing substitute materials. Continued Chinese hoarding would also push up the marginal cost of using rare earth elements, making exploitation of other known sources more economically viable. Similarly, potential U.S. hoarding of phosphates (important for fertilizer) extracted in the Western Sahara would lead to the development of synthetic fertilizer and make phosphate recycling economically feasible. Asian countries may find it difficult to fully power their rapid urbanization, especially if neighboring countries are unwilling to share hydroelectric power at reasonable prices; but new technologies such as power grids and wireless transmission could ensure that supply outpaces demand. Even water supply issues that do not lend themselves to easy political resolution – such as in the Sea of Galilee in Israel and with the Tigris and Euphrates Rivers among Turkey, Syria and Iraq –water conservation, recycling and desalination will help “losers” meet some of their water needs. A political solution, sometimes, is the only way to resolve a zero-sum resource conflict. The post-World War II international system offers countries a variety of dispute resolution mechanisms to forestall conflict, starting with the U.N. Security Council but often residing at technical agencies such as the International Atomic Energy Agency, for example, for dispute resolution and monitoring. International treaties and regional organizations such as ASEAN provide mechanisms for dispute resolution and, sometimes, interested stakeholders can provide ad hoc dispute resolution services as well. Water issues typify this type of resource problem. The headwaters for some of India’s important rivers lie within Chinese-controlled Tibet. Likewise, Armenia’s headwaters (important for hydroelectric generation) lie in hostile countries like Azerbaijan. India and Armenia are not likely to receive what either considers fair water allocations but, because of the importance of other regional political issues, third-party mediation can help both India and Armenia obtain more water than they might normally expect. For example, while India will continue to press its claims against China, likely seeking U.N. mediation, it can simultaneously mitigate the effects of China’s water diversion by introducing an economical desalination and aqueduct system to funnel water from its coasts to its inland provinces. The World Bank and other lending institutions would likely support India’s effort. Armenia may find itself in a tougher bind, although its ally Russia could help decrease its reliance on water resources for energy by reducing tariffs on natural gas. In the long run, Armenia could leverage a settlement over Nagorno-Karabakh in return for normalized relations with Turkey and Azerbaijan that would include cooperative use of collective water resources for power. Such a scenario seems unlikely now, but a disruption of regional geopolitics could make such an agreement feasible, especially if Armenia’s power situation becomes desperate. The allocation of scarce helium supplies is another example of a zero-sum problem. Poorly thought-out U.S. helium reserve policies have led to frivolous waste on this nonrenewable and hard-to-extract resource. However, changes to U.S. policy on the use and price of helium, if adopted soon, can provide enough helium to meet supply until technology invents substitutes. Similarly, enforceable fishing regulations may never return Mediterranean tuna stocks to a level that meets the burgeoning middle class demand but they can prevent collapse and restore stocks to levels that can assure reasonable supply, albeit at higher prices. Efficacious regulatory structures are also needed to assure an adequate supply of recreational beachfront for middle class consumers and low-altitude airspace (up to 500 meters) for solar and wind arrays. Although it is likely to take many more decades to convince naysayers that earth has escaped the Malthusian Trap, this Wikistrat simulation indicates that political and technological ingenuity can ameliorate virtually any type of potential resource scarcity. Fears over resource scarcity are often caused by political disputes that make it impossible to develop known resources (such as gas off the coasts of Cyprus, Japan and the Spratly Islands), even when pricing would indicate that such development is warranted. These situations are perhaps the easiest to resolve, since all sides can stand to benefit from a solution. Determining how much each side wins is the lone sticking point. In addition, technological advances can often make political disputes moot. By the time Africa and China settle their issues over agricultural land purchases, agro-industrial scientists may be growing enough food in their laboratories to feed the world. Technology can also transform the zero-sum resource conflicts of today into the win-win situations of tomorrow. Continued Chinese hoarding of rare earth elements would likely result in technological innovation making the Chinese practice counterproductive, just like butter shortages repeatedly gave rise to improved versions of margarine. Even in the worst-case scenarios where political leaders have to confront true scarcity, technological progress, higher prices leading to more production, recycling, efficiencies, substitute products and better policies can all lead to increased resource supplies, albeit at higher prices. Unresolved political conflict could lead to spot resource shortages around the globe, but in a hyperconnected world that responds quickly to technological advances and price signals and values conflict resolution, the dystopian future foretold in Soylent Green will remain in the realm of science fiction.