### Unilateralism cp

#### Text: the United States federal government should unilaterally pursue Active Space debris removal and work with the Russian Federation and Peoples Republic of China in the establishment of an international “debris credits” trading system that distributes tradeable quotas for debris production and rewards members of the international agreement with additional credits if they implement mitigation protocols.

#### US unilateral action solves space debris and international cooperation fails

Megan Ansdell, 10, 2010, master’s in international science and Technology Policy from George Washington, where she focuses on space policy, "Active Space Debris Removal: Needs, Implications, and Recommendations for Today’s Geopolitical Environment", [https://jpia.princeton.edu/sites/jpia/files/space-debris-removal.pdf], AVD

Need to Initiate Unilateral Action International cooperation in space has rarely resulted in cost-effective or expedient solutions, especially in politically-charged areas of uncertain technological feasibility. The International Space Station, because of both political and technical setbacks, has taken over two decades to deploy and cost many billions of dollars—far more time and money than was originally intended. Space debris mitigation has also encountered aversion in international forums. The topic was brought up in COPUOS as early as 1980, yet a policy failed to develop despite a steady flow of documents on the increasing danger of space debris (Perek 1991). In fact, COPUOS did not adopt debris mitigation guidelines until 2007 and, even then, they were legally non-binding. Space debris removal systems could take decades to develop and deploy through international partnerships due to the many interdisciplinary challenges they face. Given the need to start actively removing space debris sooner rather than later to ensure the continued benefits of satellite services, international cooperation may not be the most appropriate mechanism for instigating the first space debris removal system. Instead, one country should take a leadership role by establishing a national space debris removal program. This would accelerate technology development and demonstration, which would, in turn, build-up trust and hasten international participation in space debris removal. Possibilities of Leadership As previously discussed, a recent NASA study found that annually removing as little as five massive pieces of debris in critical orbits could significantly stabilize the long-term space debris environment (Liou and Johnson 2007). This suggests that it is feasible for one nation to unilaterally develop and deploy an effective debris removal system. As the United States is responsible for creating much of the debris in Earth’s orbit, it is a candidate for taking a leadership role in removing it, along with other heavy polluters of the space environment such as China and Russia. There are several reasons why the United States should take this leadership role, rather than China or Russia. First and foremost, the United States would be hardest hit by the loss of satellites services. It owns about half of the roughly 800 operating satellites in orbit and its military is significantly more dependent upon them than any other entity (Moore 2008). For example, GPS precision-guided munitions are a key component of the “new American way of war” (Dolman 2006, 163-165), which allows the United States to remain a globally dominant military power while also waging war in accordance with its political and ethical values by enabling faster, less costly war fighting with minimal collateral damage (Sheldon 2005). The U.S. Department of Defense recognized the need to protect U.S. satellite systems over ten years ago when it stated in its 1999 Space Policy that, “the ability to access and utilize space is a vital national interest because many of the activities conducted in the medium are critical to U.S. national security and economic well-being” (U.S. Department of Defense 1999, 6). Clearly, the United States has a vested interest in keeping the near-Earth space environment free from threats like space debris and thus assuring U.S. access to space. Moreover, current U.S. National Space Policy asserts that the United States will take a “leadership role” in space debris minimization. This could include the development, deployment, and demonstration of an effective space debris removal system to remove U.S. debris as well as that of other nations, upon their request. There could also be international political and economic advantages associated with being the first country to develop this revolutionary technology. However, there is always the danger of other nations simply benefiting from U.S. investment of its resources in this area. Thus, mechanisms should also be created to avoid a classic “free rider” situation. For example, techniques could be employed to ensure other countries either join in the effort later on or pay appropriate fees to the United States for removal services. Recommendations for Leadership in Space Debris Removal Going forward, the U.S. government should engage the commercial sector in space debris removal. Government contracts with several commercial firms would create a competitive environment, encouraging innovation and cost minimization. Having several companies working on the problem at the same time would also accelerate remediation as several critical orbits could be addressed at once. Furthermore, early investments in a domestic space debris removal industry would give the United States a head start in what may become a critical industry over the coming decades. The aforementioned 2009 International Conference on Orbital Debris Removal, co-hosted by DARPA and NASA, suggests that these two agencies could lead U.S. government efforts in space debris removal. However, it is important to recognize that DARPA and NASA are driven by very different motives: one is a civilian space agency, while the other is a defense research agency. Failure to appreciate these differences when establishing mission requirements could lead to a situation like that of the National Polar Environmental Satellite System (NPOESS), where the attempt to combine civil and military requirements into a single satellite resulted in doubling project costs, a launch delay of five years, and ultimately splitting the project into two separate programs (Clark 2010). Furthermore, any system developed through a joint NASA-DARPA partnership would need to be transferred to an operational agency, as both NASA and DARPA are research and development entities. The U.S. Air Force, as it is the primary agency responsible for national security space operations, is a possible option.

#### Debris credits solve the case without having to share SSA data.

Prasad and Lochan 7 [(M.Y.S. Prasad, Space Applications Centre, Indian Space Research Organisation, Ahmedabad, India, and Rajeev Lochan Indian Space Research Organisation, Bangalore, India,) “COMMON BUT DIFFERENTIATED RESPONSIBILITY - A PRINCIPLE TO MAINTAIN SPACE ENVIRONMENT WITH RESPECT TO SPACE DEBRIS” ISBN: 9781563479625, Proceedings of the Fiftieth colloquium on the Law of outer space : 24-28 September 2007, Hyderabad, India] TDI

Space debris will be a concern for future for all the countries. Especially the developing countries which have limited Space assets will face serious consequences if any of their satellites is involved with incidents / accidents with Space debris. The manned missions of advanced countries requires absolutely high level of crew safety, and hence Space debris is a serious concern to them also. Even a close approach of the debris to the operational satellites may pose problems if the cloud of debris occupies larger volume. From these considerations, it is definitely essential to evolve strategies to limit the growth of Space debris, and also to evolve debris mitigation measures.

However the analysis of the Space debris presented in section 4 clearly brought out that the debris population is proportional to the number of launches carried out by each country in the past. Hence larger responsibility lies with the countries which carried out a number of launches in the past. So the maintenance of Space environment from the Space debris point of view is a case well suited for “Common but differentiated responsibility” . In this context this principle means that all countries capable of taking actions are responsible to maintain the Space environment relatively clean with respect to Space debris. Also the countries, which are responsible for the present level of the debris population, should take higher responsibility in respect of limiting the future growth of Space debris, and also in providing knowledge and technology in the areas of Space debris monitoring and mitigation to all countries.

In this context various measures can be contemplated for future. One of them had been achieved when UN-COPUOS adopted Space debris mitigation guidelines to be implemented by all countries on voluntary basis through national mechanisms.

Different countries have evolved their own national Space debris mitigation standards and regulations to be implemented by the companies involved in aerospace activities in their countries. Still many countries feel that an appropriate legal regime at a global level is essential to tackle the Space debris issue. This is where the models evolved in the Kyoto Protocol can be considered to be tailored and used with appropriate modifications for Space debris legal regime.

Some of the new mechanisms which can be derived from the principles of Kyoto Protocol are:

• To limit the future Space debris generation, launch quota caps for each Space-faring country can be evolved linked to their past generation of the Space debris.

• The countries can be rewarded with “debris credits” in case they implement Space debris mitigation measures in their missions.

• Some advanced Space-faring nations may have pressing commitments to carry out larger number of launches. They can be enabled to carry out such missions through purchase of “debris credits” from the other countries, who have earned “debris credits” through application of Space debris mitigation measures.

• The countries which do not have any Space activity for the present, but who have plans to develop either Space transportation or deploy satellites in orbit can be given fixed quota of “debris credits”. These credits can lapse after a certain period if they do not realize their Space missions. These countries can also be enabled to market their “debris credits” to the other countries, and benefit by acquiring Space technologies.

• A Trust Fund can be created to compensate the victims involved in the accidents with Space debris, to which the contributions can be linked to the debris generated in the past by different countries. This can be a part of larger aspect of Space debris damage liability regime.

• Special treatment can be considered for the countries willing to share their knowledge and technology in the area of Space debris with other countries, to take up the research and development to a higher level. Such cooperative ventures can be given special treatment as Joint Implementation Mechanisms to earn “Debris credits”.

These are some of the ideas which are derived from the Kyoto Protocol with application to Space debris area. They are not exhaustive but only indicative for friture legal experts to examine while developing Space debris legal regime.

6. CONCLUSIONS

This paper describes various multi-lateral initiatives in the area of analysis, and mitigation of Space debris. The specific features related to type of debris and the level of launches and other activities of Space-faring nations are detailed. The innovative mechanisms evolved in the Kyoto Protocol of UN FCCC are described and their applicability for Space debris case is argued. Possible measures which can be fashioned after the Kyoto Protocol are suggested to deal with the Space debris and maintenance of Outer Space environment. All the analysis is based on the conviction that ‘Common but Differentiated Responsibility’ is very well suited for the present Space debris scenario.

### 1nc – asteroid mining good

#### Appropriation” includes claims to natural resources, not just real property.

Amanda M. Leon, Associate\*, Caplin & Drysdale, Chtd., ’18, Virginia Law Review [“MINING FOR MEANING: AN EXAMINATION OF THE LEGALITY OF PROPERTY RIGHTS IN SPACE RESOURCES” Vol. 104:497 2018] TDI

Appropriation. The term “appropriation” also remains ambiguous. Webster’s defines the verb “appropriate” as “to take to oneself in exclusion of others; to claim or use as by an exclusive or pre-eminent right; as, let no man appropriate a common benefit.”165 Similarly, Black’s Law Dictionary describes “appropriate” as an act “[t]o make a thing one’s own; to make a thing the subject of property; to exercise dominion over an object to the extent, and for the purpose, of making it subserve one’s own proper use or pleasure.”166 Oftentimes, appropriation refers to the setting aside of government funds, the taking of land for public purposes, or a tort of wrongfully taking another’s property as one’s own. The term appropriation is often used not only with respect to real property but also with water. According to U.S. case law, a person completes an appropriation of water by diversion of the water and an application of the water to beneficial use.167 This common use of the term “appropriation” with respect to water illustrates two key points: (1) the term applies to natural resources—e.g., water or minerals—not just real property, and (2) mining space resources and putting them to beneficial use—e.g., selling or manufacturing the mined resources— could reasonably be interpreted as an “appropriation” of outer space. While the ordinary meaning of “appropriation” reasonably includes the taking of natural resources as well as land, whether the drafters and parties to the OST envisioned such a broad meaning of the term remains difficult to determine with any certainty. The prohibition against appropriation “by any other means” supports such a reading, though, by expanding the prohibition to other types not explicitly described.168 As illustrated by this analysis, considerable ambiguity remains after this ordinary-meaning analysis and thus, the question of Treaty obligations and property rights remains unresolved. In order to resolve these ambiguities, an analysis of preparatory materials, historical context, and state practice follows.

#### The interest and feasibility to fund large-scale asteroid mining is coming—but appropriation is necessary

Shaw 13 - Lauren E, J.D. from Chapman University School of Law, ”Asteroids, the New Western Frontier: Applying Principles of the General Mining Law of 1872 to Incentive Asteroid Mining”, JOURNAL OF AIR LAW AND COMMERCE, Volume 78, Issue 1, Article 2, https://scholar.smu.edu/cgi/viewcontent.cgi?article=1307&context=jalc

The technology necessary for any of these or similar ventures to succeed is developing rapidly, and the costs are decreasing considerably. For example, Space Exploration Technologies (SpaceX) recently returned its reusable Dragon cargo capsule to Earth from the International Space Station (ISS) after Dragon delivered critical cargo to the ISS." Developments in reusable spacecraft, in tools used for gathering data on the material compositions of space bodies, and in alternative means of obtaining fuels, such as the ability to refuel at orbital propellant depots, are all presently multiplying, thereby driving down the costs of exploring and commercializing space." While it is not presently cost effective to mine asteroids,4 2 these developments in technology and the increasingly certain promise of financial returns will drive the private sector toward making asteroid mining a reality. However, the initial cost of reaching the asteroids, developing the tools to conduct the mining, and transporting the resources back to Earth is still very large.4 3 Not only will the initial investment be high, but there will also be substantial risks. Mining on Earth has been described as highly risky: "[R]eceiving the right to develop minerals on any given block of land is akin to buying a lottery ticket; that is, the payoff is randomly awarded."" Further, " [s]uch a lottery ticket obviously would be worth substantially less than one which provided the winner with a secure transfer of the winnings to a bank account."" Hence, to incentivize the private companies and make their claims economically viable, some certainty in their rights to the minerals should be granted. 6 Otherwise, the large investment will not be worthwhile.

#### Asteroid mining key to address sustainability and environmental problems of terrestrial mining.

Kevin MacWhorter, JD, in the William & Mary Environmental Law and Policy Review, 2016: [MacWhorter, Kevin. (J.D. Candidate, William & Mary Law School, 2016) "Sustainable mining: Incentivizing asteroid mining in the name of environmentalism." Wm. & Mary Envtl. L. & Pol'y Rev. 40 (2016): 645.]

In the next sixty years, scientists predict that certain elements crucial to modern industry – such as platinum, zinc, copper, phosphorous, lead, gold, and indium – could be exhausted on Earth. 12 Many of these have no synthetic alternative, unlike chemical elements such as oil or diamonds.13 Liquid-crystal display (“LCD”) televisions, cellphones, and laptops are among the various consumer technologies that use precious metals.14 Further, green technologies – including wind turbines, solar panels, and catalytic converters – require these rare elements. 15 As demand rises for both types of technologies, and as reserves of rare metals fall, prices skyrocket.16 Demand for nonrenewable resources creates conflict, and consumerism in rich countries results in harsh labor treatment for poorer countries.17 In general, the mining industry is extremely destructive to Earth’s environment.18 In fact, depending on the method employed, mining can destroy entire ecosystems by polluting water sources and contributing to deforestation.19 It is by its nature an unsustainable practice, because it involves the extraction of a finite and non-renewable resource.20 Moreover, by extracting tiny amounts of metals from relatively large quantities of ore, the mining industry contributes the largest portion of solid wastes in the world.21 The Environmental Protection Agency (“EPA”) describes the industry as the source of “more toxic and hazardous waste than any other industrial sector [in the United States], costing billions of dollars to address the public health and environmental threats to communities.” 22 Poor regulations and oxymoronic corporate definitions of “sustainability,” however, make it unclear as to just how much waste the industry actually produces.23

#### Asteroid mining good – climate, air, and water pollution

Tina Hlimi, M.E.S., in the Annals of Air and Space Law, 2014: [M.E.S., B.C.L., L.L.B; Articling Student with Legal Aid Ontario in Toronto, Ontario; International Secretariat Member and Health & Hazards Coordinator for the Centre for International Sustainable Development Law (CISDL) in Montreal, Quebec “THE NEXT FRONTIER: AN OVERVIEW OF THE LEGAL AND ENVIRONMENTAL IMPLICATIONS OF NEAR-EARTH ASTEROID MINING”, Annals of Air and Space Law Vol. 39, 2014, https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2546924 \*edited for gendered language]

In addition to demystifying the legal doctrine governing outer space natural resource appropriation it is also necessary to weigh the benefits and detriments of space-faring activities. Foremost, States around the world are developing at unprecedented rates and the human population is mounting in conjunction with demand for natural resources to sustain the current and newly established western standard of living. One of the fastest growing nations, China, is experiencing unhindered growth facilitated by fossil fuel use from coal and extensive mining. This has caused substantial water, soil and air degradation. In the face of these troubles, NEA mining could be the key to preserving the Earth's bounty and replenishing contaminated water supplies. The influx of natural resources could thwart the burning of dirty coal and fossil fuels, thereby mitigating the effects of climate change, such as, rising sea level, atmospheric pollution, melting of sea ice and rising temperatures. NEA harvesting could also protect the ocean and the fragile and largely unexplored deep seabeds 123 from oil and gas drilling. It could furthermore protect ecosystems from rare-earth mineral mining predominantly used to fuel the electronics sector. 124 NEA mining is especially pertinent as China restricted its global exports of rare-earth minerals in 2009, incongruously citing the need to protect the environment. Unfortunately, the supply cuts have forced dependent States like Japan, the United States and South Korea to heighten rare-Earth mineral exploration. This accordingly led to Japan's 2011 discovery of rare-earth minerals in the ocean-bed deposits of the Pacific Exclusive Economic Zone (PEEZ) thereby necessitating risky, deep-sea mining techniques, which may result in marine pollution if not carefully designed and developed. Other States, which have joined the environmentally destructive rare-earth mineral exploration movement include India, Canada, Tanzania, Australia, Brazil and Vietnam., There is accordingly much competition and exploration for rare-earth minerals which could result in significant exploitation of untouched areas like the PEEZ seabed and Mongolia.125 Other regions which may soon be targeted for mineral and hydrological resources include Antarctica and the Arctic. With the advent of technological advances, environmentally destructive practices such as refining may soon occur in outer space, sparing the Earth of pollution. 126 Accordingly, NEA mining is a viable technology for preserving the Earth's environment by curbing atmospheric and marine pollution, enhancing water supply and quality and mitigating the effects of climate change; all while allowing humankind to maintain and even improve their standard of living through increased technologies, consumption and population growth.

#### Shortages of REM prevents renewables, asteroid mining is try or die for warming

Nafeez Ahmed, journalist, in Vice, 2018: [Special Investigations & Global Trends @BylineTimes \ Technology & Systems Change @Rethink\_X \ Research Fellow @SchumacherInst // http://nafeezahmed.net “We Don't Mine Enough Rare Earth Metals to Replace Fossil Fuels With Renewable Energy” Vice, December 12, 2018 https://www.vice.com/en/article/a3mavb/we-dont-mine-enough-rare-earth-metals-to-replace-fossil-fuels-with-renewable-energy]

A new scientific study supported by the Dutch Ministry of Infrastructure warns that the renewable energy industry could be about to face a fundamental obstacle: shortages in the supply of rare metals. To meet greenhouse gas emission reduction targets under the Paris Agreement, renewable energy production has to scale up fast. This means that global production of several rare earth minerals used in solar panels and wind turbines—especially neodymium, terbium, indium, dysprosium, and praseodymium—must grow twelvefold by 2050. But according to the new study by Dutch energy systems company Metabolic, the “current global supply of several critical metals is insufficient to transition to a renewable energy system.” The study focuses on demand for rare metals in the Netherlands and extrapolates this to develop a picture of how global trends are likely to develop. “If the rest of the world would develop renewable electricity capacity at a comparable pace with the Netherlands, a considerable shortage would arise,” the study finds. This doesn’t include other applications of rare earth metals in other electronics industries (rare earth metals are widely used in smartphones, for example). “When other applications (such as electric vehicles) are also taken into consideration, the required amount of certain metals would further increase.” Demand for rare metals is pitched to rise exponentially across the world, and not just due to renewables. Demand is most evident in “consumer electronics, military applications, and other technical equipment in industrial applications. The growth of the global middle class from 1 billion to 3 billion people will only further accelerate this growth.” But the study did not account for those other industries. This means the actual problem could be far more intractable. In 2017, a study in Nature found that a range of minerals essential for smartphones, laptops, [and] electric cars and even copper wiring could face supply shortages in coming decades.

#### Warming is a threat multiplier.

**Torres 16** (Phil, PhD candidate @ Rice in tropical conservation biology, affiliate scholar @ Institute for Ethics and Emerging Technologies, July 22, 2016, “Op-ed: Climate Change Is the Most Urgent Existential Risk,” <http://ieet.org/index.php/IEET/more/Torres20160807>)

Humanity faces a number of formidable challenges this century. Threats to our collective survival stem from asteroids and comets, supervolcanoes, global pandemics, climate change, biodiversity loss, nuclear weapons, biotechnology, synthetic biology, nanotechnology, and artificial superintelligence. With such threats in mind, an informal survey conducted by the Future of Humanity Institute placed the probability of human extinction this century at 19%. To put this in perspective, it means that the average American is more than a thousand times more likely to die in a human extinction event than a plane crash.\* So, given limited resources, which risks should we prioritize? Many intellectual leaders, including Elon Musk, Stephen Hawking, and Bill Gates, have suggested that artificial superintelligence constitutes one of the most significant risks to humanity. And this may be correct in the long-term. But I would argue that two other risks, namely **climate change**and biodiveristy loss, **should take priority**right now over **every other known threat**. Why? Because **these** ongoing **catastrophes in slow-motion** will frame our **existential predicament** on Earth not just for the rest of this century, but for literally **thousands of years** to come. As such, they have the capacity to **raise**or lower the **probability of other risks scenarios** unfolding. Multiplying Threats Ask yourself the following: are **wars** more or less likely in a world marked by **extreme weather events**, **megadroughts**, **food supply disruptions**, and sea-level rise? Are **terror**ist attacks **more** or less **likely** in a world beset by **the collapse of global ecosystems**, **agricultural** failures, **econ**omic uncertainty, and political instability? Both government officials and scientists agree that the answer is **“more likely.”** For example, the current Director of the CIA, John Brennan, recently identified “the impact of **climate change**” as one of the “deeper causes of this rising instability” in countries like **Syria**, **Iraq**, **Yemen**, **Libya**, and **Ukraine**. Similarly, the former Secretary of Defense, Chuck Hagel, has described climate change as **a “threat multiplier”** with “the potential to exacerbate many of the challenges we are dealing with today — from infectious disease to terrorism.” The Department of Defense has also affirmed a connection. In a 2015 report, it states, “Global climate change will aggravate problems such as **poverty**, **social tensions**, environmental degradation, **ineffectual leadership** and **weak political institutions** that threaten stability in a number of countries.” **Scientific studies have further shown a connection between the environmental crisis and violent conflicts.** For example, a 2015 paper in the Proceedings of the National Academy of Sciences argues that climate change was a causal factor behind the record-breaking 2007-2010 drought in Syria. This drought led to a mass migration of farmers into urban centers, which fueled the 2011 Syrian civil war. Some observers, including myself, have suggested that this struggle could be the beginning of World War III, given the complex tangle of international involvement and overlapping interests. The study’s conclusion is also significant because the Syrian civil war was the Petri dish in which the Islamic State consolidated its forces, later emerging as the largest and most powerful terrorist organization in human history. A Perfect Storm The point is that climate change and biodiversity loss could very easily push societies **to the brink of collapse**. This will exacerbate **existing geopolitical tensions** and introduce entirely **new power struggles** between state and nonstate actors. At the same time, advanced technologies will very likely become increasingly powerful and accessible. As I’ve written elsewhere, the malicious agents of the future will have bulldozers rather than shovels to dig mass graves for their enemies. The result is a perfect storm of more conflicts in the world along with unprecedentedly dangerous weapons. If the conversation were to end here, we’d have ample reason for placing climate change and biodiversity loss at the top of our priority lists. But there are other reasons they ought to be considered urgent threats. I would argue that they could make humanity more vulnerable to a catastrophe involving superintelligence and even asteroids. The basic reasoning is the same for both cases. Consider superintelligence first. Programming a superintelligence whose values align with ours is a formidable task even in stable circumstances. As Nick Bostrom argues in his 2014 book, we should recognize the “default outcome” of superintelligence to be “doom.” Now imagine trying to solve these problems amidst a rising tide of interstate wars, civil unrest, terrorist attacks, and other tragedies? The societal stress caused by climate change and biodiversity loss will almost certainly compromise important conditions for creating friendly AI, such as sufficient funding, academic programs to train new scientists, conferences on AI, peer-reviewed journal publications, and communication/collaboration between experts of different fields, such as computer science and ethics. It could even make an “AI arms race” more likely, thereby raising the probability of a malevolent superintelligence being created either on purpose or by mistake. Similarly, imagine that astronomers discover a behemoth asteroid barreling toward Earth. Will designing, building, and launching a spacecraft to divert the assassin past our planet be easier or more difficult in a world preoccupied with other survival issues? In a relatively peaceful world, one could imagine an asteroid actually bringing humanity together by directing our attention **toward a common threat**. **But** if the “**conflict multipliers**” of climate change and biodiversity loss have already **catapulted civilization** into chaos and turmoil, I strongly suspect that humanity will become more, rather than less, susceptible to dangers of this sort. Context Risks We can describe the dual threats of climate change and biodiversity loss as “context risks.” Neither is likely to directly cause the extinction of our species. But **both will define the context in which civilization confronts all the other threats** before us. In this way, they could **indirectly** contribute to the **overall danger of annihilation** — and this worrisome effect could be significant. For example, according to the Intergovernmental Panel on Climate Change, the effects of climate change will be “severe,” “pervasive,” and “irreversible.” Or, as a 2016 study published in Nature and authored by over twenty scientists puts it, the consequences of climate change “will extend longer than the entire history of human civilization thus far.” Furthermore, a recent article in Science Advances confirms that humanity has already escorted the biosphere into the sixth mass extinction event in life’s 3.8 billion year history on Earth. Yet another study suggests that we could be approaching a **sudden**, **irreversible**, catastrophic **collapse of the global ecosystem**. If this were to occur, it could result in “widespread social unrest, economic instability and loss of human life.” Given the potential for environmental degradation to elevate the likelihood **of nuclear wars, nuclear terrorism**, **engineered pandemics**, a **superintelligence takeover**, and perhaps even **an impact winter**, it ought to take precedence **over all other risk concerns** — at least in the near-term. Let’s make sure we get our priorities straight.

**1nc - space col**

#### Only the private sector can solve colonization

Diakovska & Aliieva 20 [Halyna Diakovska and Olga Aliieva, Ph.D.s in Philosophy, Associate Professors, Donbass State Pedagogical University, “Consequentialism and Commercial Space Exploration,” 2020, Philosophy and Cosmology, Vol. 24, pp. 5-24, https://doi.org/10.29202/phil-cosm/24/1, EA]

The experience of the USA showed that leadership in space exploration, which is maintained solely through public funding, could be erroneous. Since 1984, the share of public funding has gradually decreased in space telecommunications, commercial space transportation, remote sensing, etc., while the share of participation of non-state enterprises has increased rapidly. A legal and regulatory framework has been modified to stimulate space commercialization. The stages of space law development are discussed in the research of Valentyn Halunko (Halunko, 2019), Larysa Soroka (Soroka & Kurkova, 2019), etc. Larysa Soroka and Kseniia Kurkova explored the specifics of the legal regulation of the use and development of artificial intelligence for the space area (Soroka & Kurkova, 2019).

As a result of changing the legal framework and attracting private investors to the space market, the US did not lose its leadership in space exploration, but rather secured it. Private investment along with government funding have significantly reduced the risk of business projects in the space industry. The quality and effectiveness of space exploration programs have increased.

In 2018, Springer published an eloquent book The Rise of Private Actors in the Space Sector. Alessandra Vernile, the author of the book, explores a broad set of topics that reveal the role of private actors in space exploration (Vernile, 2018). The book covers the following topics: “Innovative Public Procurement and Support Schemes,” “New Target Markets for Private Actors,” etc. In the “Selected Success Stories,” Vernile provides examples of successful private actors in space exploration (Vernile, 2018).

The current level of competition, which has developed on the space market, allows us to state the following fact. Private space companies have been able to compete with entire states in launching spacecraft, transporting cargo to orbital stations, and exploring space objects. The issue of mining on space objects, the creation of space settlements and the intensive development of the space tourism market are on the agenda.

In the 21st century, the creation of non-governmental commercial organizations specializing in the field of commercial space exploration, is regarded as an ordinary activity. They are established as parts of the universities around projects funded by private investors. For example, Astropreneurship & Space Industry Club based on the MIT community (Astropreneurship, 2019).

Large-scale research in the field of commercial space exploration, as well as the practical results achieved, led to the formation of a new paradigm called “New Space” ecosystem. The articles of Deganit Paikowsky’s (Paikowsky, 2017), Clelia Iacomino (Iacomino & Ciccarelli, 2018) et al. reveal its key meanings and the opportunities it offers in the space sector. The “New Space” ecosystem is a new vision for commercial space exploration. It is the formation of a cosmic worldview, in which the near space with all the wealth of its resources and capabilities, becomes a part of the global economy and the sustainable development of the society. The “New Space” ecosystem offers the following ways for commercial space exploration (Iacomino & Ciccarelli, 2018):

1. Innovative public procurement and support schemes, which significantly expand the role of commercial actors in space exploration.

2. Attracting new entrants in the space sector. First of all, these are companies working in the domain of Information and communications technology, artificial intelligence, etc. that are expanding their research in space markets. They offer innovative business models and new solutions to space commercialization.

3. Innovative industrial approaches based on new processes, methods, and industrial organization for the development and production of space systems or launchers.

4. Disruptive market solutions, which significantly reduce commercial space exploration prices, increase labor productivity, provide new types of services, etc.

5. Substantial private investment from different sources and involving different funding mechanisms. For instance, these are private fortunes, venture capital firms, business angels, private equity companies, or banks, etc.

6. Involvement of an increasing number of space-faring nations investing in the acquisition of turnkey space capabilities or even in the development of a domestic space industrial base. This expands the space markets and makes it more competitive.

The analysis of the research and advances in commercial space exploration allows us to draw the following conclusions:

1. In fact, the space market has already been created. It is currently undergoing continuous development that will integrate the resources and capabilities of the near space into the global economy over the next decade.

2. A new paradigm, denoted by the term “New Space” ecosystem, is at the heart of the created space market. The “New Space” ecosystem is a step towards the formation of cosmic thinking, in which outer space, with its resources and capabilities, is considered as a sphere of human activities.

3. Space market regulates space law, which is constantly evolving. The space law develops within the bounds of international law. In essence, the space market is integrated into the international legal field and is governed by its laws.

#### The public sector can’t ever solve it

Rand Simberg 12 [Rand Simberg is an aerospace engineer and a consultant in space commercialization, space tourism, and Internet security “Homesteading the Final Frontier: A Practical Proposal for Securing Property Rights in Space” COMPETITIVE ENTERPRISE INSTITUTE, April 2012 https://cei.org/sites/default/files/Rand%20Simberg%20-%20Homesteading%20the%20Final%20Frontier.pdf]

Introduction At the heart of the prosperity of the West lie clear and recognized freely transferrable property rights, protected under the rule of law.1 Absent legally recognized rights to buy, own, and sell titled property, it is difficult, if not impossible, to get a loan to purchase said property, improve it, mine it, drill for minerals on it, or sell the proceeds from any of those activities. Property rights are a sine qua non of wealth creation and a reason why America and other Western nations are rich and others are poor. Moreover, they lie at the heart of liberty. Their current absence off planet partially explains why we have not developed the next and, in a sense, last frontier—space. The commonly accepted explanation for the lack of off-planet development and settlement is that it is prohibitively expensive to gain access to it and to enable humans to survive in such alien environments. But this overlooks one important consideration. One of the reasons for the high cost of access and survival is because said access and survival currently have little value to most people. Therefore, there is little financial incentive to drive down those costs through traditional market competition and technology development. With the recent advent of multiple commercial launch providers competing with each other for customers, we are on the verge of solving this problem over the coming years. But even if the technological solution is at hand, the other problem—lack of off-planet property rights—remains, due to the legacies of policy decisions made during the early space age. Efforts to create an international space treaty began in the 1950s, before the launch of the first satellites. In the political climate of the era, socialism was ascendant, the former great powers of Europe were decolonizing, and the notion of a capitalistic “exploitation” of space was out of fashion in official circles. The result was the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, also known as the Outer Space Treaty.2 It was based on two fundamental principles: “that international law, including the Charter of the United Nations, applies to outer space and celestial bodies, and that outer space and celestial bodies are free for exploration and use by all States in conformity with international law and are not subject to national appropriation.”3 In the 1960s, outer space was viewed not as a potential frontier for human development and settlement, but rather as a new realm for scientific discovery and a battlefield in the Cold War between the United States and the Soviet Union. The space race to go to the Moon was viewed as ruinously expensive for both the U.S. and the USSR. In fact, as early as 1963, only two years after President John F. Kennedy had committed the United States to land a man on the Moon, his administration was having second thoughts about it, and considering a cooperative initiative instead.4 But Kennedy’s assassination in November of that year and Lyndon Johnson’s ascension to the presidency put an end to such a policy shift, and the race continued, partly as a memorial to the martyred president. However, the expense remained, and for many, including Assistant Secretary of State Henry Owen, part of the goal of the Outer Space Treaty was to make space of sufficiently low value—either militarily or economically—as to remove the incentives for racing to get there, and thus shift resources from NASA to the State Department.5 So far, the treaty has achieved that goal, by reducing the incentive for governments to send humans into space in significant numbers. Space Off-Limits to Commerce Some of the problem arises from a false conception of space as scientific preserve, rather than as a new venue for human expansion. Under the former view, the universe is a fragile jewel to be observed and studied, but minimally explored, if at all, by humans. A good example of this is Antarctica, which has some exploitable resources, but the only human activity there consists of international government research bases and low-impact tourism, and the only commerce is that required to support those activities. Contrast this with the development in the sovereign regions of the Arctic. In an environment just as harsh as the Antarctic, a resource boom is under way, led by Canada, Russia, Denmark, and Norway.6 This lack of activity is largely due to the Antarctic Treaty, which was negotiated in the late 1950s and was a model for the Outer Space Treaty, at least in its bans on claims of national sovereignty and placement or testing of nuclear weapons (or nuclear waste).7 Antarctica is thus the model on which the world’s governments are currently pursuing space activities. The only off-planet human base is the intergovernmental International Space Station (ISS), occasionally visited by paying customers whom the crews grudgingly tolerate. On the other hand, under the view of the universe as a frontier full of potential, the resources that could be developed from it offer great opportunity for human flourishing. Centuries of history demonstrate that the best means of doing that is via the free exchange of goods and services, undergirded by legally enforceable private property rights. From that perspective, the Antarctica and ISS model would be a disaster.

#### Companies are key to innovation that will get us off the rock

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It was one small step for man, one giant leap for capitalism. Only three countries have ever launched human beings into orbit. This past weekend, SpaceX became the first private company ever to do so, when it sent its Crew Dragon capsule into space aboard its Falcon 9 rocket and docked with the International Space Station. This was accomplished by a company Elon Musk started in 2002 in a California strip mall warehouse with just a dozen employees and a mariachi band. At a time when our nation is debating the merits of socialism, SpaceX has given us an incredible testament to the power of American free enterprise. While the left is advocating unprecedented government intervention in almost every sector of the U.S. economy, from health care to energy, today Americans are celebrating the successful privatization of space travel. If you want to see the difference between what government and private enterprise can do, consider: It took a private company to give us the first space vehicle with touch-screen controls instead of antiquated knobs and buttons. It took a private company to give us a capsule that can fly entirely autonomously from launch to landing — including docking — without any participation by its human crew. It also took a private company to invent a reusable rocket that can not only take off but land as well. When the Apollo 11 crew reached the moon on July 20, 1969, Neil Armstrong declared “the Eagle has landed.” On Saturday, SpaceX was able to declare that the Falcon had landed when its rocket settled down on a barge in the Atlantic Ocean — ready to be used again. That last development will save the taxpayers incredible amounts of money. The cost to NASA for launching a man into space on the space shuttle orbiter was $170 million per seat, compared with just $60 million to $67 million on the Dragon capsule. The cost for the space shuttle to send a kilogram of cargo into to space was $54,500; with the Falcon rocket, the cost is just $2,720 — a decrease of 95 percent. And while the space shuttle cost $27.4 billion to develop, the Crew Dragon was designed and built for just $1.7 billion — making it the lowest-cost spacecraft developed in six decades. SpaceX did it in six years — far faster than the time it took to develop the space shuttle. The private sector does it better, cheaper, faster and more efficiently than government. Why? Competition. Today, SpaceX has to compete with a constellation of private companies — including legacy aerospace firms such as Orbital ATK and United Launch Alliance and innovative start-ups such as Blue Origin (which is designing a Mars lander and whose owner, Jeff Bezos, also owns The Post) and Virgin Orbit (which is developing rockets than can launch satellites into space from the underside of a 747, avoiding the kinds of weather that delayed the Dragon launch). In the race to put the first privately launched man into orbit, upstart SpaceX had to beat aerospace behemoth Boeing and its Starliner capsule to the punch. It did so — for more than $1 billion less than its competitor. That spirit of competition and innovation will revolutionize space travel in the years ahead. Indeed, Musk has his sights set far beyond Earth orbit. Already, SpaceX is working on a much larger version of the Falcon 9 reusable rocket called Super Heavy that will carry a deep-space capsule named Starship capable of carrying up to 100 people to the moon and eventually to Mars. Musk’s goal — the reason he founded SpaceX — is to colonize Mars and make humanity a multiplanetary species. He has set a goal of founding a million-person city on Mars by 2050 complete with iron foundries and pizza joints. Can it be done? Who knows. But this much is certain: Private-sector innovation is opening the door to a new era of space exploration. Wouldn’t it be ironic if, just as capitalism is allowing us to explore the farthest reaches of our solar system, Americans decided to embrace socialism back here on Earth?

#### Immeasurable expected value outweighs.

Baum 16 – Executive Director of the Global Catastrophic Risk Institute [Seth D. Baum, “The Ethics of Outer Space: A Consequentialist Perspective,” 2016, Springer, pp. 115-116, EA]

Space colonization is notable because it may be able to bring utterly immense increases in intrinsic value. Early colonies might start small, given that other planets and moons have inhospitable environments. However, it may be possible to build large indoor colonies or create more hospitable outdoor environments (i.e., terraforming). Even just on other planets and moons in the Solar System, space colonies could multiply the total area available for human habitation. And there are many more planets around other stars, as ongoing research on exoplanets is now learning. One recent study estimates 22 % of Sun-like stars have Earth-like exoplanets (Petigura et al. 2013), implying billions to tens of billions of potentially habitable planets across the galaxy.

Opportunities at any given star may also be quite a bit greater than those available only on planets. Earth only receives about one two-billionth of the Sun’s radiation. To collect all the Sun’s radiation, humanity would need a Dyson swarm (named after Dyson 1960), which is a series of structures that surrounds a star, collecting its radiation to power a civilization. A Dyson swarm around the Sun could potentially enable a civilization a billion times larger than is possible on Earth. Likewise, Dyson swarms around one billion stars would bring humanity approximately 1018 (one billion–billion) times more energy per unit time.

Space colonies could also increase the amount of time available for human civilization. Earth will remain habitable for a few billion more years (O’Malley-James et al. 2014). Stars will continue shining for about 1014 more years (Adams 2008). That gives us an additional 105 times more energy, for a total of 1023 times more energy than is available on Earth. After the stars fade, other energy sources may be available. And even if our current universe eventually becomes uninhabitable, it may be possible to move to other universes (Kaku 2005). The physics here is speculative, but it cannot be ruled out, and hence there is a nonzero chance of a literally infinite opportunity for space colonization (Baum 2010a).

Whether the opportunity is infinite or merely, say, 1023 times larger than what can be done on Earth, the opportunity is clearly immense. As long as space colonization is an improvement (Sect. 8.3.1), then it would seem that the consequentialist should prioritize space colonization. The sooner space colonization begins, the more of its immense opportunity can be gained. Indeed, Ćirković (2002) estimates 5 × 1046 human lifetimes are lost for every century in which space colonization is delayed.

There can also be large value for space colonization under ecocentric intrinsic value. It is sometimes argued that Earth would be better off without humans. For example, the Voluntary Human Extinction Movement states that “Phasing out the human race by voluntarily ceasing to breed will allow Earth’s biosphere to return to good health” (http://vhemt.org, accessed 25 October 2015). However, this makes sense only if extraterrestrial locations are not intrinsically valued. Otherwise, exterminating humanity ruins the opportunity for humans to bring flourishing ecosystems into outer space. Terraforming other planets or bringing ecosystems into Dyson swarms could bring immense amounts of ecosystem flourishing.

## Case

### Contention 1

**International law can’t solve security risks.**

**Elaraby 18** Nabil Elaraby is an Egyptian diplomat and lawyer, Secretary General of the League of Arab States from 2011–16, former judge at the International Court of Justice from 2001 to 2006. [Failure of the International Security System, 3-3-2018, <https://www.thecairoreview.com/global-forum/failure-of-the-international-security-system/>]

A quick look at the contemporary international order reveals that the collective security system established by the United Nations Charter and put into place following the end of World War II has failed to protect international peace and security. The tragedy last year in Aleppo and throughout Syria at present is the biggest proof of this failure. For many years, the system’s inability to achieve peace has been attributed to the Cold War. So when the Berlin Wall fell in 1989 and the Soviet Union collapsed, there was a wave of optimism that mirrored the preamble to the UN Charter which states: “We the peoples of the world are determined to save succeeding generations from the scourge of war.” This was essentially the purpose of founding the United Nations, whose main objective was “to maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace.” Hopes were high that these lofty goals would see the light of day after the end of the Cold War, and that the world would renounce the law of the jungle so that peace and justice would finally prevail. Indeed the first ever Security Council summit meeting following the end of the cold war on January 31, 1992 saw world leaders ask the new UN Secretary-General, Boutros Boutros-Ghali, to report on the nature of post-Cold War international relations. Boutros-Ghali presented his famous report “An Agenda for Peace”. In May 1992 the general assembly appointed a committee of the whole, which I presided, to put the proposed contained in the “Agenda for Peace” into effect. However, it soon became clear that the maintenance of world peace would not come about with the end of the Cold War, because the interests of the great powers still conflicted with one another. Thus the Security Council’s ***inability to take effective*** and ***urgent measures to impose peace*** will, regrettably, continue. \*\*\* To understand the reason for this we must look back at what I call the “grand design” that was concluded in 1945 at the San Francisco Conference when the UN Charter was adopted. It was agreed then to establish a Security Council that would oversee the protection of international peace and security. The Council was given unprecedented wide powers to eliminate all threats to peace. It was also agreed that the five permanent members would have the power to veto substantive resolutions but not procedural resolutions. Unfortunately, the Charter did not clearly delineate the nature and delimitation of the procedural resolutions that could not be impeded. More importantly, the Charter granted the five permanent members veto power, which means that they could block resolutions even with the majority vote needed to pass. The argument behind this open-ended unprecedented license was that it was the responsibility of these five great powers to protect world peace, not their own narrow interests. The five great powers at the San Francisco Conference tried moreover to gain the right to veto non-procedural resolutions regardless of their content, and to incorporate this right explicitly into the charter, but they failed because of the opposition of most countries. At present, it is clear that the ***interlocking political*** and ***economic interests*** of the five great powers make it ***inconceivable that any action*** taken by the Council would directly or indirectly affect those interests. Simply put the Security Council, with its present structure, has been made to be in a state of permanent paralysis the recent deliberations in the council on Ghouta-Syria reflect this paralysis. As a result, the international protection system enshrined in the UN Charter no longer exists. This is what the Arab countries have struggled with over the past seven decades when it came to Palestine, and what the region is struggling with now when it comes to Syria. \*\*\* It is noteworthy that the Security Council’s paralysis [failure] does not hinge solely on the actual use of the veto power. I was the representative of Egypt in the Security Council in 1996 and 1997. I chaired the Council in June 1996 and witnessed first-hand the five great powers threatening in the negotiation phase to veto many crucial resolutions. Ultimately, when the G-5 accept to pass a resolution, it usually ends up formulated as follows: Refraining from taking the action required to end the conflict, and merely appointing an envoy to manage the conflict. The best example of this are the resolutions on Palestine. Imposing sanctions that ***do not change the situation much*** but often harm many innocent people. Using ***distorted ineffective verbal formulations*** such as the repeated condemnations and denunciations we see now in the Council’s resolutions that do not call for any action that would change the tragic situation in question. The net result is that the Council is being confined to ***managing conflicts, not ending them***.

**The international order doesn’t solve war or coop.**

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Liberal Institutionalism

Liberal institutionalism is probably the ***weakest of the three major liberal theories***.65 Its chief proponents make modest claims about what international institutions can actually do to bring peace, and the historical record shows clearly that ***for any great power on the road to war, they are little more than a speed bump***. That includes liberal democracies like Britain and the United States.

Institutions are the set of rules that describe how states should cooperate and compete with each other. They prescribe acceptable forms of behavior and proscribe unacceptable behavior. The rules are negotiated by states; they are not imposed. The great powers dominate the writing of these rules and pledge to obey them, even where they think it is not in their interest to do so. In effect, countries voluntarily tie their hands when they join an international institution. The rules are typically formalized in international agreements and administered by organizations with their own personnel and budgets. It is important to emphasize, however, that those organizations per se do not compel states to obey the rules. International institutions are not powerful bodies, which are independent of the states that comprise the system, and they are not capable of forcing states to follow the rules. They are not a form of world government. States themselves must choose to obey the rules they created. Institutions, in short, call for the “decentralized cooperation of individual sovereign states, without any effective mechanism of command.”66

This emphasis on voluntary obedience also captures how international law works, which tells us there is no meaningful difference between institutions and law at the international level. International institutions are sometimes called “regimes,” and many scholars use those terms interchangeably. Thus the analysis here is as applicable to international law and regimes as it is to international institutions.67

The Ultimate Goal: Cooperation among States

Liberal institutionalists rarely argue that international institutions are a powerful force for peace. Instead, they make the less ambitious claim that institutions help settle disputes peacefully by promoting interstate cooperation. This emphasis on cooperation is clearly evident in Robert Keohane’s After Hegemony: Cooperation and Discord in the World Political Economy, probably the most influential work on international institutions.68 But as his title indicates, Keohane concentrates on explaining how to enhance economic cooperation among states. He says little about war and peace. Some liberal institutionalists do deal directly with security issues, but they too mainly talk about how those security institutions enhance cooperation.69 This focus on cooperation is found throughout the institutionalist literature, where many of the key pieces have “cooperation” in the title, and where hardly anyone elaborates on how cooperation causes peace.70

It is important to specify the particular circumstances in which institutions foster cooperation. They work only when states have mutual interests but cannot realize them because the structure of the situation gives them incentives to take advantage of each other. An example of this problem is the classic prisoner’s dilemma, where two individuals have a vested interest in cooperating but cannot because each fears the other might take advantage of him. Instead, they try to exploit each other, which leaves them both worse off than if they had made the deal. Collective action logic is another instance where individuals have common interests but do not realize them because there are powerful incentives for them to take advantage of each other. Institutions, the argument goes, can help individuals in these situations realize their common interests.

The ***theory has little relevance when states have conflicting interests and neither side thinks it has much to gain from cooperation***. In these circumstances, ***states will almost certainly aim to take advantage of each other, and that will sometimes involve violence***. In other words, if the differences are profound and involve important issues, countries will think in terms of winning and losing, which will invariably lead to intense security competition and sometimes war. ***International institutions have little influence on state behavior in such conditions***, mainly because the ***theory does not address how institutions can resolve or even ameliorate deep conflicts between great powers***.71 It is thus not surprising that liberal institutionalists have little to say about the causes of war and peace.

There is another way to show the limits of institutions. Some liberal institutionalists argue that international politics can be divided into two realms—political economy and security—and that their theory applies mainly to the former. Charles Lipson, for instance, writes that “significantly different institutional arrangements are associated with international economic and security issues.”72 Moreover, the likelihood of cooperation in these realms is markedly different. When economic relations are at stake, “cooperation can be sustained among several self-interested states,” whereas the ***prospects for cooperation are “more impoverished . . . in security affairs***.”73

The same thinking is reflected in Keohane’s After Hegemony, where he emphasizes that he is concentrating “on relations among the advanced market-economy countries . . . the area where common interests are greatest and where the benefits of international cooperation may be easiest to realize.”74 One example of this important distinction is the contrast between the United Nations’ ineffectiveness at resolving political disputes between the great powers and the effectiveness of the International Monetary Fund and the World Bank at facilitating economic cooperation among the major powers. What this means in practice is that liberal institutionalists focus mainly on fostering cooperation in the economic and environmental realms, because those are the domains where states are most likely to need the help of institutions to realize their common interests. Liberal institutionalists devote much less attention to security regimes.

One might argue that military alliances are security institutions, and they certainly have an important effect on international politics. There is no question that alliances are useful for coordinating the actions of the member states in both peace and war, which makes their collective efforts more efficient and effective. NATO is a case in point. It was hugely important during the Cold War in helping the West deter Soviet ambitions in Europe. But the alliance was among states with powerful incentives to cooperate in the face of a common threat, not states that had fundamental disagreements. Thus the general point stands: liberal institutionalists pay little attention to questions about war and peace.

Some might say that John Ikenberry, probably the most prominent liberal institutionalist besides Keohane, is an exception. He has developed a theory that is truly international in scope and can explain how to achieve cooperation in both the economic and security realms. In his seminal book After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order after Major Wars, he explains the circumstances under which states can build international orders, which seems to imply an order that covers the entire globe.75 Ikenberry is particularly interested in the international order that came into being after World War II, for which the United States was principally responsible. That order, of course, was heavily institutionalized.

On close inspection, however, we see that Ikenberry’s story is all about the Cold War order within the West, where the major countries had few profound disputes. He pays little attention to the security competition between the United States and the Soviet Union. Nor does he say much about the United Nations—a truly international institution, but almost useless for managing superpower relations. In the end, Ikenberry is not dealing with international order; he is dealing with economic and military relations among the advanced industrial countries of the West. His focus is similar to Keohane’s in After Hegemony, and although they offer somewhat different theories, neither explains what causes security competition and war or how institutions prevent rival great powers from fighting each other.

The Anarchy Problem

It might seem surprising, but the major liberal institutionalist thinkers do not claim, at least most of the time, to be offering a clear alternative to realism. They seem to want to retain significant elements of realpolitik in their arguments while yet going beyond it. Ikenberry, for example, writes that his theory “draws upon both realist and liberal theoretical traditions,” while Keohane writes that “we need to go beyond Realism, not discard it.”76 Helga Haftendorn, Keohane, and Celeste Wallander, the editors of a book dealing directly with security institutions, write: “As we see it, security studies, still dominated by realist thinking, will greatly benefit by incorporating institutionalist approaches.”77 It is hard to understand how any theory that is based in good part on realist logic can possibly leave balance-of-power politics behind. But let us put that matter aside and instead concentrate on explaining why international institutions hold out little hope of significantly enhancing the prospects for peace, even if they enhance the prospects for cooperation.

Liberal institutionalism is predicated on the belief that the main inhibitor of international cooperation is the threat of cheating, which is largely a consequence of intractable uncertainty. A state can never know what other states will think and do in the future. Institutions, so the argument goes, can ameliorate that problem in four ways.

First, they can increase the number of transactions among countries over time. This iteration raises the cost of cheating by creating the prospect of future gains through cooperation. The “shadow of the future” deters cheating today, since a state caught cheating jeopardizes its prospects of benefiting from future cooperation. Iteration gives the victim the opportunity to retaliate against the cheater: it facilitates a tit-for-tat strategy, which works to prevent cheaters from getting away with their transgression. In addition to punishing states that gain a reputation for cheating, it also rewards those that develop a reputation for adherence to agreements.

Second, rules can tie together interactions between states in different issue areas. The aim of issue linkage is to create greater interdependence between states, which will make them more reluctant to cheat in one issue area for fear that the victim, and perhaps other states, will retaliate in another area. Like iteration, linkage raises the costs of double-dealing and provides ways for victims to retaliate against the cheater.

Third, a system of rules can increase the amount of information available to the participants in cooperative agreements, which permits close monitoring. Raising the level of information discourages cheating by increasing the likelihood cheaters will be caught. It also provides victims with early warning of possible cheating, enabling them to take protective measures before they are badly hurt.

Finally, rules can reduce the transaction costs of individual agreements. When institutions perform the tasks described above, states are able to devote less effort to negotiating and monitoring agreements, and to hedging against possible defections. By increasing the efficiency of international cooperation, institutions make it more profitable and thus more attractive.

There is no question that the fear of a rival state breaking the rules, either covertly or openly, is a central element in the realist story, and one of the driving forces behind security competition and war.78 States are deeply concerned about the balance of power because they can never be certain they will not fall victim to another state cheating. If they do, there is no night watchman they can turn to for help. The key question for our purposes is whether international institutions solve the cheating problem in any way that challenges basic realist logic. Almost certainly, they do not.

The central problem, of course, is the ***absence of a higher authority that can credibly threaten to punish states if they disobey the rules***. International institutions are not autonomous actors that can force a state to obey the rules when it thinks that doing so is not in its national interest. ***There is no evidence of any institution coercing a great power into acting against realist dictates***. Instead, institutions depend on their member states to stick to the rules, because they think it serves their long-term interests. In the institutionalist story, member states have to police themselves.79

But we know from the historical record that ***states will cheat or disobey when they think that adhering to the rules is not in their interest***. Consider, for example, that the United States—the quintessential liberal democratic state—violated international law to initiate wars against Serbia in 1999 and Iraq in 2003.80 In both cases, Washington failed to secure the required United Nations Security Council resolution sanctioning those wars. Still, the United States opted to ignore international law in both cases because it felt there were strong moral and strategic imperatives for doing so. Naturally, it was never punished. One could also point to instances when France and Germany violated well-established EU rules because they believed doing so was in their interest.81 They were not punished either. It is hard to find a case where an international institution punished a great power in any serious way for breaking the rules.

Given that states sometimes have fundamental differences and ***international institutions cannot meaningfully constrain them***, those states recognize that they are operating in a self-help world where it makes eminently good sense to control as large a share of global power as possible, regardless of whether they gain that control by following the rules. After all, if a state obeys the law but sacrifices its security, who will come to its rescue if it is attacked by a rival state? Probably nobody. This logic explains why liberal institutionalism has so little to say about matters of war and peace, and why it ***does not offer a serious challenge to realism***.

I would add a final word about cheating. ***Fear of cheating is generally considered a more formidable obstacle to cooperation when security issues are at stake***:82 betrayal in such circumstances could bring a devastating military defeat. This threat of “swift, decisive defection,” as Charles Lipson writes, is simply not present in international economics. Given that “the costs of betrayal” are potentially much graver in the military sphere, it is hardly surprising that liberal institutionalism has little to say about security affairs but much to say about economic and environmental cooperation. As we saw, the other reason liberal institutionalism is relevant in the economic realm is that states often have common interests that institutions can help realize. In the security realm, where rival states often have fundamental differences, ***institutions are largely irrelevant***, save for alliances.

In sum, international institutions are useful tools of statecraft when states have common interests and need help realizing them. They can facilitate cooperation among states, although that cooperation is not always for peaceful ends. The more important point, however, is that ***there is no reason to think institutions can push states away from war***.

#### TURN: Private actors solve space war and ASAT restraint.

Wendy Cobb, professor of Security Studies, in Privatizing Peace, 2021: [Wendy N. Whitman Cobb, Associate Professor of Strategy and Security Studies at the School of Advanced Air and Space Studies, “Privatizing Peace: How Commerce Can Reduce Conflict in Space,” 2021, Routledge, pp. 68-69, EA]

Finally, given the involvement of an ever-larger number of private actors in space, states also need to consider the lost opportunity costs if private actors choose to forego research, development, and deployment of new technologies because the danger in space is too high. As space becomes more commercialized, these private actors can exert pressure on states to behave peacefully in order to promote further economic development. Gartzke and Quan Li argue that this can happen through the movement of capital from conflict-prone states or areas to non-conflictual states.50 This is not necessarily applicable to space because there is no area in space which is formally protected, but commercial space actors may choose not to engage in new economic investment which can in turn affect a state’s economic performance. To date, the size of the space sector is comparatively small, so, arguably, the potential economic loss would not be that great. Where the harm comes from is state reliance on private actors for military and national security space services. As states contract out space services to a greater extent, private actors exert an even greater influence over the state by having a capability they do not. Why might private companies want a more conflict-free space? If there is weaponized conflict in space, they could potentially benefit through new launches to send up replacement satellites; this is similar to an argument that war can actually be beneficial to an economy because companies are needed to create materiel and weapons.51 But, in a debris filled environment, sending replacements is more difficult and dangerous. Some private companies want to engage in human spaceflight; a conflictual or more dangerous orbital environment would likely prevent those activities or increase their costs to such an extent that it becomes economically infeasible. James Clay Moltz argues specifically that “the growing presence of space tourists in low-Earth orbit would greatly increase the incentives for restraint in any future [ASAT] test programs.”52 Those foregone development costs and commercial activities can have a similar cost to states simply by discouraging private actors from participating in the market.

#### That causes escalation and turns debris

Talia Blatt writes in the Harvard International Review, 2020: [Talia M. Blatt, “Anti-Satellite Weapons and the Emerging Space Arms Race,” 05/26/20, Harvard International Review, https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/, EA]

Nevertheless, a space race born from the Cold War continues to unfold. While the current space race may not have the same monopoly on the American imagination as the sprint to the moon held during the 1950s and 60s, it deserves our equal attention. We are now witnessing the rapid and increasingly international development of anti-satellite weapons. The race for these weapons [which] not only increases the risk of global conflict—it could jeopardize all future space exploration. What Are Anti-Satellite Weapons (ASATs)?Difficult to define, ASATs occupy a gray zone in international arms control. On one level, they are exactly what the term suggests: weapons designed to destroy or limit satellites for military purposes, such as undermining the command and control centers of an adversary’s military. ASATs can function in several ways. For example, kinetic energy ASATs (KE-ASATs) destroy satellites by physically colliding with them at high velocities. Drones, ballistic missiles, and explosives detonated near satellites can all function as KE-ASATs.Conversely, non-kinetic ASATs use any non-physical mechanism to render a satellite inoperative, such as blinding satellites with lasers, launching cyberattacks, or jamming frequencies.But definitional issues arise because any technology that can physically or non-kinetically damage a satellite can be considered an ASAT weapon. For example, supposedly benign technology aimed at removing defunct satellites or other space junk—known as Active Debris Removal (ADR) technology—can also remove active satellites. With ostensibly civil but covertly military capabilities or functions, many space technologies, including ADR, are put in a category commonly known as “dual-use.” The dual-use nature of space infrastructure makes differentiating between weapon and non-weapon nearly impossible. As a result, regulating ASATs—and many other space-based weapons systems—is extremely difficult. A Brief History of ASAT Proliferation The earliest ASAT testing began during the Cold War, when the success of Sputnik I in October of 1957 catalyzed American fears about the Soviet Union’s potential goal of developing nuclear armed satellites capable of circling the globe. In response, the US developed its first ASAT: Bold Orion, an air-launched ballistic missile. The Soviet Union responded with its own ASAT program, developing weapons through the 1960s and 70s known as co-orbitals. Unlike previous KE-ASAT designs, these co-orbitals worked by syncing up with a target satellite’s orbit, then detonating.The United States responded to Soviet co-orbitals in the 1980s with the ASM-135 weapon, an air-launched KE-ASAT distinguished by its hit-to-kill method. Unlike the Soviet co-orbitals, the hit-to-kill system did not require explosives; it just used the energy generated by the collision between the craft and the satellite, making delivery more stable. In a 1985 demonstration authorized by President Ronald Reagan, an ASM-135 successfully destroyed a defunct satellite. Roughly 30 years later, China joined the space race. In 2007, China successfully tested a KE-ASAT, destroying an old weather satellite with a ballistic missile. And just last year, India also successfully tested an ASAT in what the Indian government referred to as Mission Shakti.As of 2018, Russia and China were still developing more advanced non-kinetic ASATs. Russia is specifically developing an ASAT system known as Nudol, which operates in Lower Earth Orbit and can move between orbital paths, threatening more satellites than weapons limited to just one orbital path. So, despite the end of the Cold War era, more and more nations are jumping into a space arms race that is resulting in the rapid proliferation of advanced space weaponry. The ASAT Appeal A global fixation on anti-satellite weapons is arguably the logical end result of the main American project of the late 20th and early 21st century: the movement to digital communications. Via the telephone, computers, and eventually the internet, the United States pioneered the use of space-based communications for most civil and military functions. The benefits of satellite-based communications—namely increased efficiency, precision, and volume of information transmitted—are self-evident; however, the US lead in the transition to space-based systems posed a threat: relying on satellites for military use more than any other country created an asymmetric dependency. In other words, an unexpected denial of space-enabled information or capabilities would be more debilitating to the United States than to any other country because no other country is as dependent on satellite communications. In an era of US hegemony, powers like Russia, China, and India are looking for arenas in which they can make the most gains against a conventionally stronger opponent. The space race has an asymmetric nature: the more the United States develops in space, the more it has to lose. Thus, space warfare provides an arena where emerging powers can gain a strategic advantage relative to the US. More broadly, ASATs are also desirable because they can function as conflict deterrents. If a conflict arises, countries may be less likely to escalate if they believe their opponents are capable of essentially blinding their military. Just as two nuclear armed opponents risk mutually assured destruction (MAD), two ASAT armed countries risk mutual impotence. If they both can “turn off” each other’s militaries—or deny access to the satellites upon which their opponent’s conventional and nuclear forces rely—both countries are rendered close to defenseless, a risk they would be extremely reluctant to take. A Uniquely Dangerous Arms Race Despite their deterrent functions, ASATs are more likely to provoke or exacerbate conflicts than dampen them, especially given the risk they pose to early warning satellites. These satellites are a crucial element of US ballistic missile defense, capable of detecting missiles immediately after launch and tracking their paths. Suppose a US early warning satellite goes dark, or is shut down. Going dark could signal a glitch, but in a world in which other countries have ASATs, it could also signal the beginning of an attack. Without early warning satellites, the United States is much more susceptible to nuclear missiles. Given the strategy of counterforcing—targeting nuclear silos rather than populous cities to prevent a nuclear counterattack—the Americans might believe their nuclear weapons are imminently at risk. It could be twelve hours before the United States regains satellite function, which is too long to wait to put together a nuclear counterattack. The United States, therefore, might move to mobilize a nuclear attack against Russia or China over what might just be a piece of debris shutting off a satellite. Additionally, accidental warfare, or strategic miscalculation, is uniquely likely in space. It is much easier to hold an adversary’s space systems in jeopardy with destructive ASATs than it is to sustainably defend a system, which is expensive and in some cases not technologically feasible because of limitations on satellite movement. Space is therefore considered offense-dominant; offensive tactics like weapons development are prioritized over defensive measures, such as improving GPS or making satellites more resistant to jamming. As a result, countries are left with poorly defended space systems and rely on offensive posturing, which increases the risk that their actions are perceived as aggressive and incentivizes rapid, risky counterattacks because militaries cannot rely on their spaced-based systems after first strikes. There are several hotspots in which ASATs and offensive-dominant systems are particularly relevant. Early warning satellites play a central role in US readiness in the event of a conflict involving North Korea. News of North Korean missile launches comes from these satellites. Given North Korea’s history of nuclear provocations, unflinchingly hostile rhetoric towards the United States and South Korea, and diplomatic opacity, North Korea is always a threatening, unknowable adversary, but recent developments have magnified the risk. With the health of Kim Jong-un potentially in jeopardy, a succession battle or even civil war on the peninsula raises the chances of loose nukes. If the regime is terminal, traditional MAD risk calculus will become moot; with nothing to lose, North Korea would have no reason to hold back its nuclear arsenal. Or China might decide to seize military assets and infrastructure of the regime. If the US does not have its early warning satellites because they have been taken out in an ASAT attack, the US, South Korea, and Japan are all in imminent nuclear peril, while China could be in a position to fundamentally reshape East Asian geopolitics. The South China Sea is another hotspot in which ASATs could risk escalation. China is developing Anti-Access Area Denial (A2/AD) in the South China Sea, a combination of long range radar with air and maritime defense meant to deny US freedom of navigation in the region. Given the disputed nature of territory in the South China Sea, the United States and its allies do not want China to successfully close off the region. But the most effective way to break an A2/AD system would be with anti-satellite weapons. ASATs could neutralize the maritime surveillance China relies upon to deny access to the region and guide cruise missiles. Thus, China is extremely wary of US ASAT development: risks to Beijing’s South China Sea strategy are seen as threats to China itself because of territorial sovereignty claims that are deeply important to the regime and have only become more pronounced under President Xi Jinping. If a Chinese satellite went dark, Beijing might perceive it as a US ASAT designed to undermine the A2/AD approach, and escalate with conventional force. An Even Greater Risk Many of these conflict scenarios start with the loss of satellite function, which may seem unlikely. But ASATs threaten satellites through more than just direct attack. ASAT testing, rather than deployment, risks the exponential accumulation of debris, which endangers satellites and creates a host of other problems. KE-ASATs rely on smashing satellites into thousands of pieces, so each test adds tremendous amounts of space debris. The 2007 Chinese KE-ASAT test alone increased the number of objects in orbit by 20 percent, producing more than two thousand pieces of debris large enough to be tracked and likely thousands more too small to be counted that will remain in orbit for centuries. Even the smallest pieces of debris can do great damage; traveling at more than 15,000 miles per hour, they can crash into other debris in a proliferation known as the Kessler Syndrome. The situation in space could approach a critical mass in which collision cascading occurs even if all launches were halted, choking orbits with debris until all satellites are destroyed and spaceflight rendered impossible. Compared to the negligible debris created during commercial launches, ASAT tests—especially if the arms race continues to escalate and countries with less developed space programs join with cruder designs—may accelerate the debris in space closer and closer to this critical mass.

#### TURN: defined property rights are key to prevent conflict.

John Myers, J.D. candidate, in the San Diego International Law Journal, 2016: [2017 J.D. Candidate, University of San Diego School of Law “Extraterrestrial Property Rights: Utilizing the Resources of the Final Frontier” SAN DIEGO INT’L L.J. VOL. 18: 77, 2016]

Moreover, the grant of property rights in space will prevent both the Tragedy of the Commons and the Tragedy of the Anticommons. In the first case, if property rights are not granted in space, it is foreseeable that conflicts will arise because multiple corporations could land on the same asteroid. Hypothetically, if a particularly resource-rich asteroid that would be easy to land on and mine is discovered, both an American corporation and a Chinese corporation could land on it and this would result in issues both in space and on Earth. In the second case, if property rights are not granted in space, it is as likely foreseeable that corporations will not invest in space and the resources of space will go underexploited.

### at: billionaires in space enslave

#### You cant solve that lol – literally labor abuses will still happen

#### Not specific

#### If we’re advanced enough to create space settlements we’re advanced enough to automate manual labor – robots are more reliable and don’t need sleep or food or water – no risk of trillions toiling in space

#### This is completely speculative – we won’t be able to colonize space for decades if not centuries, we have no idea what conditions will look like then and Bezos will be long dead

#### Labor conditions improve over time – white collar office workers in developed countries are way better off than Gilded Age factory workers – so by the time we colonize space, conditions will likely be way better

#### Nonunique, billionaires could send people into space without appropriating anything, they don’t prove appropriation itself is bad

#### Private companies can’t force people to go into space, it would be voluntary, so if conditions are so nightmarish no one would go. Instead private companies would entice people to make these journeys or else there wouldn’t be volunteers.

#### Nonunique, governments are just as bad and even worse, Amazon warehouses may have poor conditions but they’re nothing compared to prison labor where inmates are forced to work for pennies.

#### I outweigh on probability and timeframe: there’s real oppression happening on Earth right now we should worry about before dystopian sci-fi scenarios

#### This is only one particular kind of appropriation which is niche and hundreds of years away so doesn’t prove the resolution true as a general principle

### AT Debris

#### Their evidence isn’t about appropriation – other private and public rocket launches are alt causes

#### Use sufficiency framing – they need to win that negating uniquely crosses the tipping point

Alexander Salter, professor of economics, for the Mercatus Institute, 2015: (Alexander Salter is the Comparative Economics Research Fellow at the Free Market Institute and an assistant professor of economics at Texas Tech University. September 2015. Mercatus Institute. Space Debris A Law and Economics Analysis of the Orbital Commons. https://www.mercatus.org/system/files/Salter-Space-Debris.pdf)

Fortunately, private and public actors may be able to act unilaterally under the purview of a given nation-state (as Ansdell recommends53) and, in a manner, may be unlikely to run afoul of international legal issues. It bears repeating that the primary problem posed by space debris is the possibility of the Kessler syndrome. A complete removal of existing debris is unnecessary; instead, mitigation and removal together simply need to keep orbital access and trajectories sufficiently uncluttered to prevent reaching the congestion “tipping point.”

#### Debris is manageable – removing only a few pieces per year solves

Megan Ansdell in the Journal of Public & International Affairs, 2010: (Megan; is a graduate student at the George Washington University Elliot School of International Affairs, focusing on space policy; Active Space Debris Removal: Needs, Implications, and Recommendations for Today’s Geopolitical Environment; https://jpia.princeton.edu/sites/jpia/files/space-debris-removal.pdf; accessed 8/29/19; MSCOTT/Julia)

Effectiveness of Debris Removal A recent NASA study that simulated active debris removal over the next 200 years showed that certain pieces of space debris are more dangerous than others, in that they are more likely to cause debris-creating collisions (Liou and Johnson 2007). These more dangerous objects have masses of 1,000 to 1,500 kilograms and 2,500 to 3,000 kilograms; orbital inclinations of 70 to 75, 80 to 85, and 95 to 100 degrees; and orbital altitudes of 800 to 850, 950 to 1,000, and 1,450 to 1,500 kilometers. The study found that annually removing as few as five of these objects will significantly stabilize the future space debris environment (Liou and Johnson 2007, 3). These results suggest that the threat posed by space debris could be significantly reduced by annually removing several large pieces from critical orbits. This would make effective space debris removal much more straightforward and potentially manageable by one nation or a small group of nations. In other words, the countries responsible for the majority of the current space debris population—China, Russia, and the United States— not only should take responsibility, but also now can take responsibility. Efforts to develop removal systems should begin immediately.

#### TURN: the profit motive creates an incentive to prevent debris which solves.

Jae Page and Laurel Besco, professors at the University of Toronto, in Territory, Politics, Governance, 2021: [Department of Geography, Geomatics and Environment, University of Toronto, Mississauga, ON, Canada. Department of Geography, Geomatics and Environment, University of Toronto, Mississauga, ON, Canada "Dispossession through collision: low-Earth orbit and planetary sustainability." Territory, Politics, Governance (2021): 1-18.]

Incentivizing users to invest in the resource will ultimately require political will. In a world where neoliberal ideals of privatization and competition reign over international negotiations, it is likely that those with a financial advantage will control the political discourse. As such, incentives for innovation will likely come about in two ways. The first incentive to invest in LEO may stem from a need to reduce liability and perpetuate market growth. Adilov et al. (2018) demonstrate that increased launches will result in an ‘economic’ Kessler syndrome before a physical one. According to their model, the increased risk of orbital debris will reach a point where firms no longer can make a profit from new satellite launches (Adilov et al., 2018). Finding solutions to remedy orbital debris may therefore proceed from corporate interests. Organizations such as Astroscale already see the potential business opportunities for ADR and are currently lobbying governments for space-sustainability policies that will assist in new market growth. Passing domestic legislation for debris removal is certainly an important step to securing a sustainable LEO

#### Even if Kessler syndrome occurs, it’s only a short-term impact

Journalist Adam Smith in Newsbreak, 2021: (Adam Smith, 8/9/2021, “Space Debris is blocking our path off the planet and legal loopholes mean Earth’s governments don’t have to care”, https://www.newsbreak.com/news/2335529276985/space-debris-is-blocking-our-path-off-the-planet-and-legal-loopholes-mean-earth-s-governments-don-t-have-to-care)

Fortunately, there is time left for humanity to rectify its situation. Low altitude space (550 kilometres) can recover from a series of fragmentations over approximately half a decade, Aaron C. Boley, associate physics professor at The University of British Columbia, told The Independent – although higher altitudes (700 kilometres) can take ten times as long to recover. “Even if fragmentations were to take place at low enough altitudes that we might expect the orbits to recover in a few years, the situation would still be largely disruptive. Plus, energetic fragmentations, such as a satellite-satellite collision or explosion, will place debris on a wide range of orbits”, Professor Boley says, although it is unlikely that it would ever reach a situation where humanity would absolutely trap itself on Earth.

#### Timeframe is *super long* even if they are right about everything

Ted Muelhaupt, aerospace engineer, in Crosslink, 2015: Theodore (Ted) J. Muelhaupt, Associate Principal Director, System Analysis and Simulation Subdivision, joined Aerospace in 1980. This subdivison is the primary Aerospace organization responsible for analysis of system-level performance expected from satellite systems, and oversight of astrodynamic and system modeling specialists. He coordinates Aerospace’s efforts in space debris, space situational awareness, and collision risk assessment, and manages the Center for Orbital and Reentry Debris Studies. He has a B.S. in aerospace engineering and an M.S. in mechanics from the University of Minnesota. "Understanding Space Debris Causes, Mitigations, and Issues", Crosslink Fall 2015 Vol. 16 No. 1, [https://aerospace.org/sites/default/files/2019-04/Crosslink%20Fall%202015%20V16N1%20.pdf], AVD

Short-term debris cascades are impossible. This may seem like a contradiction to the statement above, but one must consider the timescale. The predictions of the Kessler syndrome are quite real and broadly based, but the timescale is in decades and centuries, not hours and days. Therefore, Kessler is right, but the movies are wrong. This is a slowmotion disaster, and the good news is that it can be stopped or slowed with immediate action by the space community.

#### Low risk – any impact is more probable

Nancy Gallagher, professor of security studies, in Astropolitics, 2010: May 2010 Center for International and Security Studies at Maryland, University of Maryland Astropolitics, Volume 8 Issue 2, Space Governance and International Cooperation https://drum.lib.umd.edu/bitstream/handle/1903/15657/space\_governance\_and\_international\_cooperation.pdf?sequence=1&isAllowed=y

In sum, there are good reasons for conceptualizing space cooperation as managing a global commons so that a growing number of individual space actors can continue to use it in a safe, equitable, and sustainable manner, but there are also major reasons why framing the need for greater space cooperation in this way is unlikely to produce international agreements that make a major difference in outcomes. Interference from overcrowding and accidents caused by space debris have so far been low probability, low consequence events. This makes it hard to convince policy makers outside of the space community that they should devote significant time, money, and political capital to get more rapid international agreement on, and more widespread compliance with, stricter rules, wider information sharing, and better managerial processes. With ongoing wars and the global economic crisis, a 1-in-1,000 chance of a given satellite colliding with a chunk of space debris during a ten-year functional lifetime does not sound too bad.20 Debris cascades could dramatically increase the future risks and costs of space operations, but that would still pale by comparison with the consequences of global warming or rampant nuclear proliferation.

#### They only say that clean-up efforts are failing now but we have centuries to improve the tech

### AT Emissions

#### Your own ev proves you cant solve

#### This stems from the use of space not appropriation – satellite launches and space tourism will still exist in the aff world

#### The impact is miniscule and hydrogen fuel solves.

Science journalist Mike Brown writes in Inverse, 2021: [Mike Brown is a London-based journalist who covers innovation at Inverse. He is the author of Musk Reads, a regular newsletter that focuses on electric cars, space exploration, clean energy, and everything in-between. Mike holds a BA in English from Queen Mary, University of London, and an MS in journalism from Columbia Journalism School. “ARE SPACE ROCKETS BAD FOR THE EARTH? WHY THE QUESTION IGNORES AN IMPORTANT TRUTH” Inverse, 11.23.2021 https://www.inverse.com/innovation/are-rockets-environmentally-friendly]

Current rocket launches have a negligible effect on total carbon emissions — Everyday Astronaut found they accounted for 0.0000059 percent of global carbon emissions in 2018, while the airline industry produced 2.4 percent the same year. But the long-term effect is less clear, especially as companies like SpaceX move from hosting 26 launches in a year to 1,000 launches per rocket in a year.“I think we can guess that rockets won't be a huge impact on the environment, and they probably won't stand out as a sole source of new problems,” Darin Toohey, professor at the University of Colorado Boulder’s Atmospheric and Ocean Sciences, tells Inverse. “But they will add to the growing list of activities that have negative impacts on the environment.”Here is what we know so far. WHAT IS THE CARBON FOOTPRINT OF SPACE TRAVEL?This depends a lot on the rocket, and which fuel it burns to create thrust. Eloise Marais, an associate professor of physical geography at University College London, told The Guardian in July that she has simulated the effects of rocket launches for a decade. She found that one rocket launch can produce from 200 to 300 tons of carbon dioxide. This largely corresponds with Everyday Astronaut’s calculations. The United Launch Alliance’s Delta IV Heavy, which just burns hydrogen, comes out on top with basically no carbon. The SpaceX Falcon 9 and NASA Space Shuttle both produce around 400 tons of carbon dioxide per launch. USA Today reported that Blue Origin’s New Shepard emitted basically no carbon dioxide. That’s because it uses liquid hydrogen and oxygen as its fuel.

#### Link turn: asteroid mining is key to solve climate change – three internal links:

#### Shortages of rare earth metals will prevent transition to renewables in the status quo.

Nafeez Ahmed, journalist, in Vice, 2018: [Special Investigations & Global Trends @BylineTimes \ Technology & Systems Change @Rethink\_X \ Research Fellow @SchumacherInst // http://nafeezahmed.net “We Don't Mine Enough Rare Earth Metals to Replace Fossil Fuels With Renewable Energy” Vice, December 12, 2018 https://www.vice.com/en/article/a3mavb/we-dont-mine-enough-rare-earth-metals-to-replace-fossil-fuels-with-renewable-energy]

A new scientific study supported by the Dutch Ministry of Infrastructure warns that the renewable energy industry could be about to face a fundamental obstacle: shortages in the supply of rare metals. To meet greenhouse gas emission reduction targets under the Paris Agreement, renewable energy production has to scale up fast. This means that global production of several rare earth minerals used in solar panels and wind turbines—especially neodymium, terbium, indium, dysprosium, and praseodymium—must grow twelvefold by 2050. But according to the new study by Dutch energy systems company Metabolic, the “current global supply of several critical metals is insufficient to transition to a renewable energy system.” The study focuses on demand for rare metals in the Netherlands and extrapolates this to develop a picture of how global trends are likely to develop. “If the rest of the world would develop renewable electricity capacity at a comparable pace with the Netherlands, a considerable shortage would arise,” the study finds. This doesn’t include other applications of rare earth metals in other electronics industries (rare earth metals are widely used in smartphones, for example). “When other applications (such as electric vehicles) are also taken into consideration, the required amount of certain metals would further increase.” Demand for rare metals is pitched to rise exponentially across the world, and not just due to renewables. Demand is most evident in “consumer electronics, military applications, and other technical equipment in industrial applications. The growth of the global middle class from 1 billion to 3 billion people will only further accelerate this growth.” But the study did not account for those other industries. This means the actual problem could be far more intractable. In 2017, a study in Nature found that a range of minerals essential for smartphones, laptops, [and] electric cars and even copper wiring could face supply shortages in coming decades.

#### Asteroid mining is significantly less carbon-intensive

MIT Technology Review in 2018: [By Emerging Technology from the arXiv “Asteroid mining might actually be better for the environment” MIT Technology Review, October 19, 2018 https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/]

Today, that changes thanks to the work of Andreas Hein and colleagues at the University of Paris-Saclay in France. These guys have calculated the greenhouse-gas emissions from asteroid-mining operations and compared them with the emissions from similar Earth-based activities. Their results provide some eyebrow-raising insights into the benefits that asteroid mining might provide. The calculations are relatively straightforward. Rocket launches release significant amounts of greenhouse gases into the atmosphere. The fuel on board the first stage of a rocket burns in Earth’s atmosphere to form carbon dioxide. For kerosene-burning rockets, one kilogram of fuel creates three kilograms of CO2. (The second and third stages operate outside the Earth’s atmosphere and so can be ignored.) Reentries are just as damaging. That’s because a significant mass of a re-entering vehicle ablates in the upper atmosphere, producing NOx such as nitrous oxide (N2O), a greenhouse gas that is about 300 times more potent than CO2. By one estimate, the space shuttle released about 20% of its mass in the form of N2O every time it returned to Earth. Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO2 into Earth’s atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO2 per kilogram of platinum. That needs to be compared with the emission from Earth-based mining. Here, platinum mining generates significant greenhouse gases, mostly from the energy it takes to remove this stuff from the ground. Indeed, the numbers are huge. The mining industry estimates that producing one kilogram of platinum on Earth releases around 40,000 kilograms of carbon dioxide. “The global warming effect of Earth-based mining is several orders of magnitude larger,” say Hein and co.

#### The impact is massive

Watson Farley & Williams, environmental law firm, in 2020: [no author cited. We are an international law firm advising on complex transactions and disputes through local knowledge and an integrated international network. We have a strong sector focus, combining our technical excellence with deep industry knowledge across energy, transport and real estate. “MINING & RENEWABLE ENERGY – A GREENER WAY FORWARD” 23 NOVEMBER 2020 https://www.wfw.com/articles/mining-renewable-energy-a-greener-way-forward/]

The mining industry is responsible for 4-7% of global greenhouse gas emissions – 1% of these are from Scope 1 and 2 emissions, caused directly by mining operations or indirectly through, for example, electricity consumption used to power mines; the remaining 3-6% coming from fugitive methane emissions. Scope 3 emissions caused by all other indirect usage of the minerals extracted (for example coal used in coal-fuelled power stations) are in turn responsible for up to 28% of global greenhouse gas emissions⁴.