#### The standard is utilitarianism

Moen 16 [Ole Martin Moen, Research Fellow in Philosophy at University of Oslo “An Argument for Hedonism” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281] SJDI // RCT by JPark

Let us start by observing, empirically, that a widely shared judgment about intrinsic value and disvalue is that pleasure is intrinsically valuable and pain is intrinsically disvaluable. On virtually any proposed list of intrinsic values and disvalues (we will look at some of them below), pleasure is included among the intrinsic values and pain among the intrinsic disvalues. This inclusion makes intuitive sense, moreover, for there is something undeniably good about the way pleasure feels and something undeniably bad about the way pain feels, and neither the goodness of pleasure nor the badness of pain seems to be exhausted by the further effects that these experiences might have. “Pleasure” and “pain” are here understood inclusively, as encompassing anything hedonically positive and anything hedonically negative.2 The special value statuses of pleasure and pain are manifested in how we treat these experiences in our everyday reasoning about values. If you tell me that you are heading for the convenience store, I might ask: “What for?” This is a reasonable question, for when you go to the convenience store you usually do so, not merely for the sake of going to the convenience store, but for the sake of achieving something further that you deem to be valuable. You might answer, for example: “To buy soda.” This answer makes sense, for soda is a nice thing and you can get it at the convenience store. I might further inquire, however: “What is buying the soda good for?” This further question can also be a reasonable one, for it need not be obvious why you want the soda. You might answer: “Well, I want it for the pleasure of drinking it.” If I then proceed by asking “But what is the pleasure of drinking the soda good for?” the discussion is likely to reach an awkward end. The reason is that the pleasure is not good for anything further; it is simply that for which going to the convenience store and buying the soda is good.3 As Aristotle observes: “We never ask [a man] what his end is in being pleased, because we assume that pleasure is choice worthy in itself.”4 Presumably, a similar story can be told in the case of pains, for if someone says “This is painful!” we never respond by asking: “And why is that a problem?” We take for granted that if something is painful, we have a sufficient explanation of why it is bad. If we are onto something in our everyday reasoning about values, it seems that pleasure and pain are both places where we reach the end of the line in matters of value.

#### Extinction First:

#### 1] Reversibility- we can’t improve society if we are all dead

#### 2] Suffering- death causes suffering when people can’t get access to resources and necessities

#### 3] Moral uncertainty – we’ve been fighting about ethics for thousands of years but can’t come to a conclusion – preserving life is first

### Debris Removal CP

#### States should establish an international body that would license resources from outer space for private appropriation with a 20% royalty on all profits that is put into a Space Resource Fund that is used to fund space traffic management including at least active debris removal.

#### The CP competes and solves debris AND Developing economies.

Saletta 16 [Morgan Saletta, PhD, History and Philosophy of Science, The University of Melbourne, and Kevin Orrman-Rossiter, Graduate Student, History & Philosophy of Science, The University of Melbourne. April 17, 2016. “All of humanity should share in the space mining boom,” <https://theconversation.com/all-of-humanity-should-share-in-the-space-mining-boom-57740>] brett

One solitary asteroid might be worth trillions of dollars in platinum and other metals. Exploiting these resources could lead to a global boom in wealth, which could raise living standards worldwide and potentially benefit all of humanity. There are already companies, such as Planetary Resources, hoping to make mining in space a reality. Peter Diamondis, co-founder of Planetary Resources and founder of the XPrize Grand Challenges, believes that the benefits to humanity give us a moral imperative to explore and utilise space. He has also declared “there are twenty-trillion-dollar checks up there, waiting to be cashed!” However, behind the utopian rhetoric and dazzling dreams of riches lie some very real problems. Ownership and the Outer Space Treaty The framework of international space law is given by the Outer Space Treaty (OST), which entered into force in 1967. Among its main principals, the OST includes these statements: the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind and, outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means Because the OST is generally interpreted as preventing anything like private fee-simple ownership, it is sometimes claimed to be an obstacle to commercial ventures in space. But such claims simply do not hold water. There are numerous terrestrial examples where resources are profitably exploited in the absence of fee-simple ownership. Governments routinely licence companies to engage in timber extraction, mining, offshore oil exploration and other activities, receiving royalties payments on production. In the United States, revenues from such royalties totalled some US$13.5 billion dollars in 2014 from federally owned or managed lands alone. Nevertheless, some proponents of mining in outer space argue for serious modification or an end to the Outer Space Treaty and claim, against the evidence, that without fee-simple ownership, there is no incentive for commercial exploitation. The Unites States’ Space Act of 2015 was just one volley – and a deliberately vague one at that – in this ongoing international debate. A balanced approach? The riches exist, but how will humanity benefit from mining in outer space, or for that matter, other global commons such as the deep sea floor? Behind the lofty rhetoric of benefits to humanity, there is a dark shadow of voodoo economics, the shambling, walking dead figure of trickle down economics– and the possibility of a world where a few trillionaires enjoy the view from space while others barely eke a living on its surface. Yet we do suggest that commercial interests and profit seeking can be a healthy part of the exploration of outer space. Yet outer space is not the Wild West frontier of Frederick Jackson Turner, nor do we live in the Gold Rush days of Jack London’s tale of greed and death. In the common heritage of space, with multiple state and private actors engaging in exploration and potentially exploitation, international cooperation and oversight will benefit all. The Alaskan model There is a balanced, pragmatic approach that will promote commercial and profit driven activities, while also producing tangible benefits to all of humanity. Importantly, this pragmatic approach has a well established precedent that has existed for nearly 40 years. And this comes not from a social democracy or left-wing ideology, but was the brainchild of a libertarian, Republican governor of Alaska, Jay Hammond. That model is the Alaska Permanent Fund Corporation (APFC) created in 1976, and its unique “citizen’s dividend”. The APF is a resource wealth fund, which derives its revenue primarily from leases on oil fields. In 1977, Hammond suggested that “rather than permitting government to spend all public monies earned through the exploitation of the public’s resources for what government thinks best, let’s grant shares to Alaskans.” The first dividend payment was made in 1982, and in 2015 that payment amounted to US$2,072. Linking a citizen’s dividend to a sovereign wealth fund was unique, but the idea of a citizen’s dividend has a long and venerable tradition. One of the earliest advocates was no less than the political theorist and American Revolutionary, Thomas Paine. International body How would this work for outer space? We need an international body similar to the International Seabed Authority, which was established by the United Nations Convention on the Law of the Sea, or the International Telecommunications Union, which allocates satellite orbits. This would provide the stable business and investment environment that entrepreneurs seek by ensuring international law and obligations are met. This body could license outer space resources and levy a royalty on production, which is part of standard business practice between petroleum and other mining companies and governments here on Earth. In turn, these revenues, or a significant portion thereof, would be deposited in a Space Resource Fund, possibly under the aegis of the World Bank. And every single citizen on Earth, say aged 18 or above, would receive a dividend on a yearly basis as their rightful share as owners of the common province of humankind. Crucially, we are not suggesting redistribution, which has been an obstacle to the International Seabed Authority and the Moon Treaty in the past, but a fair share dividend of wealth that truly belongs to everyone. Our model doesn’t provide a handout, or a welfare cheque, or charity from a trillionaire philanthopist; it pays every owner in a global commons a share of what is rightfully theirs. Even tiny dividends by the standards of the world’s wealthy nations would make a difference for some developing world farmers. If there truly are trillions of dollars out there, then this might be something fundamentally world changing. We accept that Larry Page and Sir Richard Branson – founding investors and advisors in Planetary Resources – and its founders Eric Anderson and Peter Diamandis, truly want humanity to benefit from outer space, and that they truly believe in corporate social responsibility and a sustainable future. We would encourage them to embrace the idea that the sky really does belong to all of us, as the common “province of all mankind”. By paying rent for the right to exploit resources in space and royalties on production, the same way oil companies pay to exploit oil in the Gulf of Mexico, they’ll be engaging in business as usual. They will have bought the right to make a potentially enormous profit and prove they really are responsible global citizens. And they’d get a citizen’s dividend cheque too.

#### Solves debris.

Webb et al. 18 [Lucas; November 2018; Masters of Astronautical Engineering student at USC; Brittany Wojciechowski,\*\*; Wichita State University PhD student in aerospace engineering; Aubrey Koonce\*\*, Molly Williams\*\*\*, Wichita State University; European Space Policy Institute; “The Need for Strict Regulation of Asteroid Mining,” <https://espi.or.at/publications/voices-from-the-space-community/category/3-voices-from-the-space-community>] brett

In terms of policy recommendations, the aim is not to regulate the resources themselves but rather the activity of space mining. The Moon Agreement provides the groundwork for a stricter policy, which provides a model of how asteroid mining policies should be created and implemented. 12 Modeling new regulations based off of the Moon Agreement, we propose the creation of a mediating organization that oversees and enforces asteroid mining and its regulation. As in the Moon Agreement, this organization’s focus should be on the “orderly and safe development of natural resources… the rational management of those resources; the expansion of opportunities… [and] the equitable sharing”13 of asteroidal resources. We propose that asteroid mining firms must enter into a rental agreement with the mediating organizations. To gain access to mine space resources, Parties will be required to pay a small fee. This paid fee could then be applied towards administrative costs, but a portion could also be used to assist underdeveloped States’ space programs. In this way the mediating organization would be similar to the International Seabed Authority under the UN Convention on the Law of the Sea. 14 In order to restrict mining activity, Parties will have a duration of time (depending on extraction process of the mission) or until they meet a specific threshold of resources collected. If a Party does not exceed the threshold then they will have up until the end of the rental agreement to extract resources. By attaching this additional restriction to rented spaces, subsequent mining expeditions will have an equal opportunity to collect the same quantity or as much feasible within the contract duration. Careful documentation of the minerals acquired will be necessary and upon return to Earth, and expeditions will be subject to something akin to a space “customs”. The customs procedures will be to ensure that proper inventory was taken, and no resources are absent or mismarked. Additionally, the Party shall submit a written statement including their own inventory that was taken that contains the type, quantity, etc. of the resources in their possession. This submitted inventory would be open to everyone, allowing for free access to said information. Also, underdeveloped countries would have the ability to petition for resources through the mediating organization. However, it is up to the country/company to decide whether or not they will extend a helping hand. Perhaps an incentive and/or a reciprocal agreement of sorts could be proposed in order to foster assistance between the developed and underdeveloped Parties of the proposal. The proposal should be signed by nations that are interested themselves or have companies within them that are interested in space mining. Companies cannot sign the proposal themselves, however their governing country can sign and inform the mediating agency that they will regulate these companies and ensure they abide by the space mining regulations. Individuals or groups would be allowed to partner together, however the partnership should be outlined clearly within a contract and must be signed by all parties involved. Nations that have ratified the regulations will enforce the rules on the companies within their territory. The consequences of not following the rules of the proposal could include imprisonment and/or a large fine, like those described in Article 18 of Luxembourg’s asteroid mining policies.15 Any companies and/or individuals that do not follow the rules of the proposal should also be reported to the mediating agency along with the consequence given to them. Venturing forward into the opportunities that space provides humanity, equality and fairness should be at the forefront of new policies. While not every situation can be accounted for at the present time, by keeping these notions in mind, just systems can be formed to supply the foundation for future asteroid mining endeavors. The proposed guidelines for a treaty in which countries can come together to be a part of something larger, in the scheme of space exploration, are rough ideas, requiring shaping. However, the authors believe that this outline embodies the key ideals needed for expansion into space. 4 Conclusion For asteroid mining to become a reality collaboration with others needs to occur. Understanding the various aspects mining will include perspectives of multiple stakeholders, with all needing to keep open minds. A key component of this process will be to revise or otherwise clarify the Outer Space Treaty 16 (among other international agreements) as needed to ensure that international law is consistent with the policy recommendations outlined above. We encourage others to start thinking about what needs to be done for asteroid mining to become feasible and properly regulated. We also hope that the regulations provided will be of help in assisting in future policies. We must understand that strict regulations will be required to better ensure that asteroids will not become monopolized or depleted.

### Mining Argument

#### Mining is happening now

Gilbert 4-26 [Alex Gilbert is a complex systems researcher and a PhD student in space resources at the Colorado School of Mines. Milken Institute, “Mining in Space Is Coming”; <https://www.milkenreview.org/articles/mining-in-space-is-coming>] kelvin / rct LH

Space exploration is back. after decades of disappointment, a combination of better technology, falling costs and a rush of competitive energy from the private sector has put space travel **front and center**. indeed, many analysts (even some with their feet on the ground) believe that commercial developments in the space industry may be on the cusp of starting the largest resource rush in history: mining on the Moon, Mars and asteroids.

While this may sound fantastical, some baby steps toward the goal have already been taken. Last year, NASA awarded contracts to four companies to extract small amounts of lunar regolith by 2024, effectively beginning the era of commercial space mining. Whether this proves to be the dawn of a gigantic adjunct to mining on earth — and more immediately, a key to unlocking cost-effective space travel — will turn on the answers to a host of questions ranging from what resources can be efficiently.

As every fan of science fiction knows, the resources of the solar system appear virtually unlimited compared to those on Earth. There are whole other planets, dozens of moons, thousands of massive asteroids and millions of small ones that doubtless contain humungous quantities of materials that are scarce and very valuable (back on Earth). Visionaries including Jeff Bezos imagine heavy industry moving to space and Earth becoming a residential area. However, as entrepreneurs look to harness the riches beyond the atmosphere, access to space resources remains tangled in the realities of economics and governance.

Start with the fact that space belongs to no country, complicating traditional methods of resource allocation, property rights and trade. With limited demand for materials in space itself and the need for huge amounts of energy to return materials to Earth, creating a viable industry will turn on major advances in technology, finance and business models.

That said, there’s no grass growing under potential pioneers’ feet. Potential economic, scientific and even security benefits underlie an emerging geopolitical competition to pursue space mining. The United States is rapidly emerging as a front-runner, in part due to its ambitious Artemis Program to lead a multinational consortium back to the Moon. But it is also a leader in creating a legal infrastructure for mineral exploitation. The United States has adopted the world’s first space resources law, recognizing the property rights of private companies and individuals to materials gathered in space.

However, the United States is hardly alone. Luxembourg and the United Arab Emirates (you read those right) are racing to codify space-resources laws of their own, hoping to attract investment to their entrepot nations with business-friendly legal frameworks. China reportedly views space-resource development as a national priority, part of a strategy to challenge U.S. economic and security primacy in space. Meanwhile, Russia, Japan, India and the European Space Agency all harbor space-mining ambitions of their own. Governing these emerging interests is an outdated treaty framework from the Cold War. Sooner rather than later, we’ll need new agreements to facilitate private investment and ensure international cooperation.

What’s Out There

Back up for a moment. For the record, space is already being heavily exploited, because space resources include non-material assets such as orbital locations and abundant sunlight that enable satellites to provide services to Earth. Indeed, satellite-based telecommunications and global positioning systems have become indispensable infrastructure underpinning the modern economy. Mining space for materials, of course, is another matter.

In the past several decades, planetary science has confirmed what has long been suspected: celestial bodies are potential sources for dozens of natural materials that, in the right time and place, are incredibly valuable. Of these, water may be the most attractive in the near-term, because — with assistance from solar energy or nuclear fission — H2O can be split into hydrogen and oxygen to make rocket propellant, facilitating in-space refueling. So-called “rare earth” metals are also potential targets of asteroid miners intending to service Earth markets. Consisting of 17 elements, including lanthanum, neodymium, and yttrium, these critical materials (most of which are today mined in China at great environmental cost) are required for electronics. And they loom as bottlenecks in making the transition from fossil fuels to renewables backed up by battery storage.

The Moon is a prime space mining target. Boosted by NASA’s mining solicitation, it is likely the first location for commercial mining. The Moon has several advantages. It is relatively close, requiring a journey of only several days by rocket and creating communication lags of only a couple seconds — a delay small enough to allow remote operation of robots from Earth. Its low gravity implies that relatively little energy expenditure will be needed to deliver mined resources to Earth orbit.

The Moon may look parched — and by comparison to Earth, it is. But recent probes have confirmed substantial amounts of water ice lurking in permanently shadowed craters at the lunar poles. Further, it seems that solar winds have implanted significant deposits of helium-3 (a light stable isotope of helium) across the equatorial regions of the Moon. Helium-3 is a potential fuel source for second and third-generation fusion reactors that one hopes will be in service later in the century. The isotope is packed with energy (admittedly hard to unleash in a controlled manner) that might augment sunlight as a source of clean, safe energy on Earth or to power fast spaceships in this century. Between its water and helium-3 deposits, the Moon could be the resource stepping-stone for further solar system exploration.

Asteroids are another near-term mining target. There are all sorts of space rocks hurtling through the solar system, with varying amounts of water, rare earth metals and other materials on board. The asteroid belt between the orbits of Mars and Jupiter contains most of them, many of which are greater than a kilometer in diameter. Although the potential water and mineral wealth of the asteroid belt is vast, the long distance from Earth and requisite travel times and energy consumption rule them out as targets in the near term.

Even the surface of celestial bodies pose a challenge to mining machinery since they consist of unconsolidated rocky materials called regolith instead of more familiar soil.

Wannabe asteroid miners will thus be looking at smaller near-Earth asteroids. While they are much further away than the Moon, many of them could be reached using less energy — and some are even small enough to make it technically possible to tow them to Earth orbit for mining.

Space mining may be essential to crewed exploration missions to Mars. Given the distance and relatively high gravity of Mars (twice that of the Moon), extraction and export of minerals to Earth seems highly unlikely. Rather, most resource extraction on Mars will focus on providing materials to supply exploration missions, refuel spacecraft and enable settlement.

Technology Is the Difference

The prospects for space mining are being driven by technological advances across the space industry. The rise of reusable rocket components and the now-widespread use of off-the-shelf parts are lowering both launch and operations costs. Once limited to government contract missions and the delivery of telecom satellites to orbit, private firms are now emerging as leaders in developing “NewSpace” activities — a catch-all term for endeavors including orbital tourism, orbital manufacturing and mini-satellites providing specialized services. The space sector, with a market capitalization of $400 billion, could grow to as much as $1 trillion by 2040 as private investment soars.

But despite the high-profile commercial advances, governments still call the shots on the leading edge of space resource technologies. The United States extracted the first extraterrestrial materials in space from the Moon during the Apollo missions, followed by the Soviet Union’s recoveries from crewless Luna missions. President Biden recently borrowed one of the Apollo lunar rocks for display in the Oval Office, highlighting the awe that deep space can still summon.

For the time being, scientific samples remain the goal of mining. Last October, NASA’s OSIRIS-REx mission — due to return to Earth in 2023 — collected a small amount of material from the asteroid Bennu. In December, Japan returned a sample of the asteroid Ryugu with the Hayabusa2 spacecraft. And several weeks later, China’s Chang’e 5 mission returned the first lunar samples since the 1970s.

Sample collection is accelerating, with recent missions targeting Mars. Japan is planning to visit the two moons of Mars and extract a sample from one. NASA’s robotic Perseverance rover will collect and cache drilled samples on Mars that could later be returned to Earth. Perseverance also carries gear for the unique MOXIE experiment on Mars — an attempt to produce oxygen on the planet with technologies that could eventually extract oxygen for astronauts to breath and refuel spacecraft.It’s about as wide as the Eiffel Tower is tall and it could be where we obtain the elements needed to power bases on the moon, Mars or in orbit one day.

#### Private entities are key to space mining – research, investment, and more

Krishnan 20 [C A Krishnan, 8-6-2020, "Space mining: Just around the corner?," Week, <https://www.theweek.in/news/sci-tech/2020/08/06/Space-mining-Just-around-the-corner.html> [accessed 12-6-21] lydia // rct LH

A Mars mission carrying 100 metric tons cargo in 2022 followed by a manned mission by 2024 are the immediate milestones of Elon Musk’s SpaceX plan which aims to create a self sustaining Mars city by 2050. Just a few decades back this would have sounded as fantasy, but today it looks as if this time frame may actually be bettered. Space missions are set to undergo revolutionary changes and Elon Musk’s vision and timelines are indicators of this. Space is increasingly being seen as a treasure trove of precious minerals and also a place for future human habitation beyond the earth. Global private space industry investors believe that space mining has the potential to shape and define the 21st Century. NASA estimates that the 'Asteroid belt’ holds minerals worth quintillion of dollars. American astrophysicist Neil Degrasse Tyson believes, “The first trillioners will be those who mine asteroids”. The “Main Asteroid Belt” is located between the orbits of Mars and Jupiter, about 450 to 650 million Kilometers from earth, with million asteroids in it. Over the decades, apart from Moon and Mars, governments and private agencies have been carrying out extensive research and studying asteroids for their composition, possibility of mining them and their mining value —Asteriod ‘Bennu’ has been assessed at $670 million and asteroid ‘2011 UW158’ at $ 5.7 trillion. Transportation of the mined resources for utilisation, however, poses major hurdles. A ‘BBC Future’ report by Sarah Cruddas puts the cost of shipping a ton of water into space at about $ 50 million. As per Chris Lewicki, president of Planetary Resources, an asteroid mining company, it takes more energy to escape the first 300 kilometers from the Earth than the next 300 million kilometers. Similarly, bringing back anything more than a few kilograms of samples from space to the Earth would be even more complex in terms of logistics. To start with, therefore, global space industry investors are focusing on keeping mined space resources in space itself for ‘in situ resource utilisation’. Availability of water on the Moon, Mars and asteroids offer very attractive prospects; apart from being crucial for supporting life and growing food, it also opens the possibility of using its constituents, hydrogen and oxygen, for making rocket fuel. Today, the possibility of manufacturing tools and even building habitats on Moon or Mars with the help of 3D printers using iron, nickel, cobalt, gold, platinum, and iridium etc which are available on the Moon, Mars and asteroids seem within reach. Researchers are working on using regolith, the weathered rock particles found on lunar surface for making moon bricks using 3D printers. These bricks will form the basic construction material for the first moon station and even the first moon hotel. Space industry players believe that an investment of $ 4 billion in water mining in space can generate annual revenue worth about $2.4 billion. Similarly, there is a new community of customers who are already looking for buying propellant in space. American space launch provider, United Launch Alliance (ULA), a Lockheed Martin and Boeing joint venture that provides launch rockets, has made it known that, ULA is willing to pay about $ 3000 a Kg for propellant in low earth orbit. Fast paced developments are taking place in the field of space mining technology with private players in the lead. Optical mining using concentrated sunlight, robotics, automated mining applications, advanced drilling machines etc are just a few examples. Participation of private players has reduced the investment burden and greatly enhanced the width and pace of innovation. It is believed that launch of the first asteroid mining vehicle as well as setting up of the first fuelling stations on the Moon and in low earth orbit could become a reality within a decade. Japanese mission ‘Hayabusa’ was the first to bring samples from an asteroid to earth in 2010. ‘Hayabusa - 2’ made its rendezvous with the near earth asteroid ‘162173 RYUGU’ in June 2018, left the asteroid after collecting samples in November 2019 and will be back on earth on December 6, 2020. Similarly the NASA mission OSIRIS-REx, costing about $ 1 billion, launched in 2016 is due to return to earth with samples of asteroid ‘101955 Bennu’ on September 24, 2023. The latest US space mission, ‘Perseverance’ launched on July 30, 2020 will land on Mars on February 18, 2021. It will be using a helicopter on Mars, set to be the first use of a helicopter outside the earth. Apart from collecting samples from Mars and search for signs of habitable conditions on Mars, it will also test the possibility of manufacturing molecular oxygen from the carbon dioxide-rich Mars atmosphere. Beyond the technological capability, there are, however, complex legal issues. While making fuel and water in space and its ‘in situ resource utilisation’ may pass the scrutiny, commercial exploitation of space through minerals mining, tourism, real estate etc may prove hugely contentious in terms of international legal framework for space. The current legal frameworks were adopted when space activities were entirely within the domain of national governments and were confined to research alone. But with the nature of space activities moving from purely research activities to military applications to commercial activities and with the entry of private players and a new community of consumers in space, the vintage outer space treaty has been rendered grossly inadequate; vagueness of the treaty does not cater for the ‘new types of uses’ or the ‘new users’ of space. Louis de Gouyon Matignon, in a thesis on the subject observed that “some states have already taken the absence of express prohibition as a sign that the utilisation of space resources is permissible, and both the USA and Luxembourg recently adopted national legislations expressly allowing it”. This has, however, triggered a response from the international community denouncing such unilateral initiatives and recommending a collective approach on the lines of the laws for high seas and deep sea bed. Whether a widely acceptable new space treaty comes through or not, Space mining is a reality and the early entrants are likely to retain monopoly and huge economic advantages for a very long time.

#### Commercial mining solves extinction from scarcity, climate, terror, war, and disease – solves the aff.

Pelton 17—(Director Emeritus of the Space and Advanced Communications Research Institute at George Washington University, PHD in IR from Georgetown). Pelton, Joseph N. 2017. The New Gold Rush: The Riches of Space Beckon! Springer. Accessed 8/30/19.

Are We Humans Doomed to Extinction? What will we do when Earth’s resources are used up by humanity? The world is now hugely over populated, with billions and billions crammed into our overcrowded cities. By 2050, we may be 9 billion strong, and by 2100 well over 11 billion people on Planet Earth. Some at the United Nations say we might even be an amazing 12 billion crawling around this small globe. And over 80 % of us will be living in congested cities. These cities will be ever more vulnerable to terrorist attack, natural disaster, and other plights that come with overcrowding and a dearth of jobs that will be fueled by rapid automation and the rise of artifi cial intelligence across the global economy. We are already rapidly running out of water and minerals. Climate change is threatening our very existence. Political leaders and even the Pope have cautioned us against inaction. Perhaps the naysayers are right. All humanity is at tremendous risk. Is there no hope for the future? This book is about hope. We think that there is literally heavenly hope for humanity. But we are not talking here about divine intervention. We are envisioning a new space economy that recognizes that there is more water in the skies that all our oceans. Th ere is a new wealth of natural resources and clean energy in the reaches of outer space—more than most of us could ever dream possible. There are those that say why waste money on outer space when we have severe problems here at home? Going into space is not a waste of money. It is our future. It is our hope for new jobs and resources. The great challenge of our times is to reverse public thinking to see space not as a resource drain but as the doorway to opportunity. The new space frontier can literally open up a “gold rush in the skies.” In brief, we think there is new hope for humanity. We see a new a pathway to the future via new ventures in space. For too long, space programs have been seen as a money pit. In the process, we have overlooked the great abundance available to us in the skies above. It is important to recognize there is already the beginning of a new gold rush in space—a pathway to astral abundance. “New Space” is a term increasingly used to describe radical new commercial space initiatives—many of which have come from Silicon Valley and often with backing from the group of entrepreneurs known popularly as the “space billionaires.” New space is revolutionizing the space industry with lower cost space transportation and space systems that represent significant cost savings and new technological breakthroughs. “New Commercial Space” and the “New Space Economy” represent more than a new way of looking at outer space. These new pathways to the stars could prove vital to human survival. If one does not believe in spending money to probe the mysteries of the universe then perhaps we can try what might be called “calibrated greed” on for size. One only needs to go to a cubesat workshop, or to Silicon Valley or one of many conferences like the “Disrupt Space” event in Bremen, Germany, held in April 2016 to recognize that entrepreneurial New Space initiatives are changing everything [ 1 ]. In fact, the very nature and dimensions of what outer space activities are today have changed forever. It is no longer your grandfather’s concept of outer space that was once dominated by the big national space agencies. The entrepreneurs are taking over. The hopeful statements in this book and the hard economic and technical data that backs them up are more than a minority opinion. It is a topic of growing interest at the World Economic Forum, where business and political heavyweights meet in Davos, Switzerland, to discuss how to stimulate new patterns of global economic growth. It is even the growing view of a group that call themselves “space ethicists.” Here is how Christopher J. Newman, at the University of Sunderland in the United Kingdom has put it: Space ethicists have offered the view that space exploration is not only desirable; it is a duty that we, as a species, must undertake in order to secure the survival of humanity over the longer term. Expanding both the resource base and, eventually, the habitats available for humanity means that any expenditure on space exploration, far from being viewed as frivolous, can legitimately be rationalized as an ethical investment choice. (Newman) On the other hand there are space ethicists and space exobiologists who argue that humans have created ecological ruin on the planet—and now space debris is starting to pollute space. Th ese countervailing thoughts by the “no growth” camp of space ethicists say we have no right to colonize other planets or to mine the Moon and asteroids—or at least no right to do so until we can prove we can sustain life here on Earth for the longer term. However, for most who are planning for the new space economy the opinion of space philosophers doesn’t really fl oat their boat. Legislators, bankers, and aspiring space entrepreneurs are far more interested in the views of the super-rich capitalists called the space billionaires. A number of these billionaires and space executives have already put some very serious money into enterprises intent on creating a new pathway to the stars. No less than five billionaires with established space ventures—Elon Musk, Paul Allen, Jeff Bezos, Sir Richard Branson, and Robert Bigelow—have invested millions if not billions of dollars into commercializing space. They are developing new technologies and establishing space enterprises that can bring the wealth of outer space down to Earth. This is not a pipe dream, but will increasingly be the economic reality of the 2020s. These wealthy space entrepreneurs see major new economic opportunities. To them space represents the last great frontier for enterprising pioneers. Th us they see an ever-expanding space frontier that offers opportunities in low-cost space transportation, satellite solar power satellites to produce clean energy 24h a day, space mining, space manufacturing and production, and eventually space habitats and colonies as a trajectory to a better human future. Some even more visionary thinkers envision the possibility of terraforming Mars, or creating new structures in space to protect our planet from cosmic hazards and even raising Earth’s orbit to escape the rising heat levels of the Sun in millennia to come. Some, of course, will say this is sci-fi hogwash. It can’t be done. We say that this is what people would have said in 1900 about airplanes, rocket ships, cell phones and nuclear devices. The skeptics laughed at Columbus and his plan to sail across the oceans to discover new worlds. When Thomas Jefferson bought the Louisiana Purchase from France or Seward bought Alaska, there were plenty of naysayers that said such investment in the unknown was an extravagant waste of money. A healthy skepticism is useful and can play a role in economic and business success. Before one dismisses the idea of an impending major new space economy and a new gold rush, it might useful to see what has already transpired in space development in just the past five decades. The world’s first geosynchronous communications satellite had a throughput capability of about 500 kb / s. In contrast, today’s state of the art Viasat 2 —a half century later— has an impressive throughput of some 140 Gb/s. Th is means that the relative throughput is nearly 300,000 greater, while its lifetime is some ten times longer (Figs. 1.1 and 1.2 ). Each new generation of communications satellite has had more power, better antenna systems, improved pointing and stabilization, and an extended lifetime. And the capabilities represented by remote sensing satellites , meteorological satellites , and navigation and timing satellites have also expanded their capabilities and performance in an impressive manner. When satellite applications first started, the market was measured in millions of dollars. Today commercial satellite services exceed a quarter of a billion dollars. Vital services such as the Internet, aircraft traffi c control and management, international banking, search and rescue and much, much more depend on application satellites. Th ose that would doubt the importance of satellites to the global economy might wish to view on You Tube the video “If Th ere Were a Day Without Satellites?” [ 2 ]. Let’s check in on what some of those very rich and smart guys think about the new space economy and its potential. (We are sorry to say that so far there are no female space billionaires, but surely this, too, will come someday soon.) Of course this twenty-fi rst century breakthrough that we call the New Space economy will not come just from new space commerce. It will also come from the amazing new technologies here on Earth. Vital new terrestrial technologies will accompany this cosmic journey into tomorrow. Information technology, robotics, artificial intelligence and commercial space travel systems have now set us on a course to allow us humans to harvest the amazing riches in the skies—new natural resources, new energy, and even totally new ways of looking at the purpose of human existence. If we pursue this course steadfastly, it can be the beginning of a New Space renaissance. But if we don’t seek to realize our ultimate destiny in space, Homo sapiens can end up in the dustbin of history—just like literally millions of already failed species. In each and every one of the five mass extinction events that have occurred over the last 1.5 billion years on Earth, some 50–80 % of all species have gone the way of the T. Rex, the woolly mammoth, and the Dodo bird along with extinct ferns, grasses and cacti. On the other hand, the best days of the human race could be just beginning. If we are smart about how we go about discovering and using these riches in the skies and applying the best of our new technologies, it could be the start of a new beginning for humanity. Konstantin Tsiokovsky, the Russian astronautics pioneer, who fi rst conceived of practical designs for spaceships, famously said: “A planet is the cradle of mankind, but one cannot live in a cradle forever.” Well before Tsiokovsky another genius, Leonardo da Vinci, said, quite poetically: “Once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return.” The founder of the X-Prize and of Planetary Resources, Inc., Dr. Peter Diamandis, has much more brashly said much the same thing in quite diff erent words when he said: “The meek shall inherit the Earth. The rest of us will go to Mars.” The New Space Billionaires Peter Diamandis is not alone in his thinking. From the list of “visionaries” quoted earlier, Elon Musk, the founder of SpaceX; Sir Richard Branson, the founder of Virgin Galactic; and Paul Allen, the co-founder of Microsoft and the man who financed SpaceShipOne, the world’s first successful spaceplane have all said the future will include a vibrant new space economy. Th ey, and others, have said that we can, we should and we soon shall go into space and realize the bounty that it can offer to us. Th e New Space enterprise is today indeed being led by those so-called space billionaires , who have an exciting vision of the future. They and others in the commercial space economy believe that the exploitation of outer space may open up a new golden age of astral abundance. They see outer space as a new frontier that can be a great source of new materials, energy and various forms of new wealth that might even save us from excesses of the past. Th is gold rush in the skies represents a new beginning. We are not talking about expensive new space ventures funded by NASA or other space agencies in Europe, Japan, China or India. No, these eff orts which we and others call New Space are today being forged by imaginative and resourceful commercial entrepreneurs. Th ese twenty-fi rst century visionaries have the fortitude and zeal to look to the abundance above. New breakthroughs in technology and New Space enterprises may be able to create an “astral life raft” for humanity. Just as Columbus and the Vikings had the imaginative drive that led them to discover the riches of a new world, we now have a cadre of space billionaires that are now leading us into this New Space era of tomorrow. These bold leaders, such as Paul Allen and Sir Richard Branson, plus other space entrepreneurs including Jeff Bezos of Amazon and Blue Origin, and Robert Bigelow, Chairman of Budget Suites and Bigelow Aerospace, not only dream of their future in the space industry but also have billions of dollars in assets. These are the bright stars of an entirely new industry that are leading us into the age of New Space commerce. These space billionaires, each in their own way, are proponents of a new age of astral abundance. Each of them is launching new commercial space industries. They are literally transforming our vision of tomorrow. These new types of entrepreneurial aerospace companies—the New Space enterprises—give new hope and new promise of transforming our world as we know it today. The New Space Frontier What happens in space in the next few decades, plus corresponding new information technologies and advanced robotics, will change our world forever. These changes will redefi ne wealth, change our views of work and employment and upend almost everything we think we know about economics, wealth, jobs, and politics. Th ese changes are about truly disruptive technologies of the most fundamental kinds. If you thought the Internet, smart phones, and spandex were disruptive technologies, just hang on. You have not seen anything yet. In short, if you want to understand a transition more fundamental than the changes brought to the twentieth century world by computers, communications and the Internet, then read this book. There are truly riches in the skies. Near-Earth asteroids largely composed of platinum and rare earth metals have an incredible value. Helium-3 isotopes accessible in outer space could provide clean and abundant energy. There is far more water in outer space than is in our oceans. In the pages that follow we will explain the potential for a cosmic shift in our global economy, our ecology, and our commercial and legal systems. These can take place by the end of this century. And if these changes do not take place we will be in trouble. Our conventional petro-chemical energy systems will fail us economically and eventually blanket us with a hydrocarbon haze of smog that will threaten our health and our very survival. Our rare precious metals that we need for modern electronic appliances will skyrocket in price, and the struggle between “haves” and “have nots” will grow increasingly ugly. A lack of affordable and readily available water, natural resources, food, health care and medical supplies, plus systematic threats to urban security and systemic warfare are the alternatives to astral abundance. The choices between astral abundance and a downward spiral in global standards of living are stark. Within the next few decades these problems will be increasingly real. By then the world may almost be begging for new, out of- the-box thinking. International peace and security will be an indispensable prerequisite for exploitation of astral abundance, as will good government for all. No one nation can be rich and secure when everyone else is poor and insecure. In short, global space security and strategic space defense, mediated by global space agreements, are part of this new pathway to the future.

### Case

### 1NC – Kessler / Debris

#### Risk is low – sat designs and cleanup checks.

O’Gorman 18 (John, MA thesis submitted to Rochester Institute of Technology, “The Cost of Clean Space- A Study of the Additional Fuel Costs of Launching Above Low Earth Orbit,” 5-18, <https://pdfs.semanticscholar.org/d703/101d657334d2e1575d08005e290578770cd1.pdf?_ga=2.70400848.1753078645.1567896134-909185996.1567896134>)

To conclude, orbital debris is a current issue and has the potential to be a serious problem in the coming decades and centuries if business as usual is conducted. Fortunately, steps are being taken now which can mitigate this disastrous scenario. The space community is still relatively small and better rocket and satellite design is helping to avoid the accidental creation of debris. Studies over the feasibility of pulling large objects from orbit have already been done and they show a large amount of promise for managing the future creation of debris very effectively. Although current international policies managing debris do not yet exist, the discussion over how space will be managed is already well underway. If sound debris policies can come out of these discussions, the utility of LEO can be preserved for future generations.

**Probability – 0.1% chance of a collision.**

**Salter 16** [(Alexander William, Economics Professor at Texas Tech) “SPACE DEBRIS: A LAW AND ECONOMICS ANALYSIS OF THE ORBITAL COMMONS” 19 STAN. TECH. L. REV. 221 \*numbers replaced with English words] TDI

The probability of a collision is currently low. Bradley and Wein estimate that the **maximum probability** in LEO of a collision over the lifetime of a spacecraft remains **below one in one thousand**, conditional on continued compliance with NASA’s deorbiting guidelines.3 However, the possibility of a future “snowballing” effect, whereby debris collides with other objects, further congesting orbit space, remains a significant concern.4 Levin and Carroll estimate the average immediate destruction of wealth created by a collision to be approximately $30 million, with an additional $200 million in damages to all currently existing space assets from the debris created by the initial collision.5 The expected value of destroyed wealth because of collisions, currently small because of the low probability of a collision, can quickly become significant if future collisions result in runaway debris growth.

#### Kessler Syndrome false – less debris and existing guidelines solve

Lewis 15 (Hugh, Senior Lecturer in Aerospace Engineering at the University of Southampton, “Space debris, Kessler Syndrome, and the unreasonable expectation of certainty.” Room, <https://room.eu.com/article/Space_debris_Kessler_Syndrome_and_the_unreasonable_expectation_of_certainty>, Accessed 8/10/19, JMoore)

There is now widespread awareness of the space debris problem amongst policymakers, scientists, engineers and the public. Thanks to pivotal work by J.C. Liou and Nicholas Johnson in 2006 we now understand that the continued growth of the debris population is likely in the future even if all launch activity is halted. The reason for this sustained growth, and for the concern of many satellite operators who are forced to act to protect their assets, are collisions that are expected to occur between objects – satellites and rocket stages – already in orbit. In spite of several commentators warning that these collisions are just the start of a collision cascade that will render access to low Earth orbit all but impossible – a process commonly referred to as the ‘Kessler Syndrome’ after the debris scientist Donald Kessler – the reality is not likely to be on the scale of these predictions or the events depicted in the film Gravity. Indeed, results presented by the Inter-Agency Space Debris Coordination Committee (IADC) at the Sixth European Conference on Space Debris show an expected increase in the debris population of only 30% after 200 years with continued launch activity. Collisions are still predicted to occur, but this is far from the catastrophic scenario feared by some. Constraining the population increase to a modest level can be achieved, the IADC suggested, through widespread and good compliance with existing space debris mitigation guidelines, especially those relating to passivation (whereby all sources of stored energy on a satellite are depleted at the end of its mission) and post-mission disposal, such as de-orbiting the satellite or re-orbiting it to a graveyard orbit. Nevertheless, the anticipated growth of the debris population in spite of these robust efforts merits the investigation of additional measures to address the debris threat, according to the IADC.their capabilities for rendezvous and proximity operations improve.

**They say satelites are key for solving climate change but that argument flows negative – the affirmative BANS space appropriation, meaning they will ban satelites – voting negative judge will solve**