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

Definitions:

Appropriation: To take exclusive possession of (https://dictionary.cambridge.org/us/dictionary/english/appropriation).

Private Entities: Individuals or organizations other than federal, state, or local personnel or agencies (https://www.lawinsider.com/dictionary/private-entities).

A1) Innovation

Krishnan 2020("Space Mining: Just around the Corner?" *The Week*, https://www.theweek.in/news/sci-tech/2020/08/06/Space-mining-Just-around-the-corner.html.)

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

Houser 17(Houser, Kristin. "Private Companies, Not Governments, Are Shaping the Future of Space Exploration." *Futurism*, Futurism, 12 June 2017, https://futurism.com/private-companies-not-governments-are-shaping-the-future-of-space-exploration.)

SpaceX, Blue Origin, Bigelow Airspace, Virgin Galactic, Boeing, Lockheed Martin… Not only has the number of private companies engaged in space exploration grown remarkably in recent years, these companies are quickly besting their government-sponsored competitors.

Amazon CEO Jeff Bezos's Blue Origin and Tesla CEO Elon Musk's SpaceX are arguably the two companies that are setting the pace. In November 2015, the former completed the first successful vertical rocket landing after sending their New Shepard 100 kilometers (62 miles) into the air. SpaceX landed its own rocket a month later, only they did so with a craft twice as heavy as Blue Origin's and traveled all the way into space first.

A month after that, in January 2016, Bezos's company became the first entity to re-launch and re-land a previously used rocket. SpaceX followed suit in 2017. "The government was never able to [build reusable rockets], but now, two private companies within the space of the same year have done that," points out Lewicki.

Without Private Property rights, there is no incentive to develop space

Cheng 2020 (Cheng, Dean. "Outer Space and Private Property." *The Heritage Foundation*, https://www.heritage.org/space-policy/commentary/outer-space-and-private-property.**)**

The **innovation** exhibited in the various Falcon launches, including the ability to reuse the booster rockets, has seen **a significant drop** in the cost of placing payloads into orbit. As a result, a real opportunity exists for companies to begin thinking about how to use space not simply to improve terrestrial operations, but to make money from space and its physical resources.

The uncertainty associated with private property rights, however, has had a **constrain[ed]ing effect on the ability to exploit space more extensively. Companies are unlikely to be willing to risk capital and assets if they are not sure that they will be able to profit from their investments.**

For this reason, NASA Director James Bridenstine's Sept. 10 announcement of a formal solicitation for lunar soil and ore (known as regolith) is enormously important.

In one stroke, the U.S. government has made it clear that corporations will be able to develop lunar and other celestial resources within a legal framework. As important, NASA's solicitation is open to international companies; this means that the United States recognizes a global right for companies to extract and exploit space resources.

This welcome development will provide significant support for efforts to develop a sustainable space industrial capacity that moves from providing information support services to producing material goods.

A2) Space Mining

Gilbert 21(Gilbert, Alex. "Mining in Space Is Coming." *Milken Institute Review*, https://www.milkenreview.org/articles/mining-in-space-is-coming.)

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.

Mining on Earth Devastates the Environment, and earth resources are running out

MacWhorter, 16 [Kevin MacWhorter, J.D. Candidate at William & Mary Law School, Sustainable Mining: Incentivizing Asteroid Mining in the Name of Environmentalism, February 2016, William & Mary Environmental Law and Policy Review https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1653&context=wmelpr]

Rare Element Mining on Earth 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. Many of these have no synthetic alternative, unlike chemical elements such as oil or diamonds.

Liquid-crystal display (LCD) televisions, cellphones, and laptops are among the various consumer technologies that use precious metals. Further, green technologies including wind turbines, solar panels, and catalytic converters require these rare elements. As demand rises for both types of technologies, and as reserves of rare metals fall, prices skyrocket. Demand for nonrenewables resources create conflict, and consumerism in rich countries results in harsh labor treatment for poorer countries. In general, the mining industry is extremely destructive to Earth's environment. In fact, depending on the method employed, mining can destroy entire ecosystems by polluting water sources and contributing to deforestation. It is by its nature an unsustainable practice, because it involves the extraction of a finite and non-renewable resource. 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. 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.

Scarcity causes conflict

Daniel **Darling 19**, senior international military markets analyst at Forecast International Incorporated, an aerospace and defense consulting firm located in Newtown, Connecticut, where he covers the Europe and Asia-Pacific markets, "The Coming Wars over Water," The National Interest, 4/14/19, https://nationalinterest.org/blog/buzz/coming-wars-over-water-52147

But another looming issue confronting global leaders involves the earth's most precious resource: **water**.

In many regions of the globe—from **Northern Africa** to the **Middle East** to **Central and South Asia**—efforts to manage internal freshwater supplies or conserve transboundary water agreements are **under strain** as **scarcity rises** in parallel with **population growth**, **consumption** and **warming temperatures**.

A World Bank study on the global water picture in 2016 noted that entire regions may see their **g**ross **d**omestic **p**roduct decline by up to 6 percent by 2050 due to water-related losses in agriculture, health, income and property. The areas highlighted consist of many of the world's largest population concentrations, regions with developing economies, intensive and unsustainable agricultural practices and high occurrences of drought.

Dam-building and its **downstream effects** across **national borders**—as in the case of Ethiopia's Grand Ethiopian Renaissance Dam and China's water diversion project from the Yarlung Tsangpo River in southern Tibet—threaten to **escalate tensions** or **redefine national claims** over **disputed regions.**

Such disputes could **mushroom across the globe** in the face of broader demographic and resource shifts.

According to the Pacific Institute's water conflict chronology database, eighteen water-related incidents occurred in 2018 alone, ranging from violence erupting at protests over water management to outright fighting between competing communities over access to water and herding rights.

These incidents appear destined to become more a **norm** than an outlier as water resources are consumed faster than rainfall replenishment in some areas and limitations **exacerbate longstanding tensions,** be they **ethnic**, **tribal** or **national-based**. Delicate tradeoff systems between nations located upstream and downstream of major rivers threaten to be **undone by disruptions**, as in the case of Central Asian countries sharing parts of the Fergana Valley.

In addition, scarcity issues may create **internal security pressures** by leading to **radicalization** amongst vulnerable population sectors.

With water a vital and finite resource, the world's industrialized nations are naturally protective of local supply and place a premium on water security in instances where water flows across shared borders. When mixed with **political disputes** or **rivalries**, resource pressures may act as a **catalyst for armed conflict**.

Wars over water resources **are not without precedent**. The Six-Day War of 1967, for instance, was in part an Israeli military response to a Syrian attempt to dam the Yarmuk River, a tributary of the Jordan River, a crucial water source for Israel.

Another potential flashpoint exists in one of the world's most tense arenas: **the border between India and Pakistan**. There the potential repudiation of a water-sharing agreement brokered by the World Bank in 1960, the Indus Waters Treaty, would serve to **further damage relations** between Pakistan and India, potentially sending the two rivals **spiraling into a conflict** that might **draw in other nations.**

Technology Review 2018(arXiv, Emerging Technology from the. "Asteroid Mining Might Actually Be Better for the Environment." *MIT Technology Review*, MIT Technology Review, 2 Apr. 2020, https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/.)

But profit margins are only part of the picture. A potentially more significant aspect of these missions is the impact they will have on Earth's environment. But nobody has assessed this environmental impact in detail.

Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO_2 into Earth's atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO_2 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.

Asteroid mining solves climate change

Asteroid mining offsets earth mining and traditional economic means that ruin the environment and enables solar power satellites – both solve climate change

Taylor 19 (Beckman, Brittany Levine. "How Asteroid Mining Will Save the Earth - and Mint Trillionaires." *Mashable*, Mashable, 23 June 2020, https://mashable.com/feature/asteroid-mining-space-economy.)

Secondly, there's the climate change fix. Suarez sees asteroid mining as the only way we're going to build solar power satellites. Which, as you probably know, is a form of uninterrupted solar power collection that is theoretically more effective, inch for inch, than any solar panels on Earth at high noon, but operating 24/7. (In space, basically, it's always double high noon).

The power collected is beamed back to large receptors on Earth with large, low-power microwaves, which researchers think will be harmless enough to let humans and animals pass through the beam. A space solar power array like the one China is said to be working on could reliably supply 2,000 gigawatts — or over 1,000 times more power than the largest solar farm currently in existence.

"We're looking at a 20-year window to completely replace human civilization's power infrastructure," Suarez told me, citing the report of the Intergovernmental Panel on Climate Change on the coming catastrophe. Solar satellite technology "has existed since the 1970s. What we were missing is millions of tons of construction materials in orbit. Asteroid mining can place it there."

Without asteroid mining, Climate Change will continue to accelerate causing extinction.

Warming causes extinction

Peter **Kareiva 18**, Ph.D. in ecology and applied mathematics from Cornell University, director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA, et al., September 2018, "Existential risk due to ecosystem collapse: Nature strikes back," Futures, Vol. 102, p. 39-50

In summary, six of the nine proposed planetary boundaries (phosphorous, nitrogen, biodiversity, land use, atmospheric aerosol loading, and chemical pollution) are unlikely to be associated with existential risks. They all correspond to a degraded environment, but in our assessment do not represent existential risks. However, the three remaining boundaries (climate change, global freshwater cycle, and ocean acidification) do pose **existential risks**. This is because of intrinsic **positive feedback loops**, substantial **lag times** between system change and experiencing the consequences of that change, and the fact these different boundaries interact with one another in ways that yield **surprises**. In addition, climate, freshwater, and ocean acidification are all directly connected to the provision of **food** and **water**, and shortages of food and water can create **conflict** and social unrest.

1AR

A1) Debris

The probability for actual collision in space is extremely low – below 0.1% chance. It'll stay this way as long as NASA's actions in the squo are the same.

Salter 16 (Salter, Alexander William. SPACE DEBRIS: A LAW AND ECONOMICS ANALYSIS OF THE ORBITAL COMMONS. Stanford Law School, 2016, www-cdn.law.stanford.edu/wp-content/uploads/2017/11/19-2-2-salter-final_0.pdf)//DebateDrills AY

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. Given the possibility of high future costs, *private and public actors should, for their own benefit, direct attention to the space debris problem now.* Global satellite revenue in 2014 totaled $195.2 billion.6 That stream of economic activity is most threatened by significantly increased concentrations of space debris in orbit. Other activities within the "space economy" ($320 billion in revenue in 2013) that are potentially threatened include human spaceflight and nonorbital spacecraft.7 *Private-sector space activities planned for the more distant future, including space tourism and asteroid mining, will also be affected* if access to orbit is complicated *by space debris*.

Long time frame for the debris impact

Burns Interviewing Kessler '13 Corrinne Burns, interviewing Donald Kessler, who made up the concept. [Space junk apocalypse: just like Gravity? 11-15-2013, https://www.theguardian.com/science/blog/2013/nov/15/space-junk-apocalypse-gravity]//BPS

Now? Are we in trouble? Not yet. Kessler syndrome isn't **an acute phenomenon**, as depicted in the movie – it's **a slow, decades-long process.** "It'll happen throughout **the next 100 years** – we have time to deal with it," Kessler says. "The time between collisions will become shorter – it's around 10 years at the moment. In 20 years' time, the time between collisions could be reduced to five years." Fortunately, communications satellites are, in the main, situated high up in geosynchronous orbit (GEO), whereas the risk of collisions lies mainly in the much lower, and more crowded, low Earth orbit (LEO). But that doesn't mean we can relax. "We've got to get a handle on it – we need to prevent the cascade process from speeding up." And the only way to do that is, he says, to begin

actively removing junk from space. Charlotte Bewick agrees. She's a mission concepts engineer with the German space technology company OHB System, with special expertise in space junk – specifically, how we can capture it and bring it back to Earth. While agreeing with Kessler that the movie scenario is exaggerated, she remains concerned. "Fragments of junk can naturally re-enter the atmosphere [and so be removed from orbit]. But we're at the stage where the rate of creation of new debris fragments is higher than the rate of natural removal. The orbits most at risk harbour important space assets – satellites for weather forecasting, oil spill and bush fire detection, and polar ice monitoring." Bewick highlights the case of Envisat, a defunct 8,000kg spacecraft circling Earth in an orbit that is very popular with space agencies and, hence, pretty crowded. "If Envisat collides with a piece of debris or a micrometeorite, the fragments could render the whole orbital region unusable." So can we get the junk down, I asked Massimiliano Vasile, part of the Mechanical & Aerospace Department at the University of Strathclyde and co-ordinator of the Stardust network. He told me defunct satellites in the high GEO region have, for some time, been shifted to higher "graveyard orbits" to keep them out of the way. But that's not an option for items in low Earth orbit. For this, he tells me, researchers are looking seriously into active debris removal – in-orbit capture techniques like harpooning, netting and tethering, the use of contactless systems like ion-beams or lasers, and even onboard robotics to position the junk away from high-risk orbital regions. As for middle Earth orbit – well, ideas are welcome, he says. We're in no **immediate danger** from Kessler syndrome – but it's not a problem that's going away. Despite Gravity's artistic license, Donald Kessler is pleased to see the phenomenon represented on the big screen. "It is **very improbable** that events would play out as they did in the film," he says. "But if it raises awareness, then that's great."

No collisions.

Mosher ’19 [Dave; September 3rd; Journalist with more than a decade of experience reporting and writing stories about space, science, and technology; Business Insider, “Satellite collisions may trigger a space-junk disaster that could end human access to orbit. Here’s How,” https://www.usafa.edu/app/uploads/Space_and_Defense_2_3.pdf; GR]

The **Kessler syndrome** plays center-stage in the movie "Gravity," in which an accidental **space collision** endangers a crew aboard a large space station. But Gossner said that type of a runaway **space-junk catastrophe** is **unlikely**. "Right now I don't think we're **close to that**," he said. "I'm not saying we couldn't get there, and I'm not saying we don't need to be smart and manage the problem. But I don't see it **ever** becoming, anytime soon, an unmanageable problem." There is no current system to remove old satellites or sweep up bits of debris in order to prevent a Kessler event. Instead, space debris is monitored from Earth, and new rules require satellites in low-Earth orbit be deorbited after 25 years so they don't wind up adding more space junk. "Our current plan is to manage the problem and not let it get that far," Gossner said. "I don't think that we're even close to needing to **actively remove** stuff. There's lots of research being done on that, and maybe some day that will happen, but I think that — at this point, and in my humble opinion — an unnecessary expense." A major part of the effort to prevent a Kessler event is the **S**pace **S**urveillance **N**etwork (SSN). The project, led by the **US military**, uses **30** different systems around the **world** to **identify**, **track**, and share **info**rmation about **objects** in space. Many objects are tracked **day and night** via a network of radar observatories around the globe. **Optical telescopes** on the ground also keep an eye out, but they aren't always run by the government. "The commercial sector is actually putting up lots and lots of telescopes," Gossner said. The government pays for their debris-tracking services. Gossner said one major debris-tracking company is called **Exoanalytic**. It uses about 150 small telescopes set up around the globe to **detect**, **track**, and **report** space debris to the SSN. Telescopes in space track debris, too. Far less is known about them because they're likely top-secret military satellites. Objects detected by the government and companies get added to a **catalog** of space debris and **checked** against the orbits of other known bits of **space junk**. New orbits are calculated with **supercomputers** to see if there's a **chance** of **any collisions**. Diana McKissock, a flight lead with the US Air Force's 18th Space Control Squadron, helps track space debris for the SSN. She said the surveillance network issues warnings to NASA, satellite companies, and other groups with spacecraft, based on two levels of emergency: basic and

advanced. The SSN issues a basic emergency report to the **public three days ahead** of a 1-in-10,000 chance of a **collision**. It then provides **multiple updates** per day until the risk of a collision **passes**. To qualify for such reporting, a rogue object must come within a certain distance of another object. In low-Earth orbit, that distance must be less than 1 kilometer (0.62 mile); farther out in deep space, where the precision of orbits is less reliable, the distance is less than 5 kilometers (3.1 miles). Advanced emergency reports help satellite providers see possible collisions much more than **three days ahead**. "In **2017**, we provided **data** for **308,984 events**, of which only **655** were **emergency**-reportable," McKissock told Business Insider in an email. Of those, 579 events were in low-Earth orbit (where it's relatively crowded with satellites).

Private Appropriation solves

Private companies are better than government and public entities at monitoring space debris—for multiple reasons.

According to Adrian Moore and Rebecca Van Burken, "It's time for the US to get serious about cleaning up space junk." 27 July 2021, *TheHill*, https://thehill.com/opinion/technology/564945-its-time-for-us-to-get-serious-about-cleaning-up-space-junk. //Advay

"Orbital debris management is not well organized within the government. Right now, the Department of Defense (DOD) does most tracking of space debris for the U.S. out of the need to protect military satellites and national security interests. NASA has its own less advanced systems for tracking debris. However, orbital debris management is not just about tracking debris anymore. It is also about forming collision warning systems and safely managing traffic in space. To do this efficiently, we need a civil repository for all orbital debris components, something that many commercial space companies have already created on their own to stay aware of orbital debris and help protect their satellites in space. Tracking debris may be a national security priority, but providing space traffic control is not really in the Defense Department's mission. We should be utilizing the private sector's expertise and advancements in this area. For example, Astroscale has contracts with both the Japanese and European space agencies to develop orbital debris removal capability. And responsibility for developing collision warnings and space traffic management would be best suited for the Office of Space Commerce, an office with existing connections to the commercial space industry, NASA and DOD."=

Private property rights prevent the over use of resources. Shruti Rajagopalan, an economics professor, explains in 2017

Shruti Rajagopalan, Assistant Professor in Economics at Purchase College, State University of New York, and Fellow at the Classical Liberal Institute, New York University Law School, 10-6-17, "Why We Need The Right To Private Property – Pragati," Pragati: The Indian National Interest Review, https://www.thinkpragati.com/opinion/1752/need-right-private-property/ //AAli

Shruti Rajagopalan, Assistant Professor in Economics at Purchase College, State University of New York, and Fellow at the Classical Liberal Institute, New York University Law School,

A system of property rights – at its core – forces the individual to bear the cost of [one's] her actions. This is the most important economic function of a system of private property. Given that we live in a world of scarcity, and each resource has many alternative uses, the main economic question in society is regarding the decision-making authority regarding scarce resources.

Where a resource is **privately owned**, the owner may use the property for [one's] ~~her~~ own benefit, **but** [the owner] ~~she~~ also **directly incurs the cost of using it**. Common property, or poorly enforced state/public property leads to **over use, and depletion of resources**, since there is **no incentive** for any single individual user to preserve the property and enjoy the benefits from preservation. For example, in India, one often sees "cleanliness is godliness" in action in individual homes, yards, temples, etc. – which are kept perfectly clean. But the moment one steps on public land, the same individuals treat it as common property, creating enormous waste management and disposal problems. Without private ownership, individuals using the common resource impose a cost on everyone else in society. Private property provides an incentive to conserve resources and maintain capital for future gains.

Thus, property rights create[s] the appropriate incentive structure to economize resources. However, to truly realize the economic benefits of this incentive structure, a system of private property rights must be accompanied by a system of voluntary exchange. Where two individuals voluntarily consent to a particular trade, this implies that the trade makes both individuals better off (based on the assumption that one will not consent to an exchange to her detriment). A voluntary exchange increases the well being of individuals involved in the trade, and the entire system of voluntary exchange therefore increases the well being of society. This was the basis for Adam Smith's foundational argument that a society based on exchange creates the incentives for specialization, thereby increasing the wealth of nations.